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The Journal of the Missouri State Medical Association www.msma.org/missouri-medicine January/February 2019

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The Journal of the Missouri State Medical Association - Since 1904

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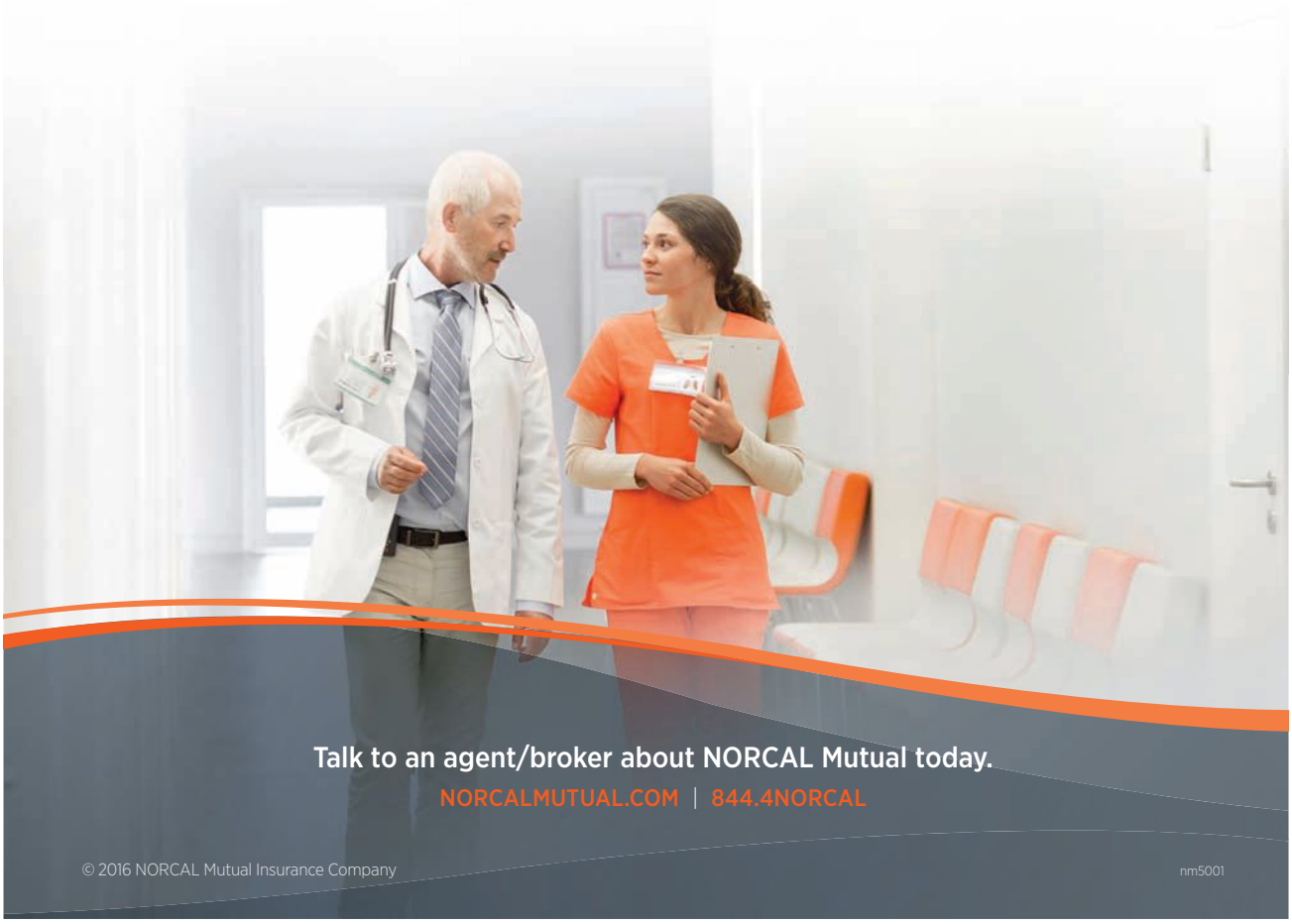
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Missouri Medicine Commences 116 Years of Distinguished Publication: PubMed Central Archiving Complete

by John C. Hagan, III, MD

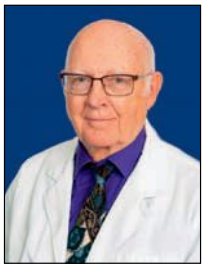
Missouri Medicine: The Journal of the Missouri State Medical Association will celebrate 116 proud years of publication in 2019. The first cover from July 1904, is reproduced in Figure 1. Our May/June 2004 centennial issue recounted the origins and rich history of *Missouri Medicine*. It is available on the MSMA website at www.msma.org-missouri-medicine-library.[1] Please review the contributions of our prescient forebearers who perceived correctly MSMA would be enriched by publishing its own Journal.

We begin this anniversary year with a new masthead calling out our position as one of the nation's foremost state medical journals. Our masthead now denotes indexing since 1966 by PubMed, the indexing service of the U.S. National Library of Medicine, by prestigious EBSCO Host Research databases and, retroactive to 2010, PubMed Central, a free full-text archive of the world's most important biomedical and life sciences journal literature.

This is an updated modification of comments in my Editorial of the November/December 2017 *Missouri Medicine*. One of the most important reasons for *Missouri Medicine's* national reputation, ability to attract quality manuscripts, and have academic departments eagerly commit to producing our signature theme issues is our content goes to world data banks and internet-search availability via our comprehensive indexing.

Approved and encouraged by the Publication Committee and Contributing Editors, about 2014 we began a long, rigorous process to have all our content archived at PubMed Central. *Missouri Medicine* was approved and set to go live on PMC in early Fall 2017. James DiNicolantonio, PharmD, a frequent contributor to our Journal, then informed us PubMed had stopped indexing the Journal in late 2016. We belatedly learned that PubMed had abruptly transitioned to a new mandatory publication platform uploading in Extensible Markup Language (XML), which is both human- and machine-readable, instead of straightforward PDF files. XML's advantage is that it supports multiple languages and is necessary for archival purposes across platforms.

PubMed was also requiring re-certification of all publications approved prior to 1988. This meant an extensive second review and recertification. PubMed Central requires journals to be included in PubMed as a condition for archiving. So, we had to stand down with PubMed Central while we reapplied to PubMed. This all boils down



John C. Hagan, III, MD, FACS, FAAO, MSMA member since 1975, is a Kansas City, Missouri, ophthalmologist and *Missouri Medicine* Editor since 2000. He is a multi-year Diamond Contributor to MMPAC.
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to hundreds of hours of work by *Missouri Medicine* most notably for Liz Fleenor, our consummate Managing Editor, myself, the Publication Committee, and MSMA staff.

The Journal was subsequently re-approved by PubMed in Fall 2018. MSMA retained Data Conversion Laboratories to upload our bimonthly content in XML and all *Missouri Medicine* issues from 1966 (PubMed/MEDLINE) and 2010 (PubMed Central). Back issues are now posted, and PubMed ID numbers available to authors. Going forward, current issues are uploaded when we post the open access electronic version on the MSMA website, and send our Journal copy to the Ovid Bell Press, which has been printing *Missouri Medicine* since 1924.

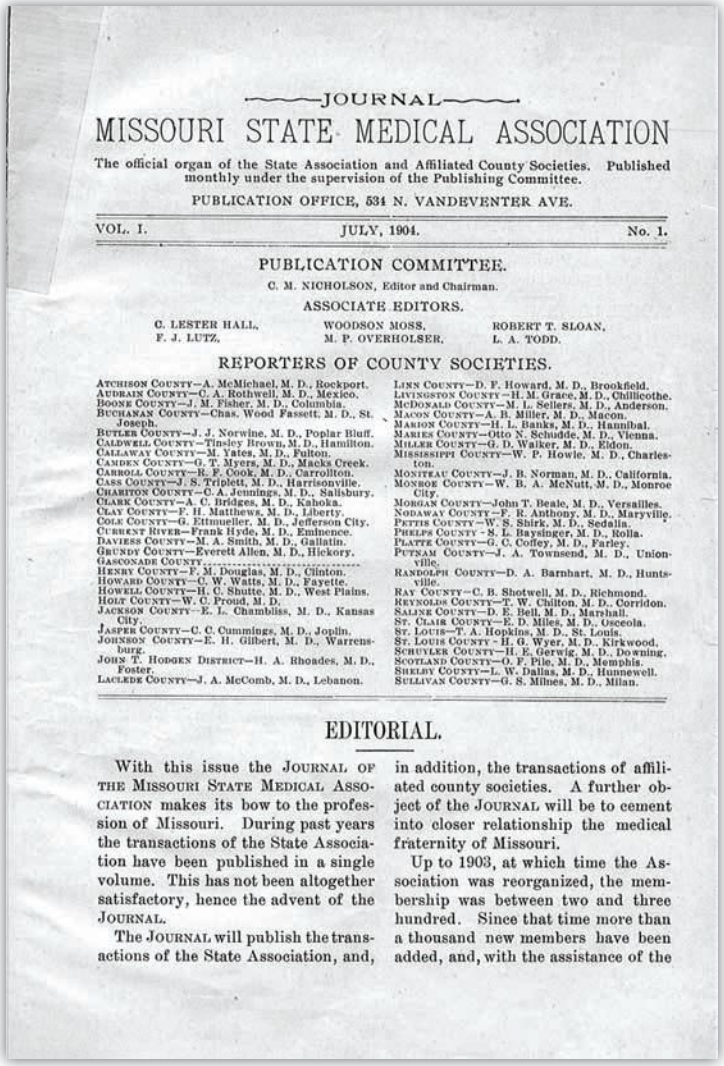
Missouri Medicine is assisting two other state medical journals also dropped from PubMed by the mandatory change to XML. This critical requirement was only noted in an obscure NIH technical publication.

Missouri Medicine wishes to especially thank Liz Fleenor, Tom Holloway, Pat Mills, Warren C. Lovinger, MD, Joe Corrado, MD, James DiNicolantonio, PharmD, the Publication Committee, and Contributing Editors, especially David Fleming, MD, and Betty Drees, MD. Joyce Backus of The National Library of Medicine greatly assisted in recertification.

We are sanguine about the future. In 2018, *Missouri Medicine* received our highest number of unsolicited scientific papers including several from overseas. Our highly acclaimed theme issues are subscribed by state medical schools through May/June 2021. Our papers are regularly cited or reprinted in the nation's media. We have moved decisively to make our Journal relevant to younger physicians by adding to our Editorial Board representatives from MSMA Medical Student Section (Calli Morris, BS), Resident & Fellow Section (Joanne Loethen, MD), Young Physician Section (Albert Hsu, MD), Young Physician Contributing Editor (Jennifer D. Bauerle, MD) and a Retired Physicians representative (Juan C. Corvalan, MD). Our physician experts include the highest qualified Doctors of Medicine and Osteopathy. Our Show-Me state medical school Deans are MSMA members and regular contributors to *Missouri Medicine*.

Two medical text books have been published based on scientific papers published in *Missouri Medicine*: "Care of the Dying Patient" edited by David Fleming, MD, co-edited by John C. Hagan III, MD, (University of Missouri Press, 2010) and "The Science of Near-Death Experiences" edited by John C. Hagan III, MD, (University of Missouri Press, 2017). I have given eight Grand Rounds in four states based on the latter book. The superb 2018 series on sleep medicine, put together by the University of Missouri School of Medicine, Department of Neurology, is also being considered for publication as a text.

Missouri Medicine enters 2019 proud and confident of our ability to remain a foremost state medical journal and one of the most important assets and functions of the Missouri State Medical Association.



JOURNAL

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EDITORIAL.

With this issue the JOURNAL OF THE MISSOURI STATE MEDICAL ASSOCIATION makes its bow to the profession of Missouri. During past years the transactions of the State Association have been published in a single volume. This has not been altogether satisfactory, hence the advent of the JOURNAL.

The JOURNAL will publish the transactions of the State Association, and, in addition, the transactions of affiliated county societies. A further object of the JOURNAL will be to cement into closer relationship the medical fraternity of Missouri.

Up to 1903, at which time the Association was reorganized, the membership was between two and three hundred. Since that time more than a thousand new members have been added, and, with the assistance of the

Figure 1. First cover of *Missouri Medicine*, July 1904. First Editor was C. M. Nicholson, MD. The Journal's historical highlights can be found at www.msma.org/missouri-medicine-library.

References

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"It's the Prices, Stupid: Why the United States is So Different from Other Countries"

by Arthur Gale, MD

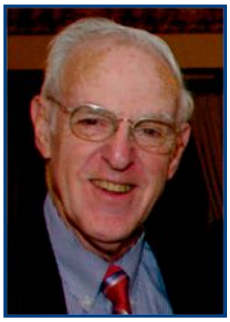
"It's The Prices, Stupid: Why the United States is So Different From Other Countries" is the title of an article that was published in the journal Health Affairs in 2003 by Princeton health care economist Uve Reinhardt.

Reinhart concluded that the main reason that medical costs were so much higher in the U.S. than other industrialized countries was higher prices. Reinhardt was on the editorial board of the *Journal of the American Association* (*JAMA*) for many years where he wrote a number of articles on medical economics. He died in 2017. Up until now his conclusions have largely been ignored by the policy makers in government, academe and business who are trying to control healthcare costs.[1]

A new study from the Harvard T. H. Chan School of Public Health and the London School of Economics published in the March 18, 2018, issue of *JAMA* confirms Reinhardt's conclusion that price is the most important factor in explaining high medical costs in the U.S.[2] I believe that the authors use the term price to mean unjustified markups on goods and services by drug and device companies, insurance companies and hospitals.

This landmark study is much more comprehensive than Reinhardt's research. Its central conclusion is that control of pricing is far more important than all of the other measures that have been tried in the past to lower health care costs. In fact it is the only effective strategy that will ever lower costs.

The study compares healthcare costs in the U.S. with the countries that comprise the OECD–Organization of Economic Cooperation and Development. These countries consist of seven European industrialized democracies as well as Canada, Australia, and Japan.



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There are many proponents of managed care who do not want to hear this message. Managed care which got its start in the 1970s was introduced to the American public as the solution to high health care costs. The U.S. did not actually have high health care costs in the 1970s when compared to other OECD countries. Ironically costs rose only after the introduction of managed care.[3] Business consultants, MBAs, and government agencies such as the Federal Trade Commission heralded managed care as a great cost saving strategy to replace the antiquated so called "cottage industry" health care delivery system which existed at that time. It turns out that the health care experts were wrong.

Ashish Jha, MD, Professor of Global Health at Harvard and senior author of the *JAMA* study notes that P4P (Pay for Performance) and VPB (Hospital Value–Based Purchasing) which were introduced in the U.S. with much fanfare as primary strategies to both lower costs and improve quality have not been shown to be effective in achieving either goal.[4] Until the *JAMA* study Jha, a leading authority and policy maker on health care issues, was a strong proponent of both P4P and VBP. The study also suggests that evidence-based medicine and meaningful use which were introduced to improve quality and lower costs have also failed to lower costs.

Most efforts to lower costs in the U.S. have focused on utilization. The *JAMA* study surprisingly shows that in most regards the U.S. is essentially not very different from the OECD countries in most measures of utilization. It does not differ significantly with regard to hospital discharges, hospital bed days, consultations, and length of stay. For MRIs, CT scans, total knee replacements, hysterectomy, Caesarian deliveries, and cataract surgery the U.S. is slightly above average. For hip replacement the U.S. is average. Jha concludes that overall that "we (the U.S.) look pretty average."[5]

The implications from these findings are enormous. Decreasing length of stay for hospitalized patients and penalizing hospitals for readmissions within 30 days will have no significant effect in lowering U.S. healthcare costs. The same can be said for prior authorization for tests and x rays, hospitalists, nurse practitioners, and mid-level care givers all of whom were introduced with the assurance that they would cut costs.

Nor will hospital and office-based doctors seeing patients faster and for shorter periods of time have a significant effect on lowering overall healthcare costs. Such assembly line medicine is a major cause of physician burnout which is endemic to the profession today. It is also frustrating to patients.

Another surprising finding of the new study shows that fee-for-service is practiced in many OECD countries and has had no significant effect in raising health care costs![6] This finding contradicts the accepted wisdom of leading U.S. policy experts. It means that capitation payments which eliminate fee-for-service do not lower health care costs. Examples are Accountable Care Organizations (ACOs), bundled payments, HMOs including staff model HMOs like Kaiser Permanente, hospital integrated systems that employ physicians, and hospital and physician risk contracts.

Some of the main architects of Obama Care stated categorically that getting rid of fee-for-service would cut costs and make Obama Care affordable to consumers.[7] That has not happened, and high premiums and deductibles make Obama Care unaffordable for many American families.

All of these managed care schemes to lower health care costs basically serve as a smoke screen to divert attention away from the true cause of high medical costs-overpricing and profiteering. An egregious example of hospital overpricing was highlighted in Elisabeth Rosenthal's book "An American Sickness." The author describes how the consulting firm Deloitte and Touche told hospitals throughout the U.S. "you can increase the amount you bring in just by manipulating how you bill."[8] Hospitals throughout the U.S. have scrupulously followed this advice.

Some other commonly held beliefs about the differences between the U.S. and the OECD countries are at odds with the evidence:

Belief: The U.S. uses more healthcare services than peer countries, thus leading to higher costs.

Evidence: The U.S. has lower rates of physician visits and days spent in the hospital than other nations.

Belief: The U.S. has too many specialists and not enough primary care physicians.

Evidence: The primary care versus specialist mix in the U.S. is roughly the same as that of the average of other countries.

Belief: The U.S. provides too much inpatient hospital care.

Evidence: Only 19% of total healthcare spending in the U.S. is spent on inpatient services-among the lowest proportion of similar countries.

Belief: The U.S. spends too little on social services and this may contribute to higher health care costs among certain populations.

Evidence: The U.S. does spend a bit less on social services than other countries but is not an outlier.

Belief: The quality of healthcare is much lower in the U.S. than in other countries.

Evidence: Overall, quality of care in the U.S. isn't markedly different from that of other countries, and in fact excels in many areas.[9]

The study by Jha clearly demonstrates that it is *prices* charged by hospitals, insurance companies, drug and device companies that explain why health care costs in the U.S. are so much higher than in OECD countries.

Managed care has been around since the Federal HMO Act was enacted under the Nixon administration in 1973.[10] It has had over 40 years to prove that it will cut costs. As I have described in numerous articles written over the past 25 years it has increased not decreased costs.

Medicare and other government programs pay for over half of the health care in the U.S. Medicare is expected to go bankrupt in 2026.[11] Businesses also are also complaining about the high cost of health care for their employees. Legendary investor Warren Buffet has called our health care system a tapeworm.[12]

What happens next is unpredictable. But in light of the *JAMA* study we at least now know what the cause of our unaffordable health care system is. It is unlikely that the leaders of managed care will voluntarily change the present system. By maintaining the status quo they can continue to reap huge profits. Perhaps as a free and democratic nation we the people might begin to address and correct the problem.

References

1. Anderson Gerard, Reinhardt Uve, Hussey Peter, Petrosyan, Varduhi, It's the Prices, Stupid: Why the United States is so Different From Other Countries. Health Affairs May June 2003, volume 22 (3).
2. Papanicolas Irene, Phd, Woskie, Llana R., MSc, Jha, Ashish, MD MPH, Health Care Spending in the United States and Other High Income Countries, JAMA, March 13, 2018.
3. Organization of Economic Cooperation and Development (OECD) Health Data 2015.
4. Jha, Ashish, MD, MPH, JAMA Forum: Value-Based Purchasing: Time for Reboot or Time to Move on? News @JAMA, February 1, 2017.
5. Kliff, Sarah, This study changed how a Harvard professor thinks about health care; https://www.vox.com/policy-and-politics, March 23, 2018.
6. Jha, Ashish, JAMA Forum; Why Does US Health Care Spending Far Outstrip That of Other Countries? March 21, 2018.
7. Brill, Steven, America's Bitter Pill, 2017.
8. Rosenthal, Elisabeth, An American Sickness, How Healthcare Became Big Business and How You Can Take it Back, 2017.
9. Harvard T.H. Chan School of Public Health News Release, March 13, 2018.
10. Nixon, Richard, Transcript of taped conversation between President Richard Nixon and John D. Ehrlichman (1971) that led to the HMO act of 1973. wikisource.org.
11. Pear, Robert, Medicare's Trust Fund is set to Run Out in 8 Years, Social Security, 16. New York Times June 5, 2018.
12. Buffet, Warren, Health care is a tapeworm on the economic system, CNBC, February 26, 2018.

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Buying 'Organic' to Get 'Authenticity'? Or Safer and More Nutritious Food? Think Again. And Again.

by Henry I. Miller, MD

Consumers have spent hundreds of billion dollars purchasing premium-priced organic food products based on false or misleading perceptions about comparative product food safety, nutrition and health attributes.

Many Americans have begun to seek "authenticity" - the quality of being trustworthy, believable, and genuine - in their lives. There's nothing wrong with that unless, in the process, they are misled by false advertising that causes them to pay inflated prices for products that are "free from" various things that are actually beneficial. Currently these include the chemical bisphenol-A (BPA), which is used to make certain plastics and as an antibacterial agent on metal coatings; and "genetically modified organisms," or "GMOs."



BPA used as a coating in canned food prevents botulism and other bacteria-caused illnesses, and its protection of canned goods allows consumers access to more fruits and vegetables, by safely preserving them in cans all year round, and at low cost. Genetic engineering using molecular techniques increases yields, boosts farmers' income, and reduces the need for the spraying of chemical pesticides.



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Because the term "authenticity" connotes different things to different individuals and depends on subjective factors like craftsmanship, worldview, and political and religious beliefs, it is hard to define exactly what people want; what they're willing to pay for; and in the end, how they make their choices.

Stanford University Business School Professor Glenn R. Carroll, PhD, has studied the phenomenon extensively and has some revealing observations about it, including that authenticity is intrinsically "self-contradictory and ironic,"[1] because being genuinely authentic means not drawing attention to it. According to Prof. Carroll, the whole point of being authentic is not appearing to be calculating or grasping, but rather behaving in a way that seems consistent with values that are pure and ingenuous. For example, his research has found that restaurants that want to be perceived as authentic should find ways to get others to comment on their authenticity, but should not explicitly claim it themselves.

Carroll and his colleagues also found that "[a]authenticity seems to buffer businesses against negatives"; thus, as research subjects evaluated restaurants, authenticity tended to trump even negatives like lack of cleanliness. He cites microbreweries as another example of an important negative trumped by authenticity: especially when they first became popular, small, boutique breweries often made products that were objectively inferior (in blind taste tests) to those of the behemoths in the industry, who had both

deep expertise and sophisticated technology. But, Carroll says, they "were just trading on the fact that they were small-scale craft producers doing something different. And they didn't really know how to brew beer. . . But people associated the craft operation with higher quality and certainly with higher value and were willing to suspend a lot of judgment."

Arguably, the demand for raw (unpasteurized) milk, which regularly causes serious illnesses in numbers far out of proportion to its consumption,[2] is a similar example. Other industries and individuals consciously exploit this sort of myopia to portray themselves falsely as more-authentic-than-thou, and with great success. You need look no further than the office of your local "naturopathic doctor" or the shops that sell "natural" nostrums such as herbal supplements.

Physician Stephen Barrett, MD, discussed naturopathy comprehensively (and with appropriate supporting references) in 2013 on the Quackwatch website. He defined and characterized it this way:

"Naturopathy, sometimes referred to as 'natural medicine,' is a largely pseudoscientific approach said to 'assist nature,' 'support the body's own innate capacity to achieve optimal health,' and 'facilitate the body's inherent healing mechanisms.' Naturopaths assert that diseases are the body's effort to purify itself, and that cures result from increasing the patient's 'vital force.' They claim to stimulate the body's natural healing processes by ridding it of waste products and 'toxins.' At first glance, this approach may appear sensible. However, a close look will show that naturopathy's philosophy is simplistic and that its practices are riddled with quackery."[3]

Dr. Barrett went on to describe the various discredited and often dangerous practices of naturopathy, the basis of which is unscientific and implausible mumbo jumbo.

Another ubiquitous example of the quest for authenticity is the widespread rejection of "industrial," conventional farming in favor of "organic" offerings at your local supermarket. The definition of "organic" is a movable feast, with the organic industry and government constantly tweaking its meaning; the products and practices that define it are completely arbitrary, with no scientific basis.

Is it safer or more nutritious, as the industry claims and many consumers believe? A study[4] published in 2012 in the *Annals of Internal Medicine* by researchers at Stanford University's Center for Health Policy aggregated and analyzed data from 237 studies to determine whether organic foods are safer or healthier than non-organic foods. They concluded that fruits and vegetables that met the criteria for "organic" were on average no more nutritious than their far cheaper conventional counterparts, nor were those foods less likely to be contaminated by pathogenic bacteria like *E. coli* or *Salmonella*. Moreover, because of its lower yields, organic agriculture is wasteful of water and arable land.

What, then, is "organic" all about? Well, when organic standards were established in 2000, Secretary of Agriculture Dan Glickman emphasized the fundamental meaninglessness of the organic designation: "Let me be clear about one thing, the organic label is a marketing tool. It is not a statement about food safety. Nor is 'organic' a value judgment about nutrition or quality." That really says it all. It's worth repeating: The organic label is no more than a marketing tool. And it's a cynical one, because so many unsuspecting consumers are ripped off by the high prices of organic products, without palpable benefit.

Advocates tout organic-food production — in everything from milk and coffee to meat, produce, and cigarettes[5] (yes, you read that correctly) — as a "sustainable" and "authentic" way to feed the planet's expanding population. The evidence argues otherwise. For one thing, lower crop yields are inevitable,[6] given organic farming's systematic rejection of many advanced methods and technologies. If the scale of organic production were significantly increased, the lower yields would increase the pressure for the conversion of more land to farming and more water for irrigation, both of which are serious environmental issues.

Another limitation of organic production is that it disfavors the best approach to enhancing soil quality — namely, the minimization of soil disturbances such as tilling, combined with the use of cover crops. Both approaches help to limit soil erosion and the runoff of fertilizers and pesticides. Organic growers do frequently plant cover crops, but in the absence of effective herbicides, often they have to rely on tillage for weed control, which promotes the runoff of chemicals and soil erosion.

One prevalent myth is that organic agriculture does not employ pesticides and other "synthetic substances." Organic farming does use insecticides and fungicides to prevent predation of its crops. Dozens of "synthetic substances" are allowed under U.S. organic rules and commonly used in the growing and processing of organic crops.[7] They include nicotine sulfate, which is highly toxic to warm-blooded animals, and extremely toxic copper sulfate.

The reason these are permitted is revealing. Organic practices are so primitive and inferior that constantly-

challenged organic farmers periodically go whining to USDA's National Organic Standards Board (whose members are from the organic industry), which rubber-stamps their requests for new chemicals to be approved. For example, as described in Food Safety News: "The U.S. Department of Agriculture is proposing to change restrictions on 17 substances allowed in organic production or handling: micronutrients, chlorhexidine, parasiticides, fenbendazole, moxidectin, xylazine, lidocaine, procaine, methionine, excipients, alginic acid, flavors, carnauba wax, chlorine, cellulose, colors, and glycerin.

"The changes up for public comment also add 16 substances to the National List, meaning organic producers can use them in production and handling [emphasis added]: hypochlorous acid, magnesium oxide, squid byproducts, activated charcoal, calcium borogluconate, calcium propionate, injectable vitamins, minerals, electrolytes, kaolin-pectin, mineral oil, propylene glycol, acidified sodium chlorite, zinc sulfate, potassium lactate and sodium lactate.[8]"

That puts into clear perspective the organic industry's fear-mongering about esoteric-sounding chemicals in a recent full-page advertisement[9] with "a long list of chemicals you should never have to read" (because they're not permitted in organic agriculture). Moreover, the list in the previous paragraph, which contains only the most recent request. . . to "adjust" the chemicals permitted in organic agriculture, fails to take into account the pervasive cheating – by using prohibited chemicals and practices – in the organic industry; vide infra.

Academics Review, a reliable, science-oriented nonprofit organization of academic experts, performed an extensive analysis[10] of hundreds of published academic, industry and government research reports concerned with consumers' views of organic products. It also looked at more than 1,500 news reports, marketing materials, advocacy propaganda, speeches, etc., generated between 1988 and 2014 about organic foods. Their analysis found that "consumers have spent hundreds of billion dollars purchasing premium-priced organic food products based on false or misleading perceptions about comparative product food safety, nutrition and health attributes," and that this is due to "a widespread organic and natural products industry pattern of research-informed and intentionally-deceptive marketing and paid advocacy."

All that doesn't sound terribly authentic to me, but whether it is or not, what's even worse is the extensive cheating. USDA reported in 2012 that 43 percent of the 571 samples of "organic" produce tested contained prohibited pesticide residues, and that "the findings suggest that some of the samples in violation were mislabeled conventional products, while others were organic products that hadn't been adequately protected from prohibited pesticides."[11]

Supposedly-organic imports are an especially weak link. A landmark report issued in September 2017 by USDA's Inspector General after a year-long investigation exposes the systematic failure of government officials to ensure the integrity and safety of organic food imports.[12] Over the past several years, there has been a huge spike in organic imports -- particularly corn and soybeans -- to keep pace with consumer demand; more than 100 countries now ship supposedly organic products here. The USDA's National Organic Program (NOP) is tasked with making sure those countries meet our rigorous organic standards, but they employ a dubious system largely based on reciprocity and good faith, rather than tight controls and federal enforcement. Moreover, USDA is in the untenable and arguably unethical position of both promoting and regulating organic products.

The USDA Inspector General found widespread problems with the National Organic Program that could result in "reduced U.S. consumer confidence in the integrity of organic products imported into the United States." The report cites the agency's failure to reconcile organic standards between different countries, verify documents at U.S. ports of entry, and conduct mandatory audits of major exporters. The inspector general also discovered that not only are prohibited pesticides are being used on organic shipments, but that the government's ability to detect them is virtually non-existent:

"Imported agricultural products, whether organic or conventional, are sometimes fumigated at U.S. ports of entry to prevent prohibited pests from entering the United States. [USDA's Agriculture Marketing Service] has not established and implemented controls at U.S. ports of entry to identify, track, and ensure that treated organic products are not sold, labeled, or represented as organic. As a result, U.S. consumers of organic products have reduced assurance that foreign agricultural products maintain their organic integrity from farm to table."

The report concluded that National Organic Program officials have performed so poorly that fraud and corruption are common throughout the supply chain in a burgeoning food sector that claims to be healthier, safer and more eco-friendly than non-organic food. Thus, many consumers are paying a large premium to buy imported organic foods that aren't organic at all.

At long last, the mainstream media are waking up to this scandal. The *Washington Post* published three investigative reports (here[13] and here,[14] and the one cited below) on the lucrative but fraudulent organic business, exposing organic milk producers who did not meet federal regulations, and tracking the importation of millions of pounds of falsely labeled organic grains from Eastern Europe. *Post* reporter Peter Whoriskey described three shipments of imported supposedly organic corn and soybeans that were "large enough to constitute a meaningful portion of the U.S. supply of those commodities. All three were presented as organic, despite evidence to the contrary."[15]

But here's the irony of ironies: With respect to food safety, consumers who are being bamboozled into buying conventional food masquerading as organic might actually be better off. Organic foods are notorious for contamination. According to Bruce Chassy, professor of food science at the University of Illinois, "Organic foods are recalled 4 to 8 times more frequently than their conventional counterparts."[16] That is hardly surprising. Aside from the presence of pathogenic bacteria, organic grains are particularly susceptible to toxins from fungi. Here's why… Every year, scores of packaged food products are recalled from the U.S. market because of the presence of all-natural contaminants such as insect parts, toxic molds, bacteria, and viruses. Because farming takes place out of doors and in dirt, such contamination is a fact of life. Over the centuries, the main culprits in mass food poisoning have often been mycotoxins, such as ergotamine from ergot or fumonisin from Fusarium species. These come from the fungal contamination of unprocessed crops, which is exacerbated when insects attack food crops, opening wounds in the plant that provide an opportunity for pathogen invasion. Once the molds get a foothold, poor storage conditions also promote their post-harvest growth on grain.

Fumonisin and some other mycotoxins are highly toxic, causing fatal diseases in livestock that eat infected corn and esophageal cancer and neural tube defects in humans. Regulatory agencies such as the U.S. FDA and UK Food Safety Agency have established recommended maximum fumonisin levels in food and feed products made from corn. Unprocessed or lightly processed corn (e.g., corn meal) can have fumonisin levels that exceed recommended levels. In 2003, the UK Food Safety Agency tested six organic corn meal products and 20 conventional (non-organic) corn meal products for fumonisin contamination. All six organic corn meals had elevated levels—from nine to 40 times greater than the recommended levels for human health—and they were voluntarily withdrawn from grocery stores. By contrast, the 20 conventional (i.e., non-organic) products averaged about a quarter of the recommended maximum levels.[17]

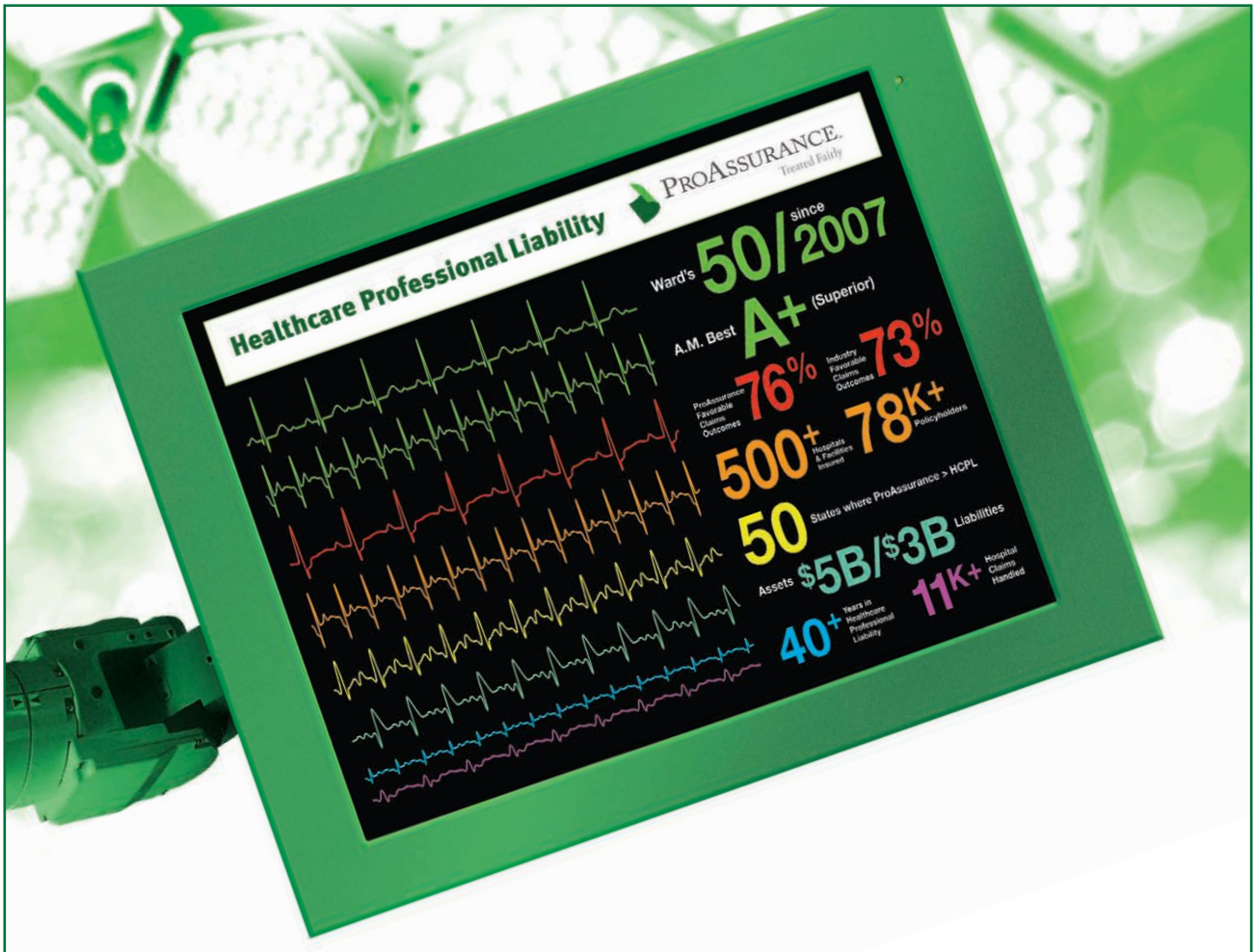
Stanford's Professor Carroll has some business advice that should give pause to the organic industry about its long-term prospects: "If you open up and start telling your story, you better make sure it's true and that you're actually doing what you claim you're doing, because you'll be found out if you lie or exaggerate. Someone will eventually discover the hypocrisy and go around telling everybody about it, and you'll be worse off than if you hadn't gone down that route in the first place."

Telling everybody about the hypocrisy of the organic and other industries is the authentic purpose of this article.

References

1. https://www.gsb.stanford.edu/insights/authenticitys-paradox-if-you-flaunt-it-you-lose-it. [accessed 9/17/18]
2. https://www.foodsafetynews.com/2017/11/new-jersey-orders-udder-milk-to-stop-illegally-selling-raw-milk/#.WgsV4KKjZcV [accessed 9/17/18]
3. https://www.quackwatch.org/01QuackeryRelatedTopics/Naturopathy/naturopathy.html [accessed 9/17/18]
4. http://annals.org/aim/article-abstract/1355685/organic-foods-safer-healthier-than-conventional-alternatives-systematic-review [accessed 9/17/18]
5. https://ecocult.com/whats-the-deal-with-american-spirit-cigarettes/ [accessed 9/7/18]
6. https://www.forbes.com/sites/stevensavage/2015/10/09/the-organic-farming-yield-gap/#27be5e4a5e0e [accessed 9/17/18]
7. https://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=9874504b6f1025eb0e6b67cadf9d3b40&rgn=div6&view=text&node=7:3.1.1.9.32.7&idno=7 [accessed 9/17/18]
8. https://www.foodsafetynews.com/2018/01/numerous-changes-proposed-to-organic-programs-national-list/ [accessed 9/17/18]
9. https://www.thepacker.com/article/ota-pushes-back-wall-street-journal-op-ed-piece [accessed 9/17/18]
10. http://academicsreview.org/wp-content/uploads/2014/04/AR_Organic-Marketing-Report_Print.pdf [accessed 9/17/18]
11. https://www.ams.usda.gov/sites/default/files/media/Pesticide%20Residue%20Testing_Org%20Produce_2010-11PilotStudy.pdf [accessed 9/17/18]
12. https://www.usda.gov/oig/webdocs/01601-0001-21.pdf [accessed 9/17/18]
13. https://www.washingtonpost.com/news/wonk/wp/2017/07/13/uncertainty-and-dysfunction-have-overtaken-usda-program-for-organic-foods-key-lawmaker-says/?utm_term=.93ecb8521278 [accessed 9/17/18]
14. https://www.washingtonpost.com/news/wonk/wp/2017/06/12/millions-of-pounds-of-apparently-fake-organic-grains-convince-the-food-industry-there-may-be-a-problem/?utm_term=.da7e14bf6344 [accessed 9/17/18]
15. https://www.washingtonpost.com/business/economy/the-labels-said-organic-but-these-massive-imports-of-corn-and-soybeans-werent/2017/05/12/6d165984-2b76-11e7-a616-d7c8a68c1a66_story.html?utm_term=.8718168286e9 [accessed 9/17/18]
16. Personal communication, July 1, 2017
17. https://www.westernfarmpress.com/bt-corn-can-reduce-serious-birth-defects-limiting-toxic-mold [accessed 9/17/18]

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Changing With the Times: The Fascinating History of Arthur Center Community Health in Mexico, Missouri

by Nancy J. Bunge, MD & Terry Mackey

Arthur Center Community Health in Mexico, Missouri, ("the Center) is an excellent example of adapting to changing economic and political realities that have affected health care in rural Missouri. From an initial focus on behavioral health as part of the Audrain Medical Center, to a community health center with integration of behavioral health, primary care and dental services, Arthur Center has, of necessity, continued to evolve to optimally serve its community.



John Burwell (known as 'JB') Arthur
Source: Mexico Ledger

Arthur Center's history of service to Audrain County began in January 1961, with the opening of the Audrain Missouri Child Guidance Clinic to reduce the number of children with mental health needs being removed from the community and hospitalized at Fulton State Hospital. When the Community Mental Health Center Act was passed in 1963, treatment for mental illness began to move out of institutions and back into the community. In 1966, a federal grant was obtained to build a Community Mental Health Center on land donated by Mexico's well known and respected philanthropists, John Burwell (known as JB) Arthur and his wife Greta. Mr. Arthur, in 1929, founded the Mexico Refractories Company that was for many years among the area's largest employers. East Central Missouri Behavioral Health Center was dedicated in June, 1969, and was the first federally-funded community mental health center in the country. It included an inpatient unit, outpatient services, day treatment, 24-hour emergency services, medical floor consultation, and community education and served six counties – Audrain, Callaway, Montgomery, Pike, Ralls, and Monroe.

In 1980, the federal government awarded block grants for community mental health funding to the states and the Center became the Administrative Agent for the Division of Comprehensive Psychiatric Services. Services continued to expand with offices in Moberly, Macon, Fulton, Jefferson City, and Columbia. A local advocate of mental health, Margery Gantt, was appointed to the Mental Health Commission and eventually elected Chairperson in 1985. In 1992, the Center was renamed Arthur Center in honor of JB Arthur and his wife. The Center became a regional mental health provider offering comprehensive mental health and substance abuse services. A new facility was dedicated in 1997 that included inpatient adult and adolescent units.

The decline of the economy over the next five years and the advent of managed care caused increasing financial pressure on Audrain Medical Center (AMC) and Arthur Center and led to the closing of the inpatient adolescent





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unit on June 15, 2001, and shutting down operations at the clinics outside of the original six counties. In 2002, AMC's Board of Directors decided to divest the Arthur Center and retain only the inpatient adult unit. In May 2002, a group of Mexico community leaders formed a not-for-profit corporation in order to retain local control of Arthur Center. This organization was awarded the Administrative Agent Contract and with the assistance of four local banks and loan guarantees by USDA Rural Development, began operations as Arthur Center in January 2003. The organization continued to have outpatient clinics and adult/youth community-based services in both Mexico and Fulton.



East Central Missouri Mental Health, 1968
Source: Audrain County Historical Society

In April 2009, Arthur Center, in partnership with the Missouri Department of Mental Health, began operation of Hope Center, a community transition program in Fulton, Missouri. Hope Center is an intensive residential program designed to provide support and assistance to individuals with complicated mental and physical health care needs to successfully transition from the hospital or institutional setting back into the community. In July 2015, the program was moved to a new 16-bed facility in Mexico.



Authur Center Community Health, Current Facility
Source: Mexico Ledger

Arthur Center was awarded a grant in November 2013 under Section 330 of the Public Health Service Act and received the designation of a Federally Qualified Health Center (FQHC). As an FQHC, Arthur Center must care for an underserved population, offer a sliding fee scale, provide comprehensive services, have an ongoing quality assurance program and have a governing board of directors of whom the majority must be patients or family of patients of the center. Services were moved to a new 25,000 square foot integrated health care facility in Mexico on February 8, 2016, in order to provide integrated clinical care under one roof. Again, local community leaders were there to assist with tax-exempt bond funding with two local banks and the City of Mexico's Industrial Development Authority. The new facility has capacity for twelve primary care exam rooms, eight dental operatories, and twelve behavioral health offices, a wing for adult and youth behavioral health community-based program staff, two group rooms for community learning programs, and eight offices for administrative staff.

Arthur Center continues to innovate and adapt to meet the needs of the mid-Missouri community. In March 2018, a Medication Assisted Treatment program was initiated for persons with opioid use disorders. Psychiatric individualized supported living is a program serving transition-aged youth aged 18-30 with serious mental illness or co-occurring mental health and developmental disabilities. The residents of this program receive integrated care from primary care, dental and behavioral health. Arthur Center received a Bronze award from the Missouri Primary Care Association for its quality performance in 2017 and consistently remains the top



The Power of Philanthropy

JB & Greeta Arthur: Leaving the World A Better Place

When John Burwell (known as "JB") Arthur (Figure 1) died in 1973, former Missouri Governor and U.S. Senator Christopher S. Bond said "Mexico has lost one of its most outstanding citizens… His service included business and civic activities, as well as most generous philanthropy. He will long be remembered for these contributions." And this is true, as the family name still graces the Arthur Center Community Health building and the Arthur Hills Golf Course in Mexico, Missouri. His wife Greeta, a partner in community philanthropy, died in 1960. In keeping with their philanthropy, the family asked that memorial gifts be donated to the Arthur Hills Golf Course or the Cerebral Palsy School.

ARTHUR CENTER COMMUNITY HEALTH

A firebrick or refractory brick is made of special ceramic material used inlining furnaces, kilns, fireboxes, and fireplaces. Mid-Missouri has been a world source for firebrick due to local deposits of clay essential in the process. JB Arthur was brilliant in ceramic engineering and manufacturing. JB started as a bookkeeper for A.P. Green Brick in 1914 and retired 15 years later as vice president and general manager. In 1930, he founded the Mexico Refractories Company and became the world's youngest executive in the refractories industry. In 1959, Mexico Refractories merged with Kaiser Aluminum and Chemical Corporation, and in 1969, JB Arthur retired.

JB Arthur and his wife Greeta were particularly generous to projects in their Mexico hometown and Audrain County area. When they donated their longtime home to Audrain Medical Center in 1960, JB stated "I have lived in Mexico for 41 years and any success that I have had has been intimately connected with it and its citizens." This property became the site of the original Arthur Center. They also donated land and cash for the construction of the Arthur Hills Golf Course. The family donated freely toward the operation of Mexico's Cerebral Palsy School (now the Children's Therapy and Early Education School), Audrain Medical Center (now SSM- Audrain), Audrain County Historical Society Museum, Mexico Youth Center, and Mexico Boy Scouts. In 1957, the JB Arthur and Family Scholarship-Loan Fund was established at the University of Missouri, Rolla (now Missouri Science and Technology). In 1971, JB was honored, along with 14 other outstanding persons including former president Harry S Truman and Thomas Hart Benton, with a centennial honor medallion from UM-Rolla, in recognition of outstanding achievement to his country in education, service and leadership.

The Arthurs' legacy of thoughtful philanthropy has greatly benefited past, present and future generations.

performing center among Missouri FQHCs for childhood immunizations. In February 2018, Arthur Center received National Committee on Quality Assurance Level 2 Patient Centered Medical Home (PCMH) recognition and will begin Patient Centered Health Home services to MO HealthNet recipients who receive primary care services and suffer from a chronic disease. This joins a highly successful PCMH initiative focused on improving the health of 383 MO HealthNet patients who experience a mental illness and another chronic disease. There are also plans to expand dental services with the addition of a mobile dental unit which will provide improved access by making visits to schools, nursing homes and the Amish community.

As an independent not-for-profit organization, Arthur Center Community Health has had a unique ability to adapt to the changing health care environment. The support and philanthropy of many local community members, organizations and local banks has been vital to the Arthur Center's success and allowed the center to develop new strategies in response to changing needs and resources over the decades since its inception. **MM**

Opioid Crisis Hits Home for KCMS Executive Director

The personal story of losing a beloved younger brother to prescription opioid overdose

by Angela Bedell, MA

I once had a boss who loved to say "it's not personal, it's business," which drove me nuts. He always said it when someone was getting laid off or a program being discontinued, or (in my mind) when making a decision that he didn't really have the spine to own. I also could not imagine how you could spend 40+ hours per week with anyone or working on anything then proclaim that decisions were not personal.

I am all business in my role as executive director for the Kansas City Medical Society. But it is also very, very personal. It's personal every time I take a night away from my family to attend a meeting or represent the Society in the community. It's been personal as the Society has done advocacy projects that affect the health of me, my loved ones and my community.

Nothing, though, has been as personal as the opioid crisis and the work the Society has done on the subject.

Just a week into the presidency of Michael O'Dell, MD, I had to call him and, over huge lumps in my throat, tell him, that my younger brother had passed away unexpectedly and I was going to be unavailable for a few days.

That morning began with my family in our usual routine. My daughter was eating breakfast and I was quizzing her on her spelling words. My husband Larry was cleaning up breakfast dishes and he got a phone call. Larry is not easily surprised and almost never at a loss for words, but this particular phone call was different. It was obvious something horrible had happened and I kept asking him "Who is it?" I was getting really annoyed that he wouldn't tell me. A couple minutes later he took my hands and said "Kevin passed away." I couldn't breathe. I'll never forget that moment.

That had been my mom on the phone. She was living in New Mexico and my brother was staying with her. She found him, her youngest child, dead that morning. I knew I had to get to her, and somehow managed to get my whole family on an 11:00 flight to Albuquerque where she was.

My Brother and Our Family

Mom became pregnant with me at only 16 years old, and while she accomplished amazing things for her young age, she was still a teenager and she wasn't prepared for the world. We were often without things like a phone, and I saw Mom in tears many times, worried about paying bills.

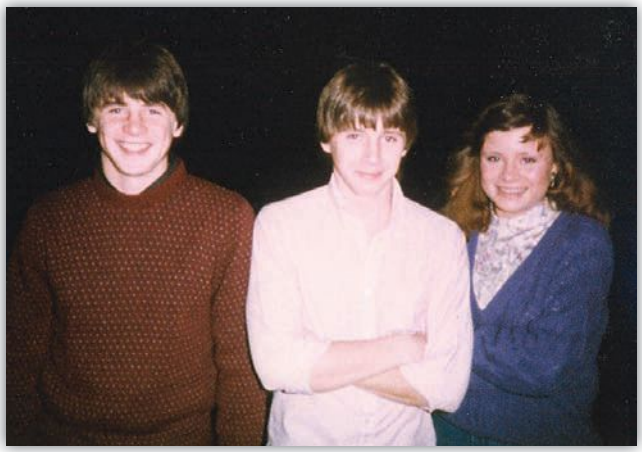
Mom completed a high school degree and then went to college, first at night and finally full time, with a goal to graduate college before I did high school. She worked at a bank and took classes at night, and I was often "in charge" at home.

Whether you believe the birth order theories or not, they played out with precision in my family. As the oldest child, I brought home good grades, never got into any trouble, and was always responsible for all the other kids. When I went to the pool in the summer, I remember keeping one eye on each of my younger brothers. In middle school and junior high, I often could only go to football games and summer carnivals if I had two little boys with me.

Kevin was the youngest, and without a doubt the baby. In high school, I had very high ACT scores. But a few years later he came home with super-high ACT scores (almost perfect) which annoyed me because the kid never studied. Mom and I both loved to talk about how smart he was. He was super intelligent, as well as a gifted athlete. He was a quiet and intense kid, always in deep thought. He would get interested or involved in something and immerse himself in it day and night. He led a life of "no grey areas."



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From left: Kevin, brother Jeff and Angela.

Having been a teenage mother and enduring gross chauvinism in her early jobs, Mom wasn't a fan of the Midwest or of small town life. The day I graduated high school, she, my stepdad, and my two brothers moved to California. They landed in Roseville, outside Sacramento. Both of my brothers transitioned from class sizes of 200 to class sizes of 2,000. I worried they wouldn't get to participate in sports in such a large school, but I was wrong. Both made the varsity football team; Kevin was an exceptional athlete and became a starter as a sophomore. This ended up being a problem, as he took some hits from really big kids, and a shoulder injury ended up causing lifelong pain.

A Quick Descent

The phone call that came on that January morning is undoubtedly the most shocking thing that has happened in my life. Though I never imagined he might die, I suspected something was wrong in Kevin's life before the holidays. A few days before Christmas, Mom, Kevin and his two sons, and my own family were gathered at my house. Kevin wasn't himself. (He had been dealing with intense arthritic shoulder pain for over a year. It had been so bad he could no longer do landscaping and had to give up most of his favorite activities.). This day was different; he was staring blankly as though he was half asleep. He did make enough conversation that day to tell me his holiday plans, which included spending a couple weeks in New Mexico before starting a new job in mid-January.

After seeing Kevin in this state, I called Mom. She told me that he was severely depressed and she was worried. I don't know if I literally rolled my eyes, but that was certainly part of my reaction. It seemed she was making excuses for her baby. I misinterpreted his struggles, and I still have serious regrets about that.

I met Kevin briefly on Christmas Eve afternoon and he handed me a gift for my daughter, a Shopkins Bakery. For a single guy with two children, this was very thoughtful to find gifts for my daughter, down to the girly gift bag. He was celebrating Christmas with his children and then heading to New Mexico to enjoy the mountains and stay at Mom's. That was the last time I saw him.

After he had been in New Mexico a few days, Mom told me on the phone that he was really enjoying the outdoors and the mountains, that he was going hiking every day and he'd lost weight. Mom moved to New Mexico just two years before to teach Navajo kids in an under-served rural community; she lived alone and was enjoying his company.

Right after the New Year, out of the blue, Kevin made an unusual, one-day trip from New Mexico to Kansas City to see his children. Strangely quick, I thought, for such a long drive.

The Morning That Killed Him

The unusual, 14-hours-each-way, drive back to Missouri was made to obtain opioids. And Kevin managed to get four prescriptions for them within four hours, in the Kansas City area. I know because the day after I arrived in New Mexico and made it to Mom's house, I went through his briefcase and found the checkout paperwork from every single physician he saw. I saw the dates and times he was at the offices. The notes include things like "he hopes to soon be off OxyContin" and "he has lost 10 pounds in two weeks and is making progress toward health goals."

I'll never forget sitting on the floor of the guest bedroom of Mom's small house in New Mexico, reading the papers and holding the pill bottles, and feeling like I was holding the weapon that killed by brother.

My brother had experienced real pain over months, and because of it, became under-employed and stressed. He may have been scared to be in New Mexico without access to pain medicine, and thought he was "stocking up." He may have been in a state of addiction that I will never completely understand. I don't know his thoughts that day, so I don't know how "wrong" he was or how much of a "victim" he was. To me it doesn't matter now, but when I hear discussions on the opioid epidemic, I am surprised how much it matters to policymakers to categorize the people involved and their behaviors.

To really understand the social complexities of addictions and mental health issues, it's necessary to know the true stories of what's making people sick and even killing them. In the case of my brother's death, it's not

complexities, just a couple simple principles that I hope to share.

Whether simple or complex, the factors twisting data and reported outcomes are influenced by one thing: family pride. The problem is that families do not want to share the ugliness of the true story they just experienced. I really don't want to tell the part of this story that is my brother's "fault." He was a generous, brilliant, creative soul who coached his son's ball teams and built a landscaping business and his legacy should not be his cause of death.

My brother's death certificate reads "atherosclerotic and hypertensive cardiovascular disease." I don't really want to share this secret, but the fact is my mother and I were both relieved that the coroner did not make any proclamation of addictions. Mom in particular was really concerned that may happen, and would forever be "the story." I have a good friend who also lost her brother from an opioid addiction, and while she is certain this is what killed him, it certainly is not on the death certificate.

My first point is this: The data on deaths from opioids may be grossly understated, as no one dies from only the addiction. Several recent studies in fact support that actual death totals may be much higher.[1,2]

When the KCMS board discussed opioid abuse, the question was asked about the data. I wanted to speak up and point out how understated I think the numbers are. I didn't, as the story I had to share isn't short.

The Real Problem

I've sat in civic and county committee meetings on behalf of the Medical Society when a local PDMP was being discussed. I had a letter from then-President, Dr. Stephen Salanski, proclaiming the Society's support of allowing physicians access to information about patients prescriptions. The Jackson County meeting went well, I read the letter and listened to a short discussion before a unanimous vote.

The next meeting, at City Hall, was different. I read the same letter then sat down and listened to the committee's discussion, which included comments about "needing to stop criminalizing addicts." While I appreciate the service, the leadership and the intentions of the group, I was astounded how uninformed they were.

I knew that my brother seriously misrepresented his situation to physicians, (and yes, I know, he is responsible for his actions) but I also knew he hadn't technically broken the law. The conversation I was hearing—like many in health care— was focused on finding fault instead of a solution. It was superficial, lacking in important facts and frustrating to listen to. I sat up tall and took deep breaths, and resisted the temptation to go to the microphone and say, "You don't get it, the doctors want to help these patients and they need information to do it."

I made it through that meeting by watching Drs. Rex Archer and Sarah Martin-Anderson, and saying silent prayers that they would have the patience and perseverance to complete their work. (They did.)

More frustrating to me personally was what came later: the PDMP issued by executive order from the office of former Gov. Eric Greitens, which basically just monitored physicians' prescribing habits. As if the doctor who sees the most patients in pain is over-prescribing. Have lawmakers never had a family member in pain?

I am completely certain that if any of the four doctors my brother saw that morning in Missouri had been able to know what prescriptions he already had, they wouldn't have written him another one. I am certain that at least one of those physicians would have tried to get him help for his addiction. My other simple point: the doctors needed information, not regulations.

Now that a little time has passed since my brother's death, I remember the months of pain being harder on him than the addiction. None of us could really draw the line on where one ended and the other began. The pain eliminated the outdoor life he loved. He gained weight, his blood pressure rose and the lack of sleep kept him in a constant dazed, fatigued state. There certainly is a place for appropriately managed pain medicine.

After my brother's death, I had to hold it together and organize a memorial and take care of the usual business. Our mom and his dad, for various reasons including emotional distress and their own health issues, were overwhelmed. Like many women, I took care of my family, I got my job done, and no one saw any dropped balls. Looking back, I see that I was walking through quicksand every day, and that for a couple years, life was blurry and tough.

At annual meetings, I sometimes have told the membership "thank you for this professional opportunity, it is an honor to work to advance your mission." It truly is an honor. And it's very personal.

References

1. Buchanich J, Balmert L, Williams K, et al. The Effect of Incomplete Death Certificates on Estimates of Unintentional Opioid-Related Overdose Deaths in the United States, 1999-2015. Public Health Reports. June 27, 2018. https://doi.org/10.1177/0033354918774330

2. Ruhm C. Corrected US opioid involved drug poisoning deaths and mortality rates, 1999–2015. Addiction. February 12, 2018. https://doi.org/10.1111/add.14144

MM

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Scendendo Lungo il Tratto di Casa…. "Coming Down the Home Stretch"

by Joseph A. Corrado, MD

I cannot believe this wonderful year is passing so fast! It was like yesterday we gathered in St. Louis and passed the gavel. However, this winter has been a blast, so to speak, not only with the weather but in meeting with all of you.

Just after Thanksgiving the Kansas City Medical Society welcomed Donna and me to their newly reestablished annual meeting. It was a huge success and very well attended, albeit in Kansas. The theme was "Inspiring Health Together" with extremely touching vignettes of patients thanking their physicians for what they do, and asking them to continue and even accelerate their rate of influence on health policies. (Figure 1.)



Figure 1. Kansas City Medical Society

We had the pleasure of meeting the U.S. Surgeon General Vice Admiral Jerome Adams, MD, MPH, who talked of his incredible voyage from being an anesthesiologist to becoming the Surgeon General.

In early December we joined the St. Charles-Lincoln County Medical Society, and I was honored in assisting Drs. Willman and Adams in presenting their Dr. William Jones McElhenny scholarship award to Calli Morris, as her proud parents watched. What a great tradition for prospective medical students in their area. With a little extra time that day, we had the chance to visit "Old St. Charles" during their wonderful Christmas displays. I highly recommend it. (Figure 2.)



Figure 2. St. Charles-Lincoln Counties Medical Society

The next day, we whisked to the northwest corner of the state to join the Buchanan County Medical Society in St. Joseph and install Drs. Corder and Ross. Here we heard a great presentation on what medicine would be like on a Mars mission, while dining and enjoying a silent auction. (Figure 3.)

Well, winter being winter, dangerous weather kept us from having our Jefferson City Council meeting. I know in between the three tele-conference calls, my tractor and I had to dig out of 20" of snow! But there was great insight in cancelling and overall, I think the telephone meetings went so well that they have given us a money-saving alternative to consider as we discuss membership, policy, and programming.



Joseph A. Corrado, MD, FACS, a surgeon from Mexico, Mo., and MSMA member since 1982, is MSMA President for 2018-2019.
Contact: bigdocjoe@sbcglobal.net

The final week of January was extra busy. We travelled to Greene County Medical Society in Springfield. Their motto is "Bringing Physicians Together to Improve the Health of Our Community." We were cordially received at Doe's restaurant by some old and new friends, and even Dr. David Barbe, Immediate Past President of the American Medical Association, was able to join us in between his travels. As was my purpose there, I had the distinct pleasure of assisting in the installation of the 109th president, Dr. Shannon Woods, a hometown boy. His emphasis for the year is on increasing membership and participation at the local level. (Figure 4.)



Figure 3. Buchanan County Medical Society

On Saturday evening, it was off to the 182nd year of organized medicine in St. Louis to attend the Saint Louis Metropolitan Medical Society Gala at the Missouri Athletic Club. After I installed their new councilors and Dr. Ramona Behshad as president, her remarks were most uplifting and personal, and reflected both the patient and physician point of view. It was great to see so many past MSMA presidents there and to join so many young physicians and students who were engaged in organized medicine. It is truly a new age and I feel the future has hope. (Figure 5.)



Figure 4. Greene County Medical Society

On Groundhog Day, we came full circle and attended the Boone County Medical Society Gala in Columbia. It seems fitting that my last major event before our MSMA Annual Convention took me home to District 5 where I spent three decades proudly representing on the MSMA Council. The landscape of medicine is rapidly changing in mid-Missouri, and I'm sure there will be plenty of opinions and lively discussion on how and what to grow, and who and where to trim.



Figure 5. St. Louis Metropolitan Medical Society

I look forward to seeing many of you at the upcoming White Coat Rally at the Missouri Capitol in Jefferson City on March 5. It's so important that you show your support. How can I express how much of an impression that makes with our legislators and those who lobby on our behalf?

Last but not least, don't forget the Annual Convention in Kansas City this spring, April 5-7, at the Westin Crown Center, honoring our new incoming president Dr. James DiRenna. I can't wait!

Ciao for now.

MM

The New Kansas City Medical Society: A Community of Physicians Spanning the Entire Metro Region

by Michael L. O'Dell, MD & Jim Braibish



From left, Gregory K. Unruh, 2017 president of the Wyandotte-Johnson County Medical Society; Angela Bedell, executive director and CEO of the Kansas City Medical Society; and Joshua M.V. Mammen, MD, PhD, FACS, president of the Kansas City Medical Society, sign the final merger documents at the Nov. 16, 2017, KCMS annual meeting.

On Jan. 1, 2018, we inaugurated a new Kansas City Medical Society, one that represents physicians from the entire Kansas City metropolitan area—in both Missouri and Kansas. It is a grand accomplishment for physicians and patients in our region and the start of an important new era.

The new KCMS is the result of a merger of the former Kansas City Medical Society in Missouri and the Wyandotte-Johnson County Medical Society in Kansas. The idea of one community medical society has been talked about and dreamed of for many years, and its time has arrived. Two organizations, each more than 130 years old, have worked hard to honor their heritage while organizing for today.

KCMS now welcomes members from the Missouri counties of Cass, Clay, Jackson and Platte, and the Kansas counties of Jackson and Wyandotte. About 60% of the Kansas City metro population resides in Missouri and the other 40% in Kansas.

Our medical societies recognize that the Kansas City metropolitan area is a regional presence not defined by state lines. We have a local motto you will see on t-shirts and coffee mugs around the region, "KC: Too Much City for One State." As the city recognizes its regional oneness, the boundary of the state line diminishes in importance.

Our physicians practice in both states. Our patients live in both states. The Medical Society must speak for all patients and physicians, not just those one side of State Line Road.

The activities of the new KCMS include:

- Advocating for physicians with legislators and insurance companies
- Providing educational programs on issues and trends in medicine
- Informing physicians through our journal Kansas City Medicine and electronic communications
- Coordinating volunteer health care for the uninsured and underinsured
- Promoting public health initiatives for the region
- Offering venues for networking among physicians

New Foundation for Charity Care

An important consideration throughout the merger discussion was the need to join the charitable care work of our respective foundations. The Kansas City Medical Society Foundation now manages the work of MetroCare and



Michael L. O'Dell, MD, MSHA, FAAFP, MSMA member since 2010, is chair of the Department of Community and Family Medicine at the University of Missouri-Kansas City School of Medicine, and associate chief medical officer for the Truman Medical Centers Lakewood campus. He is past president of the Kansas City Medical Society and editor of *Kansas City Medicine*. Jim Braibish, APR, is principal of Braibish Communications and managing editor of *Kansas City Medicine*.
Contact: Michael.O'Dell@tmcmed.org

WyJo Care, our programs that match low-income, uninsured patients with specialty medical services donated by local physicians. Over 700 volunteer physicians from a variety of specialties are enrolled in MetroCare and WyJo Care, delivering over $7 million of charitable care per year.

The merger will help us expand these charitable care efforts. We also expect the unified foundation's scope to grow to include other good work, such as assisting medical students in need.



The November 2018 Kansas City Medical Society Annual Meeting featured U.S. Surgeon General Jerome Adams, MD, MPH. Pictured with Dr. Adams are, from left, KCMS board members Joshua Mammen, MD, PhD (2018 president); Carole Freiberger-O'Keefe, DO; Christine Park White; MD; Gregory Unruh, MD; Stephen Salanski, MD; Michael O'Dell, MD; Dr. Adams; Jim Wetzel, MD; Sheila McGreevy, MD; Mark Brady, MD (2019 president); Scott Kujath, MD; Angela Bedell, executive director and CEO. In his address, Dr. Adams called for greater investment in community health and well-being to reduce disparities. The event drew a record attendance of 350 physicians, partners and guests.

Accomplishing the Merger

Over the last several years, the two societies began to collaborate on issues that are regional in nature. A bi-state Vaccination Task Force was formed to promote teenage vaccination against HPV and other diseases. We also collaborated to support Tobacco 21, an initiative to pass municipal and county ordinances prohibiting tobacco sales to persons under the age of 21.

In August 2016, both the WyJo and KCMS boards passed resolutions supporting the merger. A six-member transition team was formed to work out leadership, governance and other details of the new society. The team included Mark D. Brady, MD; Joshua M.V. Mammen, MD, PhD; Sheila M. McGreevy, MD; Michael L. O'Dell, MD, MSHA; Stephen Salanski, MD; and Gregory K. Unruh, MD. Throughout the process, they remained motivated by the common desire to ensure that area physicians are represented by a unified organization.

There were many complexities to be worked out in joining the two societies. Not only did we face the typical issues in a merger, we also dealt with creating a medical society that is a constituent of two state associations and responds to advocacy issues with two state legislatures. It took 18 months of late-night meetings, writing new bylaws, developing a new governance structure and much heavy-lifting. Hard work was put into developing governance for today's health care environment.

The new KCMS is governed by a 15-member Board of Directors. It is supported by a larger Leadership Council that includes the board along with representatives of area hospitals and other practices. The Leadership Council meets quarterly and discusses physician advocacy issues and patient advocacy and access concerns.

The new KCMS retains its strong relationship with MSMA and the Kansas Medical Society. Both state societies played key roles in facilitating the creation of this new physician community. We encourage all of our members to join and be active in the appropriate state society.

Vision of the Future

A unified medical society serving Kansas City now speaks with increased authority, advocating for patients and the physicians serving them. Through our new society, we will be better together. A better sense of community for physicians across the Kansas City area. Greater knowledge of the work, skill and professionalism among our Kansas City colleagues. And finally, striving together toward excellence in medical and surgical care for the people of Kansas City. **MM**

Missouri Medicine in the News

Did you make the news? Submit your success story and photo to hwansing@msma.org.

Missouri Medicine announces three new members of the Editorial Board: Michael S. Clarke, MD, Military Medicine; Laine M. Young-Walker, MD, Psychiatry; and Gary A. Salzman, MD, Pulmonary.



Michael S. Clarke, MSMA member since 1976, is an orthopedic surgeon from Springfield, Missouri. A retired Army colonel with 32 years of military service, he served for over 20 years as associate editor of *JSOA,* the *Journal of Surgical Orthopedic Advances* and on the editorial board of the *Greene County Medical Society Journal* for most of his 45 years of active orthopedic practice in Springfield.



Laine M. Young-Walker, MD, MSMA member since 2015, is Associate Dean for Student Programs and Professor of Psychiatry, Division Chief of Child and Adolescent Psychiatry at the University of Missouri - Columbia School of Medicine, Columbia, Missouri.



Gary A. Salzman, MD, MSMA member since 2007, is a published author and Professor of Medicine and Section Chief, Respiratory, Critical Care, Sleep Medicine at the University of Missouri - Kansas City, Kansas City, Missouri.

Elizabeth J. Plogsted James, MD, a former *Missouri Medicine* Editorial Board member for Neonatology, passed away January 2, at her home in Columbia, Missouri. The founder of MU's neonatal-perinatal medicine program, she served as medical director of the neonatal intensive care unit for 36 years until her retirement.

CSPAN2 City Tour/Books featured an interview aired January 19 and 20, 2019, with John C. Hagan, III, MD, who edited "The Science of Near-Death Experiences" (Missouri University Press, 2017 available from MSMA or Amazon.com). The book, a best seller at MU Press, is based on the highly acclaimed series begun in 2013 in *Missouri Medicine* on the common medical syndrome of Near-Death Experience. Grand Rounds based on the book have been presented by Dr. Hagan in three states and will be on the 2019 MSMA Annual Convention program. This is a link to the interview by CSPAN reporter Tiffany Rocque https://www.c-span.org/video/?456862-1/the-science-death-experiences



"Sleep Medicine: Insomnia and Sleep," on page 68 concludes a series of articles on sleep medicine by the University of Missouri School of Medicine, Department of Neurology. *Missouri Medicine* thanks Pradeep Sahota, MD, and his faculty for their in-depth coverage of this important topic.



Kudos to Muhammad Asif, MD, on working with Western Missouri Medical Center to introduce a new practice in Warrensburg with Building Blocks Pediatrics. MSMA thanks you for your membership support since 2015.



Long-time Mid-Missouri dermatologist John DeSpain, M.D. has joined Missouri Medical Group and is launching a new practice, Missouri Medical Group Dermatology. MSMA is proud to call Dr. DeSpain an MSMA member since 2002.



Thomas A. Hopkins, MD, has been a valued MSMA member since 1995 and recently joined the team at Mercy Clinic Primary Care.

Did you make the news? Submit your success story and photo to hwansing@msma.org. **MM**

Alliance Supports Community Health

by Gillian Waltman

The Alliance celebrated the festive season by hosting many charity and fundraising events. Several counties provided support for food banks, a mobile food drive, women's shelters, school programs, and other local charities.

In November, the St. Louis Metropolitan Medical Society Alliance hosted an evening at The Vault, a luxury resale boutique where a percentage of sales benefited the local Alliance health projects. Checks were donated by individuals and by the Alliance at a holiday sharing party in December to St. Martha's Hall, Loyola Academy, and the St. Louis Area Food Bank. St. Martha's Hall also received toiletries for the women and books and toys for the children in the shelter. They are also supported by SLMMS in making these donations.

Kansas City Metro Med Alliance's holiday luncheon in December raised over $500 for charitable donations. They also provided hats, scarves, and blankets to Hope Lodge, the local chapter of the American Cancer Society.

Buchanan County Medical Society Alliance held a holiday luncheon and fundraiser, with half the proceeds benefitting the MSMF/Alliance Scholarship Fund and the other half directed to pay for the anti-bullying books they provide to the St. Joseph School District.

Cape Girardeau Medical Society Alliance set up and volunteered at a mobile food drive for families at Franklin School. They also held a holiday luncheon for Alliance members.

Thanks to all the physicians and Alliance members who contributed to the Alliance Holiday Sharing Card; roceeds from donations benefit the MSMF and AMAF. There were 38 participants and we raised almost $3,200. It was published with donor names in *Missouri Medicine, Show Me Alliance News*, and on the MSMA website.



Gillian Waltman is the 2018-2019 MSMA Alliance President and Professor, Ophthalmology, Saint Louis University, St. Louis, Missouri.
Contact: gillian.waltman@gmail.com

Alliance Health Projects

The Drugs Are NOT for Me! program was taken into schools across the state, led by Alliance Health Vice President Kelly O'Leary. Students in sixth through eighth grades are educated on the consequences of drug use by Alliance members in collaboration with their teachers. Like our former Smoking Is NOT for Me! program, participating students submit an essay, poem, or artwork with their ideas. This program is met with enthusiasm by students and teachers. The submissions are judged locally in each county and the winning entries will be sent to the state level competition to be judged and prizes awarded.

Kelly continues her quest to educate the county Alliances and other organizations on the abuse and misuse of opioids. She is a compelling speaker, having lost her own son to an accidental overdose four years ago.

Current Alliance Issues

The biggest problem facing the Alliance is maintaining its membership numbers and also identifying current members to take on leadership positions. We are still working to increase membership, round up former members, and recruit new ones. Efforts are being made to retain former Boone County Medical Association Alliance members, at least as direct members of the MSMA Alliance.

Future Alliance Meetings

The Alliance Day at the Legislature will be held February 19-20, in Jefferson City organized by our Legislative Vice President Kirk Doan. The lobbying team at MSMA will prime us for our legislative visits and provide oppose/support information for the various bills affecting medicine. Our winter board meeting will take place the following day at the Baymont Inn.

The MSMA Alliance Annual Meeting will be held in conjunction with the MSMA Convention at the Westin Crown Center in Kansas City April 4-6. Please mark your calendars for the Alliance Foundation Fundraiser Dinner to be held on Friday, April 5. In honor of my theme for this year Look on the Bright Side, it is called The British Invasion! Please look for details and the registration forms on the MSMA website and in *Show Me Alliance News.* Note that the hotel will not allow any on-site reservations.

We are also holding a Cabi Fashion Show (another small fundraiser) on Thursday night. This was very popular last year at convention. Proceeds from both events will benefit the MSMF. **MM**

2018 Contributors to Missouri Physicians Health Program

The Missouri Physicians Health Program is proud to recognize the following organizations and individuals who contributed to our annual fund drive. We are truly grateful for their generosity which helps provide crucial support as we strive to provide high quality physician health care services and meet the demand for our services statewide. Many of our participants are physicians in training who are unable to pay for services rendered. Your contribution helps us to defray those costs. We encourage you to generously contribute to our 2019 campaign. Thank you for your compassionate support.

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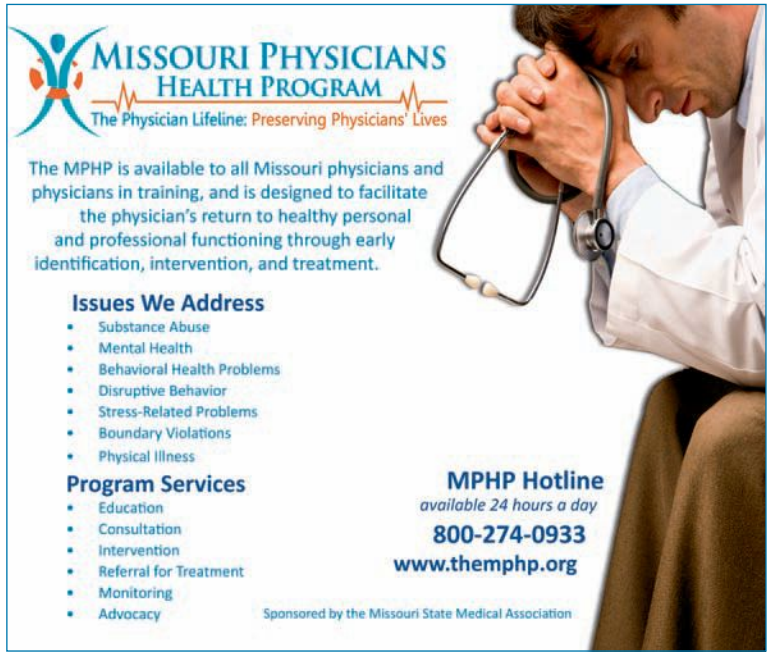
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Missouri State Medical Association

161st Annual Convention

April 5-7, 2019 / Westin Kansas City at Crown Center
www.msma.org/annual-convention

General Sessions



Friday, April 5 | 1:30 pm

The Science of Near-Death Experiences

John C. Hagan, III, MD
Editor, *Missouri Medicine*
Ophthalmologist
Kansas City, Missouri

CME MOC



Friday, April 5 | 3:30 pm

Gen Nation: Making Sense of Generational Differences in the Workplace and Beyond*

Michael Wood, Co-Founder
747 Insights
Des Moines, Iowa

*No ABIM/MOC Points offered for this session



Saturday, April 6 | 8:00 am

Non-Opioid Pain Medicine (The Other Pills Used to Cure the Ills)

Nicholas Madaffer, MD
Assistant Professor
Physical Medicine & Rehabilitation
University of Missouri
Columbi, Missouri

CME MOC



Saturday, April 6 | 10:00 am

Alcoholics in the Hospital: Patients, Not Staff

Joan Shaffer, MD
Adult Intensivist
Mercy St. Louis
St. Louis, Missouri

CME MOC



Saturday, April 6 | 1:30 pm

Physician Suicide: The Silent Epidemic

Amanda Kingston, MD
Assistant Professor
Psychiatry
University of Missouri
Columbia, Missouri

CME MOC



Saturday, April 6 | 3:30 pm

OMSS PRESENTATION
Data & Leverage in Physician Employment Negotiations

Kyle Claussen, Vice President
Resolve Physician Agency
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Missouri State Medical Association

161st Annual Convention

April 5-7, 2019 / Westin Kansas City at Crown Center
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PRELIMINARY PROGRAM

Pre-Convention Meetings

Thursday, April 4

2:30 pm	MSMA Insurance Agency Board Meeting
3:30 pm	MSMA Executive Committee
3:30-6:00 pm	Convention Registration
3:30-6:00 pm	Exhibitor Setup & Registration
5:00 pm	**MSMA Council Meeting**
6:30 pm	Alliance Dutch Treat Dinner
6:30 pm	**MSMA Council Reception & Dinner**

Convention Meetings

Friday, April 5

6:30 am-4:00 pm	Convention Registration
6:45 am	Moneta Group Investment Advisors Breakfast
7:00 am	**Exhibit Hall Opens/Continental Breakfast for all Conferees**
8:00 am	**Opening Session MSMA House of Delegates**
8:30 am	Alliance Board Meeting
10:00 am	Alliance General Assembly - Session I
10:00 am	**Reference Committee A**
10:30 am	**Reference Committee B**
11:00 am	Missouri Physicians Health Luncheon & Meeting
11:30 am	"Spirit of the Alliance" Awards Luncheon
Noon	SLMMS Caucus & Luncheon
Noon	KCMS Caucus & Luncheon
1:30 pm	**MSMA General Session**
3:30 pm	**MSMA General Session**
4:30 pm	Alliance Past President's Reception
5:00 pm	Organized Medical Staff Section Business Meeting
5:00 pm	Medical Student Section Business Meeting
5:30 pm	Medical School Alumni Receptions
7:00 pm	Alliance Foundation Fundraiser/Dinner
7:00 pm	Resident and Medical Student Mixer

Program subject to Change. Refer to Convention Official Program for times and meeting locations. For more information, contact MSMA's Benita Stennis, at 800-869-6762 or bstennis@msma.org.

Saturday, April 6

6:30 am-4:00 pm	Convention Registration
7:00 am	**Exhibit Hall Opens/Continental Breakfast for all Conferees**
All Day	CME Programs, Lectures & Meal Functions
7:00 am	International Medical Graduate Section Meeting
8:00 am	**MSMA General Session**
8:30 am	Alliance General Assembly - Session II
10:00 am	**MSMA General Session**
10:00 am	MMPAC Meeting
10:15 am	Resident and Fellow Section Business Meeting
10:30 am	Exhibit Hall Closes
10:45 am	Young Physician Section Business Meeting
11:15 am	Resident and Fellow Section/ Young Physicians Section/ Medical Student Section Program
Noon	SHINE of Missouri Product Theater
12:30 pm	Alliance Installation Luncheon
1:00 pm	AMA Issues
1:30 pm	**MSMA General Session**
2:30 pm	Missouri State Medical Foundation Meeting
2:30 pm	Alliance Board Meeting
3:00 pm	Component/Specialty Society Leaders Meeting
3:30 pm	OMSS Educational Session
5:15 pm	Reception: 50-Year Pin Recipients & MSMA Past Presidents
6:30 pm	**MSMA Presidential Inauguration**
7:30 pm	**MSMA Presidential Reception** *Entertainment, Hors d'oeuvres & Cash Bar*

Sunday, April 7

7:00 am	District Breakfasts & Caucuses
8:15 am	**Second MSMA House of Delegates**
Immediately Following Closure of the HOD	MSMA Council Meeting

www.msma.org/annual-convention

Call the Westin Kansas City at Crown Center
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Rates start at $151 per night plus charges and taxes.

Negotiating Noncompetition Agreements

by Liz LaFoe, JD

Many healthcare provider employment and practice agreements contain restrictive covenants, such as noncompetition agreements. Negotiating the terms of a restrictive covenant is advisable, because these agreements can limit future practice options should a healthcare provider subsequently desire to change employers or practice groups, or wish to open their open practice in a nearby area. Noncompetition provisions typically prevent former employees from working for a competitor within a certain distance (*e.g.*, 15 miles) for a set period of time (*e.g.*, three years).[2] Restrictive covenants may also protect confidential information, such as patient lists. Although restrictive covenants are commonly used to protect healthcare employers from the future actions of physician employees, these provisions may also be considered for other types of employees with technical skills and influence over a healthcare employer's established patient base, such as radiologic technologists and prosthetists.[3]

This article discusses the general legal requirements and enforceability of noncompetition agreements in Missouri. A healthcare provider or employer negotiating the terms of a noncompetition agreement should consult an experienced labor and employment attorney for advice specific to their situation.

In noncompetition agreement litigation, courts consider the competing values of employers and employees. The employer needs a highly trained, competitive, and profitable workforce, without fear that workers will take advantage of the employer's business secrets and any specialized training, or steal the employer's customers. Likewise, employees need the ability to advance their careers and provide for their families, both of which may at times require seeking different employment.[4] In these cases, courts also consider two long held rules of law: the freedom to contract and the rule against restraint of trade.[5] On the one hand, parties are allowed to negotiate away some of their rights, such as the right to work within a certain distance of former employers, in exchange for employment and other benefits. But employers are not allowed to overly restrict future employment opportunities. Therefore, Missouri courts uphold reasonable noncompetition agreements in some, but not all, circumstances.[6]

The most frequently litigated issue about noncompetition agreements is whether or not the provision is valid.[7] To be valid, a noncompetition agreement must meet the following criteria: 1. it must be supported by consideration; 2. it must serve legitimate interests of the employer; and 3. it must be reasonable in scope, time, and distance.[8]

Consideration

First, valid noncompetition agreements must be supported by consideration, meaning the employer must give something of value in exchange for the employee's promise not to compete.[9] Typically, a noncompetition is signed as part of the initial employment contract, before the new employee begins work. However, if the agreement is signed after employment begins, continuing employment can still qualify as consideration in an at-will employment contract, provided the employee also has ongoing access to the protected assets and relationships of the employer (*e.g.*, the employee has regular contacts with patients, access to customer lists, and/or specialized trainings).[10] Other benefits, such as a separate payment or promotion, are also sufficient consideration, whether the noncompetition agreement is signed before or after employment begins.[11]

Legitimate Business Interest

Second, the noncompetition agreement must exist to protect a legitimate business interest. In Missouri, legitimate interests include confidential information and



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customer relationships, including a healthcare provider's established patient base.[12] The classic type of confidential information is an employer's trade secrets, which are actually protected even without a specific noncompetition agreement. However, confidential information may also include specialized training techniques and customer or patient contacts or lists, when the purpose of the noncompetition provision is to keep the former employee from using this type of information against the former employer.[13] Further, the employee must have sufficient contact with, and influence over, customers or in the case of physicians, their patients to lure them from the former employer.[14]

Reasonableness

Finally, the noncompetition agreement must be reasonable in scope, time, and distance. To determine reasonableness, Missouri courts look at whether the agreement is more restrictive than necessary to protect the employer's legitimate interests.[15] A noncompetition agreement is always deemed too restrictive if it seeks to protect the employer from "mere" competition because all employers are subject to some competition, even from former employees.[16] For example, a noncompetition agreement preventing a former employee from looking for *new* customers is too restrictive.[17] Courts also examine whether time and distance restrictions are fair. For example, in the context of a physician noncompetition agreement, Missouri Courts have upheld a provision restricting a physician from practicing within a 75-mile radius of their former employer for a period of two-years.[18] A noncompetition agreement lacking any geographic limit (*i.e.*, a global noncompete) is unenforceable; an agreement with an unreasonable number of years (*e.g.*, former employee cannot compete for decades) would also likely be unenforceable.[19]

If a Court finds the noncompetition agreement is invalid because it is unreasonable, in some cases the Court will modify it and enforce it to the extent the employer can prove that *some* of the requested limitation(s) are reasonable.[20] However, this is at the Court's discretion; the Court may also find the agreement is "wholly unreasonable" and refuse to enforce it at all. When a valid noncompetition agreement is breached by a former employee, the employer's remedy is either injunctive relief (a court order that the former employee must cease its competitive activities for a certain period of time, usually for the period of time set forth in the agreement and beginning on the date the Court enters the order for the injunctive relief) or damages (the former employee must pay for the financial losses his or her actions caused).[21]

Conclusion

Noncompetition agreements raise complex issues and it is advisable to carefully consider and negotiate the terms before entering into such an agreement. Enforcement is dependent on the facts and circumstances of each individual case. It is prudent to seek the advice of an experienced attorney when drafting this type of provision or entering into an employment agreement in which one is contained.

References

1. This article was written by Liz LaFoe, an associate in the Jefferson City, Missouri office of Husch Blackwell LLP. The information contained in this article should not be construed as legal advice or a legal opinion on any specific facts or circumstances. The contents are intended for general information purposes only, and readers are urged to consult their own attorney concerning their own situation and any specific legal questions.
2. Robert Dierker & Richard Mehan, 35 Mo. Practice Series § 11:1-11:2, *Covenant Not to Compete* (Updated 2018).
3. *See e.g.*, *Kessler-Heasley Artificial Limb Co., Inc. v. Kenney*, 90 S.W.3d 181 (Mo. App. S.D. 2002); *Silvers, Asher, Sher &McLaren, M.D.s Neurology, P.C. v. Batchu*, 16 S.W.3d 340 (Mo. App. W.D. 2000).
4. *Healthcare Services of the Ozarks, Inc. v. Copeland*, 198 S.W.3d 604 (Mo. 2006).
5. *Id.* (internal citation omitted).
6. *Id.* (internal citation omitted).
7. Robert Dierker & Richard Mehan, 35 Mo. Practice Series § 11:1-11:2, *Covenant Not to Compete* (Updated 2018).
8. *Id.*
9. *Id.*
10. *See e.g., Nail Boutique, Inc. v. Church*, 758 S.W.2d 206 (Mo. App. S.D. 1988); *JumboSack Corp. v. Buyck*, 407 S.W.3d 51 (Mo. App. E.D. 2013); *Healthcare Services of the Ozarks, Inc. v. Copeland*, 198 S.W.3d 604 (Mo. 2006); *Osage Glass, Inc. v. Donovan*, 693 S.W.2d 71 (Mo. 1985); *Whelan v. Sec. Co. v. Kennebrew*, 379 S.W.3d 835 (mo. 2012); Robert Dierker & Richard Mehan, 35 Mo. Practice Series § 11:1-11:2, *Covenant Not to Compete* (Updated 2018).
11. *Id.*
12. *See e.g.*, *Kessler-Heasley Artificial Limb Co., Inc. v. Kenney*, 90 S.W.3d 181 (Mo. App. S.D. 2002); *Silvers, Asher, Sher &McLaren, M.D.s Neurology, P.C. v. Batchu*, 16 S.W.3d 340 (Mo. App. W.D. 2000).
13. *See e.g., Nail Boutique, Inc. v. Church*, 758 S.W.2d 206 (Mo. App. S.D. 1988); *JumboSack Corp. v. Buyck*, 407 S.W.3d 51 (Mo. App. E.D. 2013); *Healthcare Services of the Ozarks, Inc. v. Copeland*, 198 S.W.3d 604 (Mo. 2006); *Osage Glass, Inc. v. Donovan*, 693 S.W.2d 71 (Mo. 1985); *Whelan v. Sec. Co. v. Kennebrew*, 379 S.W.3d 835 (mo. 2012); Robert Dierker & Richard Mehan, 35 Mo. Practice Series § 11:1-11:2, *Covenant Not to Compete* (Updated 2018).
14. *Id.*
15. *Id.*
16. *Id.*
17. *Healthcare Servs. of the Ozarks v. Copeland*, 198 S.W.3d 604 (Mo. 2006).
18. *Silvers, Asher, Sher &McLaren, M.D.s Neurology, P.C. v. Batchu*, 16 S.W.3d 340 (Mo. App. W.D. 2000).
19. *Sigma-Aldrich Corp. v. Vikin*, 451 S.W.3d 767 (Mo. App. E.D. 2014).
20. Robert Dierker & Richard Mehan, 35 Mo. Practice Series § 11:1-11:2, Covenant Not to Compete (Updated 2018).
21. Kessler-Heasley Artificial Limb Co., Inc. v. Kenney, 90 S.W.3d 181 (Mo. App. S.D. 2002); Silvers, Asher, Sher & McLaren, M.D.s Neurology, P.C. v. Batchu, 16 S.W.3d 340 (Mo. App. W.D. 2000); Robert Dierker & Richard Mehan, 35 Mo. Practice Series § 11:1-11:2, Covenant Not to Compete (Updated 2018). .

MM

Female Genital Cutting: Considerations for the Western Physician

by Amy Gee, MD, Elena Kraus, MD & Amy Bilyeu, MD

Female genital cutting is a common practice that affects millions of woman annually. It is a practice that harms women by causing suffering and potentially long-term medical problems and without redeeming medical benefits.

Female genital cutting (FGC) is an international health concern that affects over 200 million women worldwide in 30 countries, with an additional three million women and children at risk annually.[1] Called female genital mutilation (FGM) by the World Health Organization (WHO), it includes any procedure that intentionally alters or causes injury to the female genital organs for non-medical reasons. Many in the Western World consider FGC to be a human rights violation and there have been international efforts to eliminate the practice.[2] FGC is a cultural practice performed predominantly in Africa, the Middle East, and Asia. With increasing immigration to the United States, healthcare providers may be faced with managing medical complications of this practice. It is also crucial for us to consider and be knowledgeable of the social, ethical, and legal ramifications of its continued practice.

FGC goes back almost 2000 years and has been described as a mark of upper class and a female rite of passage.[3] It has deep roots in cultural traditions and social norms. It is performed more often in patriarchal societies where women often have poor education and little decision-making power. The practice is meant to control women's sexual behavior and improves chances a woman will maintain her virginity until marriage. It is also perceived to improve hygiene and be more aesthetically pleasing. In these same cultures, marriage ensures a woman's livelihood and wellbeing, and women who are circumcised can obtain higher social status for their families.[4] These social benefits are crucial to a good life in these cultures and induce perpetuation of the practice.[5] Qualitative studies show it is viewed as an act to show love for your children and to promote a peaceful married life.[6] Indeed, studies indicate that despite their awareness of the harm it can bring and the reinforcement of their low status, both immigrants and women in their native countries support the practice.[7] This powerful social context helps explain the difficulties that have been met in decreasing and abolishing FGC, and considerations that physicians must make in their counseling and advocacy.

There are four types of circumcision described by the WHO. Type 1 involves excision of the prepuce, with or without excision of part or all of the clitoris. Type 2 involves the partial or total removal of the clitoris and the labia minora. Type 3, also called infibulation, includes removing part or all of the external genitalia and approximation of the remnant labia majora. This can result in a small neointroitus and the creation of a covering seal over the urethra and/or vaginal opening. Type 4 includes all other harmful procedures to the genitalia, including scratching, pricking, and others not specified in the first three types.[1]

The procedure is carried out from as early as infancy until age 15, although in some areas it is delayed until just prior to marriage.[1] In most places, trained non-medical native 'circumcisers' perform the procedure on girls either held or strapped down without standard sterile surgical technique. Knives, razors, scissors, and/or hot objects are used without anesthesia or prophylactic antibiotics. For hemostasis, mixtures of honey, oil, dough, or tree sap are used. Postoperatively, the girl's thighs and legs may be bound to ensure healing of the wound. Depending on what type of circumcision, these girls could be bound for up to a week.[3]

Medical Consequences

Female genital cutting offers no known medical benefit, and there are significant short term and lifelong complications (See Table 1). Immediate complications include hemorrhage, pain, shock, genital tissue swelling,



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infections, urination problems, and death. Long-term medical complications include post-traumatic stress disorder (PTSD), permanent tissue damage, recurrent urinary and vaginal infections, adverse obstetric outcomes including episiotomy, prolonged labor, and obstetric lacerations, as well as sexual consequences, including dyspareunia, decreased sexual satisfaction and sexual desire.[1,8,11] One study done in Africa showed that women who underwent Type II and III FGC were at significantly higher risk of cesarean delivery, postpartum hemorrhage, and extended maternal hospital stay, and their infants are at significantly higher risk of requiring resuscitation and of dying in the hospital than those without FGC.[9] Perhaps, the most shocking injuries are clavicle, femur, and humerus fractures from the girls struggling during the procedure as they are being forcible strapped down.[10] Accurate assessment of the diversity of consequences of this practice is limited due to the retrospective nature of the studies.

Our Response

Responses from physician professionals and international health organizations have generally been that of condemnation, based on the premise that all female genital cutting is a violation of the human rights of women and has potentially serious health consequences. Efforts have been made to decrease its practice worldwide. The WHO has been particularly vocal in this conversation, even publishing a summary document that made a plan to eliminate the practice, endorsed by numerous world organizations, including UNAIDS, UNIFEM, and UNICEF.[2]

One organized effort successful in discouraging the practice has been the creation of laws against FGC and even its medicalization, both in countries where it is more prevalent as well as locally.[12] In the United States, a federal statute banned the procedure in 1996. Recently, the first U.S. physician was charged in federal court for performing female circumcision.[13] Despite these efforts, it has not kept a significant number from having the procedure done during return visits to their home countries.[14] Nonetheless, it expresses a clear view that our culture will not participate or condone this practice.

Educational efforts have aimed at providing physicians and nurse a greater understanding of the practice and training healthcare providers to educate and empower patients to make their own health decisions. This education has been helpful for providers in high prevalence settings,[12] but is also crucial for patients abroad and in our own clinics. Listening and engaging with neutral language will encourage patients to seek help when they are suffering with consequences, or considering having the procedure performed in their home countries. Describing their cutting as "mutilation" or a violation of their rights potentially disregards decision-making they have exercised and their inherited culture, potentially perpetuating the victimization of these women. Using appropriate language when counseling and given possible therapeutic options to patients with FGC is imperative. Although the response of Western physicians should be clearly and strongly opposing this procedure as medically harmful, it is still important to consider the potential ramifications of our approach to education of individual patients, and what types of campaigns we offer support to eradicate the practice.

Table 1. Complications of female genital cutting.

Acute Complications
hemorrhage
pain
septic shock
genital edema
infections, abscesses
urinary retention
broken bones
death
Chronic Complications
urinary tract infections
vaginal infections
difficult labor and delivery
dysmenorrhea
infertility
dysparunia
decreased sexual satisfaction
PTSD

Male vs Female Circumcision

Any consideration of FGC naturally encourages a discussion of how it is similar and different to male circumcision. Female and male circumcisions have similarities that prompt consideration of both patient consent and medical utility. In 2012, Germany, backed by major medical associations, briefly outlawed male circumcisions on the grounds that it violated a child's right to bodily integrity and self-determination.[15] There are key differences between male and female genital cutting that make female genital cutting an issue of human rights and harm. Infant male circumcision, like female circumcision, proceeds upon parental consent. There is precedent for parents to consent for medical treatment on behalf of their children; however, they are usually interventions with clear medical benefits. Herein lies one primary difference between the two. There is some evidence that male circumcision may provide medical benefit.[16] Importantly, there is little evidence of significant harm on physical or psychological



Figure 1. Young girl undergoing female circumcision[19].



Figure 2. Tools used for female circumcision[20]

health. Studies have shown that male circumcision leads to decreased risk of HIV acquisition, other sexually transmitted infections, and urinary tract infections.[17] Furthermore, there are far more extreme types of female genital cutting than male circumcision and with them the possibility of far more complications. Beyond the physical and medical differences, there is an important moral difference between the two. There is a significantly different intent of the two procedures. Male circumcision is done for cultural or religious reasons, but female circumcision reflects an underlying message about the status of women and an intention to affect their sexual function and behavior.[18] Importantly, male circumcision does not intend to affect the male's future sexual behavior or communicate a lower status of males. Combined with the minimal medical risk and potential of medical benefit, male circumcision has far fewer consequences than FGC.

Conclusion

Female genital cutting is a common practice that affects millions of woman annually. It is a practice that harms women by causing suffering and potentially long-term medical problems and without redeeming medical benefits. The complications of FGC far outweigh any benefits, and women should be counseled appropriately. It is our responsibility as healthcare professionals to educate women at risk for FGC and decrease its practice worldwide. We must focus on education and working to change this practice with respectful, yet definitive approaches.

See accompanying Guest Editorial on page 38.

References

1. World Health Organization. Female genital mutilation. 2018. Accessed July 22, 2018.
2. World Health Organization. Eliminating Female genital mutilation: An interagency statement. Geneva, Switzerland: World Health Organization;2008.
3. Nour NM. Female genital cutting: A persisting practice. Reviews in Obstetrics and Gynecology. 2008;1(3):135-139.
4. Hellsten SK. Rationalizing circumcision: from tradition to fashion, from public health to individual freedom— critical notes on cultural persistence of the practice of genital mutilation. Journal of Medical Ethics. 2004;30(3).
5. UNICEF. Changing a harmful social convention: Female genital mutilation/cutting. United Nations Children's Fund (UNICEF);2005.
6. Vissandjee B, Deneto S, Migliardi P, Proctor J. Female genital cutting (FGC) and the ethics of care: community engagement and cultural sensitivity at the interface of migration experiences. BMC International Health and Human Rights. 2014;14(13).
7. Mbanya VN, Gele AA, Diaz E, Kumar B. Health care-seeking patterns for female genital mutilation/cutting among young Somalis in Norway. BMC Public Health. 2018;18(517).
8. Reisel D, Creighton SM. Long term health consequences of Female Genital Mutilation (FGM). Maturitas. 2015;80(1).
9. Banks E, Meirik O, farley T, Akande O, Bathija H, Ali M. Female genital mutilation and obstetric outcome: Who collaborative prospective study in six African Countries. Lancet. 2006;367(9525):1835-1841.
10. Farage MA, Miller KW, Tzeghai GE, Azuka CE, Sobel JD, Ledger WJ. Female genital cutting: confronting cultural challenges and health complications across the lifespan. Women's Health. 2015;11(1):79-94.
11. World Health Organization. WHO guidelines on the management of health complications from female genital mutilation. Geneva, Switzerland: World Health Organization;2016.
12. Kimani S, Esho T, Kimani V, et al. Female Genital Mutilation/Cutting: Innovative Training Approach for Nurse-Midwives in High Prevalent Settings. Obstetrics and Gynecology International. 2018;2018(5043512).
13. Noble A. Detroit doctor first to be charged under federal law against female genital mutilation. The Washington Times2017.
14. Berg RC, Denison E. A Tradition in Transition: Factors Perpetuating and Hindering the Continuance of Female Genital Mutilation/Cutting (FGM/C) Summarized in a Systematic Review. Health Care for Women International. 2013;34:837-859.
15. Ahren R. Three months after circumcision ban, German government to legalize rite. The Times of Israel2012.
16. Blank S, Brady M, Buerk E, et al. Circumcision Policy Statement. American Academy of Pediatrics;2012.
17. Tobian, A, Gray R. The Medical Benefits of Male Circumcision. JAMA. 2011 Oct 5;306(13):1479-80. doi: 10.1001/jama.2011.1431.
18. Mazor J. The child's interests and the case for the permissibility of male infant circumcision. BMJ Journal of Medical Ethics. 2013;39(7).
19. 2018; www.soc.ucsb.edu/sexinfo/article/female-genital-mutilation-fgm. Accessed October 20, 2018.
20. 2017; newz.ug/eu-dedicates-2017-to-combating-female-genital-mutilation/. Accessed October 20, 2018.

Disclosure

None reported.

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Male Circumcision: The Clinical Implications Are More Than Skin Deep

by Elizabeth A. Piontek, MD & Justin M. Albani, MD

It is absurd to equate the simple removal of the male foreskin for health reasons to the barbaric amputation of the female clitoris for the sole purpose of preventing the woman from experiencing pleasure during sex.

Male circumcision remains one of the oldest and most commonly performed surgical procedures in the world. Despite the fact that 1 in 3 males currently are circumcised, some controversy remains about the procedure's medical and social value.

This was highlighted recently by a February 2018 *USA Today* article covering a proposed ban on male circumcision in Iceland. This legislation revisited the debate of whether circumcision should be a right for parents to decide or a practice that should be subject to a legalized ban.[1] If passed, the legislation would impose a six-year jail term on anyone performing the procedure on a child for non-medical reasons. Iceland has previously been known as a progressive nation when it comes to gender equality. This year the country was the first to make it illegal for companies to pay women less than men. The ban on male circumcision was proposed by a member of Iceland's Progressive Party after realizing there was no male equivalent to the country's ban on female genital mutilation which was outlawed in 2005.





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This was an absurd attempt to equate the removal of the male foreskin, a simple skin procedure usually performed in the first few days of life with well documented health benefits, to the barbaric removal of the female clitoris for which the only reported goal of the procedure is to remove a woman's ability to experience pleasure during sex. Female circumcision, performed between infancy and adolescence mostly in African, Middle Eastern, and Asian countries, is often associated with significant morbidity and even mortality in some instances, and has no known health benefits. This new plan for gender parity has progressed as even more recently in June 2018, a *New York Times* article covered a similar potential ban on male circumcision in Denmark.[2]

Think this idea is occurring only overseas? Think again. Back in 2011, a group of activists in San Francisco formed an advocacy group named the Prohibition of Genital Cutting of Male Minors.[3] Calling circumcision "male genital mutilation," the group felt this procedure was akin to female genital mutilation and succeeded in getting a ban on male circumcision placed on the city ballot. This legislation specified a penalty of a misdemeanor charge and a fine up to $1,000 or a maximum of one year in prison to those performing this procedure on anyone under 18 years of age.

Fortunately, common sense prevailed and both the San Francisco and the Icelandic bans never came to fruition, thus preventing political correctness from disrupting public health. In July 2011, the San Francisco Superior Court judge ordered the ban to be withdrawn from the ballot. In April 2018, the controversial Icelandic proposal was dropped amidst a torrent of criticism, not the least of which was that circumcision was and continues to be a religious ritual practiced in both Judaism and Islam. The very idea of making it illegal prompts further questions about religious freedoms and human rights.



Figure 1. Balanitis (infection and inflammation of the glans penis) is more common in uncircumcised men.
Source: Campbell's Urology



Figure 2. Circumcision can reduce risk of penile cancer.
Source: Campbell's Urology

According to the World Health Organization, approximately 30% of men are circumcised worldwide.[4] Although the myriad of cultural and religious reasons for circumcision are outside the scope of this discussion, the medical benefits of male circumcision are numerous and well-proven. To address the topic, the American Urological Association (AUA) published a policy statement, revised most recently in May 2017. The AUA "believes that neonatal circumcision has potential medical benefits and advantages as well as disadvantages and risks."[5] Neonatal circumcision that is properly performed by a trained and experienced operator can improve penile hygiene and prevent future issues of phimosis, paraphimosis, and balanoposthitis, all of which are commonly seen in adult urologic practice in uncircumcised men. In addition, the incidence of urinary tract infections is ten times higher in uncircumcised male infants 3-6 months of age. (Figure 1.)

Randomized controlled trials have demonstrated circumcision results in a 50-60% reduction in risk of acquiring HIV infection in heterosexual males. In three clinical trials performed in sub-Saharan Africa, uncircumcised men were randomly assigned to one of two groups. One group was offered immediate circumcision (treatment group) and those in the other group (control group) were offered circumcision at the end of the trial. All participants received HIV testing and counseling, condoms, and safe sex counseling. All three trials were stopped early due to the overwhelming evidence that circumcision offered a protective effect against HIV, and it was felt to be unethical to ask the control group to wait to be circumcised.[6,7,8] There are also reports that circumcision could reduce the risk of HPV infection and other sexually transmitted diseases such as chlamydia, trichomonas, and HSV.[9,10] Finally, there is a clear decrease in the incidence of penile cancer among U.S. males who are circumcised.

The American Academy of Pediatrics (AAP) has a very similar policy statement to the AUA. This governing body found that the health benefits of elective newborn male circumcision outweigh the risks. Although the benefits are not great enough to recommend universal newborn circumcision, they "are sufficient to justify access to this procedure for families choosing it and to warrant third-party payment for circumcision of male newborns."[11] Ultimately the AAP concluded it should be left up to the parents to decide.

As with any procedure, there are immediate risks (bleeding, infection, penile injury) and potential delayed complications (buried penis, meatal stenosis, skin bridges, chordee, and poor cosmetic appearance). However, the incidence of severe complications is extremely low, and minor complications are reported at only 3%. In the United States, EMLA cream, dorsal penile nerve block or subcutaneous ring block along with a pacifier dipped in sucrose solution are most often used for analgesia and anesthesia. These methods have been found to be both safe and effective in managing procedural pain associated with circumcision. (Figure 2.)

Advocates of a circumcision ban suggest that the parents' decision to circumcise violates a child's bodily autonomy and human rights. However, parents make countless decisions on their children's behalf daily to keep them healthy and safe, and this routinely includes procedures as well. Clearly, circumcision and its medical benefits fall within this same scope. It becomes a very slippery slope to consider placing a legal ban on a procedure that has clear medical benefits simply because

some may declare this is not the child's decision. Although blogs and websites by adult men exist who claim that their parents' decision to circumcise them has mentally scarred them and deprived them of sexual pleasure, a multitude of studies have proven that circumcision has absolutely no adverse effect on male sexual function, sensitivity, sensation, or satisfaction.[12] Despite these studies, some adult men have even sued their parents, doctors, and hospitals later in life (and won!). The mass hysteria generated over the pseudo-harmful effects of vaccinations now attributed to phony research strikes a similar chord.

The controversy over circumcision does beg the question: "Should we leave it up to the child to decide about circumcision later in life? Ultimately this decision must be deferred to the parents' judgement after taking into careful consideration the risks and benefits of the procedure, the extensive medical evidence supporting its use, and choosing an experienced and proficient physician (most often a pediatrician). An outright ban on neonatal circumcision with its significant religious and social implications as well as its well described health benefits is certainly not the answer.

References

1. Hjalmar, K 2018, "Iceland could become first country to ban male circumcision," USA Today, 19 February, accessed August 13, 2018.
2. Sorensen, MS 2018, "Denmark talks (reluctantly) about a ban on circumcising boys," The New York Times, 2 June, accessed October 15, 2018.
3. Conley, Mikaela 2011, "Proposed Circumcision Ban Struck From San Francisco Ballot," ABC News online, 28 July, accessed August 13, 2018.
4. World Health Organization. Male circumcision: Global trends and determinants of prevalence, safety, and acceptability. 2007. Accessed online August 13, 2018.
5. AUA Policy Statements: Circumcision (Accessed August 13, 2018 at http://www.auanet.org/guidelines/circumcision)
6. Auvert B, Taljaard D, Lagarde E, et al. Randomized, controlled intervention trial of male circumcision for reduction of HIV infection risk: The ANRS 1265 trial. PLOS Medicine 2005;2(11):e298.
7. Gray RH, Kigozi G, Serwadda D, et al. Male circumcision for HIV prevention in men in Rakai, Uganda: a randomized trial. The Lancet 2007;369:657-666.
8. Bailey RC, Moses S, Parker CB, et al. Male circumcision for HIV prevention in young men in Kisumu, Kenya: a randomized controlled trial. The Lancet 2007;369:643-656.
9. Auvert B, et al. Effect of male circumcision on the prevalence of high-risk human papillomavirus in young men: results of a randomized controlled trial conducted in Orange Farm, South Africa. J Infect Dis 2009;199(1):14-19.
10. World Health Organization. Neonatal and child male circumcision: a global review. 2010. Accessed online November 15, 2018.
11. American Academy of Pediatrics, Circumcision Policy Statement, Task Force on Circumcision, Pediatrics 2012;130; 585. (Accessed August 13, 2018).
12. Morris B, Krieger J. Does Male Circumcision Affect Sexual Function, Sensitivity, or Satisfaction? – A Systematic Review. J Sex Med 2013 Nov;10(11):2644-57.

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Physicians Worldwide: Educate To End Female Genital Cutting

by Amy Gee, MD

Female genital cutting (FGC) is the unspoken, medically harmful, tradition that causes long term suffering of over 200 million women in over 30 countries. The chronic health problems related to this tradition are vast and there has been no evidence of increased health outcomes. FGC unnecessarily increases the likelihood of long-term medical and surgical complications; thus, steps should be taken to immediately abandon its practice.

FGC is deeply rooted in gender inequality. FGC is performed to control women's sexuality, enhance male sexual pleasure, and absurdly preserve purity and chastity.[1] The cruel practice has continued because women are terrified of the consequences associated with being "uncut". Imagine being a mother of a young Somalian girl who doesn't want her daughter to go through the adverse life-long consequences of FGM. However, if a daughter doesn't undergo the procedure, it will subject her to a life of disparity in which she will never be married and will be an outcast in her indigenous community. As imagined, FGC is so deeply rooted in the culture that it is difficult to stop its practice.

It is our duty, as healthcare providers, to educate our patients about FGC so that they will have the information they need to make an informed decision. Surveys have found FGC is less common in girls whose mothers had access to education.[1] Education plays a huge role in eliminating this practice worldwide. Health literacy is low in the countries where FGC is commonly performed. Women who undergo FGC often do not associate the medical complications they have with the procedure. Girls who become ill or die from complications related to FGC attribute it to evil spirits and not to the procedure.[2] It has been shown that educational programs make a difference in decreasing, and sometimes eliminating, FGC. In 1997, Tostan, an American non-profit group, organized educational programs to help women make informed decisions regarding FGC. In 1997, using these educational programs, a village in Senegal completely abandoned FGC. By 2018, 8000 communities have pledged to abandon this tradition.[3]

As an OB-GYN resident, I have encountered pregnant patients that have undergone FGC. All physician and healthcare personnel interactions are great opportunities to educate them about FGC, so that they will spare their daughters undergoing the same pain and suffering. Every healthcare provider should be looking for opportunities to educate their patients about FGC. With increased awareness comes increased change. Female genital cutting must be eliminated. Please educate and do your part to end this harmful practice.

See accompanying Perspectives on pages 32 and 35.



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References

1. Cappa C. Female Genital Mutilation/Cutting: A Statistical Overview and Exploration of the Dynamics of Change. New York: United Nations Children's Fund, July 2013.
2. Mackie G. Female Genital Cutting: A Harmless Practice? Medical Anthropology Quarterly. 2003;17(2):135-158. doi:10.1525/maq.2003.17.2.135
3. Tostan International. (2018). Female Genital Cutting | Tostan International. https://www.tostan.org/areas-of-impact/cross-cutting-gender-social-norms/female-genital-cutting/ [Accessed 16 Nov. 2018].

Editor's Note

On November 20, 2018, Michigan District Federal Judge Bernard Friedman ruled that the two-decade old US Congressional nation-wide ban on female genital cutting/mutilation is unconstitutional. Twenty-seven states, including Missouri, have banned the barbaric practice and these laws remain in effect. Either the remaining states must separately prohibit the practice or Congress will need to pass a new ban addressing the legal technicalities Friedman cited or the decision would need to be successfully appealed to the Supreme Court. The female genital cutting in the case was done on nine girls by a Michigan licensed Emergency Medicine physician and an Internist. In my opinion these physicians' licenses to practice should be revoked by Michigan authorities as guilty of flagrant malpractice and perhaps felonious assault amd battery. **MM**

Diversity, Inclusion, and Student Engagement at UMKC School of Medicine

by Mary Anne Jackson, MD

Moving forward into 2019, I want to take a moment to recognize all of the hard work of the faculty and staff at the University of Missouri-Kansas City School of Medicine (UMKC SOM) as they participated in the review to showcase our school during the Liaison Committee on Medical Education visit this past April. The official letter arrived in October, with full accreditation for the eight-year cycle, confirming the vitality of the school and underscoring the programmatic excellence we've worked so hard to achieve.

We also received notification in the fall that the UMKC SOM was one of ten medical schools across the country, recognized with the INSIGHT Into Diversity Higher Education Excellence in Diversity (HEED) Award, which honors health professional colleges and universities that demonstrate an outstanding commitment to making diversity, and inclusion a top priority across their campuses. UMKC SOM decades-long pipeline programs were highlighted in the application along with the Students in Medicine, Academia, Research and Training (SMART) retention and graduation mentoring program and the "Expect Respect" initiative, which promotes positive work and learning environments.



Latinx Medical Student Association LMSA)

The HEED recognition was concurrent with news that the UMKC SOM was awarded a $3.2 million grant from U.S. Health Resources and Services Administration to expand and enhance its pipeline and mentoring programs to ensure that educationally and economically disadvantaged students have the opportunity to enter, persist and graduate from a health science district program at UMKC. In partnership with the Schools of Dentistry and Pharmacy, the programs are led by Dr. Nathan Thomas, who joined the UMKC SOM one year ago as the Associate Dean of Diversity and Inclusion, along with Dr. Alice Arrendondo, Dean of Admissions. Integral to the programs' success are the addition of two key new staff that join Drs. Thomas and Arrendondo to round out the Office of Diversity and Inclusion initiatives. We were delighted to welcome Rachel McCommon, as Coordinator of Diversity and Inclusion Strategic Initiatives, who will support student and resident success, and Dr. Allan Davis, Coordinator of Diversity Programs and Recruitment, who will coordinate the UMKC SOM high school pipeline programs, Summer Scholars and Saturday Academy. We look forward to the growth and future success of the programs—and to working with these talented and energetic individuals.



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Critical Mass Gathering (CMG) Professional & Student Networking Event



Students in Medicine, Academia, Research and Training (SMART) Mentoring Program

There are currently 650 students who are matriculating through UMKC SOM's accelerated, six-year dual-degree BA/MD program, which takes students straight from high school and engages them in an integrated curriculum consisting of liberal arts, basic sciences and clinical medicine. Students begin studying medicine on their first day and clinical experience begins immediately. The initial two years also include courses leading to bachelor degrees in liberal arts, chemistry, or biology. Clinical experiences increase in the third year, where students work together a half day a week in an outpatient continuing care clinic and on two-month internal medicine rotations throughout each of their final three years.

It is at the three-year mark when students have the opportunity to be trained and serve as health coaches in an innovative church-community-based Diabetes Prevention Program (DPP) service-learning course led by Dr. Jannette Berkley-Patton and her Community Health Research Group team along with Kathie Ervie, Program Director of the Physician Assistant Program. The DPP course is a natural fit for our students to gain more skills and understanding of health disparities, cultural competency, and disease prevention approaches, as well as an opportunity to learn to better communicate and work inter-professionally in a non-clinical, church setting. At this time, there are 15 churches in our African American community participating with nearly 70 student DPP coaches and a wait list of six more churches. This program has tremendous potential to become a national model on how medical schools and academic hospitals can work together to reduce the increasing rates of prediabetes with African Americans and other populations experiencing diabetes related health disparities.

Lastly, this January, the UMKC SOM welcomes 21 MD-only track students who enter in Year 3 of the Medical School, 13 students in our Masters in Medical Science Programs in Anesthesia and 21 students to our Physician Assistant Program. For them, and all of our students, just a few words of advice:

- Take the time to get your work done.
- Get help when you need it—the school is built to support you—you have an amazing range of mentors and teachers who are all here for you.
- Remember that medicine is a team sport—one of the true blessings of your program is that those working by your side will become some of your truest friends and life-long colleagues.
- Be sure and make time for yourself to keep balanced and focused.
- Remember your "why"—and stay open to all of the opportunities your program has to offer.
- Here's to all new possibilities for 2019 from all of us at UMKC SOM!

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New Emerging Modalities to Treat Post-Thoracotomy Pain Syndrome: A Review

by Brad Kelsheimer MD, Campbell Williams, MD & Chris Kelsheimer, MD

While not all patients can realize a pain score of zero, our goal should be to optimize their return to functionality.



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Abstract

Pain relief during and after thoracic surgery continues to be a challenging issue for anesthesiologists caring for these patients. A comprehensive approach to pain management, combined with newer approaches to peripheral nerve blockade, may improve perioperative patient care and lessen the significant risk of the post thoracotomy pain syndrome.

Introduction

Thoracic surgery presents a number of clinical challenges and concerns for anesthesiologists, among which are the need to provide one lung ventilation in order to facilitate an acceptable operative field for surgeons and the possibility of major bleeding and hemodynamic alterations due to surgeons operating in proximity to both the heart and its associated major vascular structures. However, as with all significant surgical procedures, there is a concomitant requirement to provide both intraoperative and postoperative pain relief. Thoracic surgery, and particularly thoracotomy, is associated with severe postoperative pain, the result of which can lead to respiratory complications such as hypoventilation, hypoxemia, atelectasis, pulmonary infections, and ultimately respiratory failure. Inadequate postoperative pain control may also lead to postoperative thoracotomy pain syndrome in a sizable percentage of patients that can persist for months to years.[1-3] A study by Rogers demonstrated that all patients who have rib retraction during thoracotomy sustain intercostal nerve injury and an estimated 5-65%, will continue to have persistent post-surgical pain following thoracotomy.[4-5] With the evolution of medical culture and its current focus on patient centered outcomes and enhancing the patient care experience, pain control has become as important as surgical outcomes and has a major impact on a patient's perception of their hospital experience.

Providing analgesia for thoracic surgery can be challenging for a variety of reasons. Thoracic surgery patients are often elderly and/or frail with multiple comorbidities, and thus conventional multimodal medication regimens (oral and injectable) may be difficult and/or impossible to institute because of patient safety/appropriateness concerns. Narcotic-based patient controlled analgesia (PCA) may not provide adequate pain relief, and the side effects of respiratory depression, sedation, constipation, and altered mental status frequently outweigh its benefits. Medications such as IV acetaminophen or liposomal bupivacaine may not be available on all hospital formularies due to their significant costs compared to either PO or generic formulations. Thoracic epidural analgesia has long been considered the gold standard to address post thoracotomy pain for these patients and usually provides excellent analgesia. However, they have a number of drawbacks:

- Can be challenging to place for the inexperienced anesthesiologist;
- Can be associated with serious risk including inadvertent dural puncture, epidural hematoma, spinal abscess, and spinal cord injury;

- Can result in significant hemodynamic sequelae resulting from local anesthesia-related sympathetic blockade;
- Can be contraindicated due to anticoagulation or infectious concerns.

With increasing utilization of video assisted thorascopic surgery (VATS), many anesthesiologists and surgeons posit if epidural analgesia is really necessary or appropriate. At our institution, we perform a high volume of decortication procedures which can result in open thoracotomy procedures. When these patients are infected or on anticoagulation, our practice is to avoid neuraxial techniques including single shot and catheter techniques. The cardiothoracic anesthesiologists have typically utilized single shot intercostal nerve blocks to provide analgesia post op in these challenging patients; however newer alternative peripheral nerve blocks such as erector spinae blocks and serratus anterior plane blocks may provide acceptable or improved analgesic alternatives.

Due to the subjective nature of pain and differences in surgical techniques, high fidelity studies are difficult to perform and the results are mixed. Therefore, there is no true gold standard for treating post thoracic surgery pain. The goal of this article is to provide a brief review of the different analgesic options for thoracic surgery patients that anesthesiologists may consider when providing care for these types of cases, and the clinical rationale therein.

Analgesia Options

Multimodal Medication Management

Treatment of postoperative thoracic surgical pain with intravenous and oral medications is the most non-invasive modality and have found their way into many enhanced recovery after surgery (ERAS) protocols. However, non-invasive does not necessarily mean without side effects. At our institution, conventional medication treatment utilizes PCAs with narcotics such as fentanyl, dilaudid, and morphine. PCAs are cost effective, easy to use, and typically provide higher patient satisfaction than conventional nursing controlled dosing. Poor patient understanding as well as improper dosing, such as utilizing a fentanyl PCA with a dose available every 20-30 minutes, can make them ineffective. A variety of opioid adjuncts such as ketorolac, ketamine, acetaminophen, and gabapentin have synergistic effects and may provide enhanced analgesia , but the availability of these drugs as well as provider inexperience and or bias may limit their use. Humble, Dalton and Li performed a systematic review of therapeutic interventions to reduce acute and chronic post-surgical pain in thoracotomy as well as amputation and mastectomy surgery patients and found that appropriate dose regimes of gabapentinoids, antidepressants, local anesthetics and regional anesthesia may potentially reduce the severity of both acute and chronic pain for these patients; ketamine was not effective in reducing chronic pain for these patient populations however.[6]

Neuraxial Techniques: Epidural and Paravertebral Blocks

As mentioned earlier, neuraxial anesthesia via thoracic epidurals and paravertebral blocks is an extremely potent and effective analgesic technique and thoracic epidurals are generally considered the gold standard for post thoracotomy pain control.[7] Most thoracic surgery occurs within the T3-T10 dermatomes and as a result a high/mid-level thoracic (T4-5) epidural is usually required. While the advantages of thoracic epidurals are numerous, they also have a number of limitations including the risk of catastrophic bleeding in the neuraxial space leading to spinal cord compression and its resultant paraplegia (temporary or permanent). Patients with pre-existing coagulopathies and/or on anti-platelet medications or anticoagulants will be excluded from their use. In addition, patients with a localized infection at the proposed site of epidural placement, or with significant systemic infectious pathologies are also frequently excluded because of the risk of epidural abscess. Finally, the anatomic challenges of the thoracic spine in elderly patients may require the use of alternatives to the conventional midline spinal approach utilized by all anesthesiologists for routine labor epidurals and orthopedic surgery. Side effects such as hypotension and bradycardia from the local anesthetic blockade of cardiac accelerator fibers may make nursing floor management of patients with thoracic epidurals more challenging for providers without a dedicated pain service presence.

Paravertebral blocks have been described for treatment of acute pain related to thoracotomy and video assisted thoracic procedures. The block can be performed with or without the use of a catheter and provides unilateral coverage of the chest wall by anesthetizing the nerves as they exit the intervertebral foramina, providing a somatosensory and sympathetic dermatomal block. It is viewed as a neuraxial technique by most providers and therefore is restricted if there are anticoagulation concerns. Unlike epidurals, paravertebral blocks are typically associated with less hypotension and urinary retention due to lack of bilateral blockade of the sympathetic chain. In the setting of the infected patient presenting for decortication, however, the close proximity of the paravertebral space to the pleural cavity is cause for concern when deciding whether to place a catheter. Additionally, these catheters are challenging to place with a reported incidence of pneumothorax between 1-10% as well as risk of epidural spread of medication. With the advancement of ultrasound technology and further understanding of the block, current paravertebral techniques include the use of ultrasound

guided paravertebral block and catheter placement, as well as direct placement under visualization by the surgeon. When compared to epidural analgesia for post thoracic surgery pain, pain relief appears to be similar and noninferior in many studies. However, the technique is not widely used due to the advent of other regional anesthetic techniques, as well as the need for more than one injection/catheter at multiple levels in order to provide adequate pain relief for most surgeries.[8-10]

Peripheral Nerve Blocks

Peripheral nerve block techniques avoid some of the challenges facing neuraxial techniques, such as the risk of epidural hematoma, abscess formation, and risk of central nervous system injury. Peripheral nerve block techniques do involve injection of local anesthetics in close proximity to the nerve and so pose the risk of injury due to direct nerve trauma and/or neurotoxic effects of local anesthetics. However, the acceptance of ultrasound assisted guidance when performing regional anesthetic and peripheral nerve blocks has made these blocks safer for the patient while increasing the reliability of the block itself.

Intercostal Nerve Blocks

Intercostal nerve blocks are easy to perform and can provide potent analgesia in a fast, reliable manner. An advantage of intercostal blocks is that they can be performed under direct visualization in the pleural cavity by the surgeon in the field or percutaneously by the anesthesiologist. The introduction of liposomal bupivacaine, which may have an extended duration of action up to 72 hours may make these blocks even more appealing.[11] A recent study by Khalil et al (2015) found that a series of six thoracic level intercostal blocks by the surgeon using liposomal bupivacaine under direct visualization for thoracotomies provides significantly better pain control in the acute period than epidural analgesia.[12] It should be noted that intercostal blocks do carry an increased risk of systemic local anesthetic (LA) toxicity, primarily due to neurologic and cardiovascular sequelae, if not performed properly (due to enhanced absorption of local anesthetics from the intercostal space compared to other body areas where local anesthetics are injected, resulting in higher peak plasma levels of LAs, as well as inadvertent intravascular injection), or if dosage guidelines for local anesthetic injections are not followed. Due to the circumscribed nature of the intercostal nerves innervating the chest wall, multiple levels injections are required to ensure adequate analgesia. Some of the additional risks include significant bleeding from trauma to the intercostal artery, block failure, and pneumothorax.

Interscalene Block

Even with a well-placed and functioning thoracic epidural (appropriate dermatomal spread resulting in documented dermatomal sensory analgesia), patients may still exhibit referred shoulder pain (Kehr's sign) related to chest tubes placement that frequently accompanies thoracic surgery. This classic example of referred pain results from irritation of the diaphragm, signaled by the phrenic nerve arising from cervical nerves C3 through C5, as pain in the area above the clavicle. Thus, an appropriately placed and working thoracic epidural may not cover this particular nerve distribution. However, supraclavicular bundled nerves have the same cervical nerves origin as the phrenic nerve, and a peripheral nerve block targeting this distribution may be efficacious in alleviating this symptom in patients so affected. At our institution, we have performed ultrasound guided interscalene nerve blocks to treat refractory chest tube related referred pain with good success. We typically use dilute ropivicaine (0.1 to 0.2%) with the goal of avoiding significant motor block and potential unilateral diaphragmatic weakness through the block associated motor effects on the phrenic nerve.

Erector Spinae Block

A relatively newer regional technique that offers significant advantages and has been gaining popularity for thoracic surgery is the erector spinae block. Like many regional techniques this block can also be performed as a single shot technique with an appropriate volume of LS, or by placing a catheter for continuous infusions.[13] Most anesthesiologists view this as a peripheral nerve block with its associated risks and benefits compared to neuraxial anesthesia. The block performed by injecting local anesthetic deep to the erector spinae fascia and superficial to the transverse process under ultrasound guidance. The local anesthetic can then spread and providing coverage from C7 to T10 dermatomes unilaterally. As this is a new technique, the mechanism of action is still be elucidated, but is believed to be from diffusion of the anesthetic into the paravertebral space where it is able to act on the ventral and dorsal thoracic spinal nerves.[14] Benefits of this technique includes lack of significant sympathetic blockade and its associated hemodynamic effects such as hypotension, ability of it to be performed under sedation and/or general anesthesia, being a single injection and able to cover the entire chest wall, and the elimination of the risk of an epidural related hematoma in a patient with or without anticoagulation medications. This technique is also showing promising use in trauma patients with rib fractures and abdominal surgery.[15]

Pectoralis and Serratus Anterior Plane Blocks

Additional fascial plane blocks have been described for the chest wall and include the so called PECS 1 and PECS 2 blocks involving the pectoralis nerves, and the serratus anterior plane block. Performed under ultrasound, these blocks have been described within the literature and show benefit in breast surgery at reducing the need for opioids during the perioperative period. Due to this, the serratus anterior plane block has been suggested as an analgesic adjuvant for video assisted thoracic surgery. It has been shown to help reduce opioid use in the perioperative period, but its use can be limited by port and incision locations. The block is performed under ultrasound guidance in the region of the mid axillary line at the T4-T5 level by injecting deep to the serratus anterior muscle. The block anesthetizes the lateral intercostal nerves as they pierce the fascia and typically provides T4-T8 dermatomal coverage which will provide relief for chest tube placement and anterior chest wall surgery.[15-16]

Cryoablation

Historically, cryoablation was performed at the time of surgery by freezing the intercostal nerves to -20 degrees Celsius, with the goal of provide analgesia lasting several months. Currently, it is still used to treat post thoracotomy pain syndrome in some pain management centers. However, it is not recommended as a routine adjuvant to either reduce postoperative thoracotomy pain or reduce development of the post thoracotomy pain syndrome, mostly out of concerns for its potential long term effects resulting from intermediate or permanent nerve damage.[17]

Conclusion

Post thoracic surgery pain can be difficult to manage. While there is no one technique that is right for every patient, a multimodal medical approach combined with regional anesthesia techniques has the ability to provide patients with acceptable pain control, allowing them to facilitate the coughing, ambulating and deep breathing exercises needed for optimal postoperative pulmonary hygiene and function. With the development of ERAS protocols, the classic approach to post op pain control has changed; narcotics are no longer enough. We advocate the use of a multimodal approach utilizing medications such as ketamine, acetaminophen, gabapentin, NSAIDs, and narcotics combined with a regional technique(s). Historically, we have relied on thoracic epidurals when appropriate and have also utilized intercostal nerve blocks. However, we have had significant success with the erector spinae block and have seen it provide excellent pain relief for our patients, leading us to utilize them more frequently in patients who are infected or anticoagulated. Much of the success of ERAS protocols results from preoperative preparation and teaching that prepares the patient for ambulating on post op day 0 and sets realistic patient expectations for the perioperative period. While not all patients can realize a pain score of zero, our goal should be to optimize their return to functionality. Utilizing the appropriate procedural techniques and multimodal pharmacologic adjuvants, all in an effort to provide for the very best in patient centered care, pain after thoracic surgery does not have to be the clinical challenge it has posed historically.

References

1. Pluijms, W. A., et al. "Chronic Post-Thoracotomy Pain: a Retrospective Study." Acta Anaesthesiologica Scandinavica, vol. 50, no. 7, 2006, pp. 804–808., doi:10.1111/j.1399-6576.2006.01065.x.
2. Crumley S, Schraag S. The role of local anaesthetic techniques in ERAS protocols for thoracic surgery. Journal of Thoracic Disease. 2018;10(3):1998-2004. doi:10.21037/jtd.2018.02.48.
3. Humble, S.r., et al. "A Systematic Review of Therapeutic Interventions to Reduce Acute and Chronic Post-Surgical Pain after Amputation, Thoracotomy or Mastectomy." European Journal of Pain, vol. 19, no. 4, Apr. 2014, pp. 451–465., doi:10.1002/ejp.567.
4. Macrae W. Chronic post-surgical pain: 10 years on. British Journal of Anaesthesia. 2008;101(1):77-86. doi:10.1093/bja/aen099.
5. Rogers ML, Henderson L, Mahajan RP, Duffy JP. Preliminary findings in the neurophysiological assessment of intercostal nerve injury during thoracotomy. European Journal Cardiothoracic Surgery 2002; 21: 298-301.
6. Humble S, Dalton A, Li L. A systematic review of therapeutic interventions to reduce acute and chronic post-surgical pain after amputation, thoracotomy or mastectomy. European Journal of Pain. 2014;19(4):451-465. doi:10.1002/ejp.567
7. Craig DB. Postoperative recovery of pulmonary function. Anesthesia Analgesia. 1981; 60: 46-52.
8. D'Ercole F, Arora H, Kumar PA. Paravertebral Block for Thoracic Surgery. Journal of Cardiothoracic and Vascular Anesthesia. 2018;32(2):915-927. doi:10.1053/j.jvca.2017.10.003.
9. Yeung JH, Gates S, Naidu BV, Wilson MJ, Smith FG. Paravertebral block versus thoracic epidural for patients undergoing thoracotomy. Cochrane Database of Systematic Reviews. 2016. doi:10.1002/14651858.cd009121.pub2.
10. Davies, R.g., et al. "A Comparison of the Analgesic Efficacy and Side-Effects of Paravertebral vs Epidural Blockade for Thoracotomy—a Systematic Review and Meta-Analysis of Randomized Trials." British Journal of Anaesthesia, vol. 96, no. 4, 2006, pp. 418–426., doi:10.1093/bja/ael020.
11. Bergese SD, Ramamoorthy S, Patou G, Bramlett K, Gorfine SR, Candiotti KA. Efficacy profile of liposome bupivacaine, a novel formulation of bupivacaine for postsurgical analgesia. Journal of Pain Res. 2012; 5: 107-116.
12. Khalil KG, Boutrous ML, Irani AD, et al. Operative Intercostal Nerve Blocks With Long-Acting Bupivacaine Liposome for Pain Control After Thoracotomy. The Annals of Thoracic Surgery. 2015;100(6):2013-2018. doi:10.1016/j.athoracsur.2015.08.017
13. Scimia P, Ricci EB, Droghetti A, Fusco P. The Ultrasound-Guided Continuous Erector Spinae Plane Block for Postoperative Analgesia in Video-Assisted Thoracoscopic Lobectomy. Regional Anesthesia and Pain Medicine. 2017;42(4):537. doi:10.1097/aap.0000000000000616.
14. Thiruvenkatarajan V, Adhikary S, Pruett A, Forero M. Erector spinae plane block as an alternative to epidural analgesia for post-operative analgesia following video-assisted thoracoscopic surgery: A case study and a literature review on the spread of local anaesthetic in the erector spinae plane. Indian Journal of Anaesthesia. 2018;62(1):75. doi:10.4103/ija.ija_693_17
15. Singh P, Borle A, Kaur M, Trikha A, Sinha A. Opioid-sparing effects of the thoracic interfascial plane blocks: A meta-analysis of randomized controlled trials. Saudi Journal of Anaesthesia. 2018;12(1):103. doi:10.4103/sja.sja_382_17.
16. Ökmen K, Ökmen BM. The efficacy of serratus anterior plane block in analgesia for thoracotomy: a retrospective study. Journal of Anesthesia. 2017;31(4):579-585. doi:10.1007/s00540-017-2364-9.
17. Yang MK, Cho CH, Kim YC. The effects of cryoanalgesia combined with thoracic epidural analgesia in patients undergoing thoracotomy. Anaesthesia. 2004;59(11):1073-1077. doi:10.1111/j.1365-2044.2004.03896.x.

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None reported.

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Anesthetic Care of the High Risk Parturient

by Kathleen A. Leavitt, MD & Melissa S. Meiners, MD

Clinicians who care for pregnant patients are often faced with women with complex medical conditions.



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Introduction

Maternal mortality is rising in the United States, but declining in other industrialized countries. This article will explore some of the factors responsible for the observed rise in maternal mortality in the US, the measures being taken to improve maternal outcome, and illustrate some of the resources, policies, and procedures in place at our institution that serves as a tertiary care referral center for high risk pregnancies.

Causes of Increased Maternal Morbidity and Mortality in the United States

Pregnancy is no longer relegated to the young and healthy. Women in the U.S. are entering their childbearing years with a host of complex medical conditions - rates of morbid obesity, chronic hypertension, and diabetes mellitus in women are higher than ever before. Socioeconomic disparity and lack of access to prenatal care is also evident from mortality data. In addition, the high rate of primary cesarean section has led to increased risk in subsequent pregnancy of placentation abnormalities such as placenta previa and acreta. These conditions dramatically increase the risk of maternal hemorrhage. Furthermore, with advanced maternal age, both acquired and congenital heart disease have become more prevalent.

What are the most common causes of morbidity and mortality during pregnancy? Creanga, et. al[2] performed an observational study using data gathered from the CDC Pregnancy Mortality Surveillance System and reported on causes of maternal mortality in the U.S. from 2011-2013. During this period of time, 2009 pregnancy-related deaths (defined as death of a woman while pregnant or within one year of giving birth) were reported, resulting in a ratio of 17 deaths per 100,000 live births. Table 1 lists the causes of death according to prevalence. In the U.S., there appears to be declining rates of death due to hemorrhage, hypertensive disorders of pregnancy, thromboembolic disease, amniotic fluid embolus, and anesthetic complications. However, maternal mortality is rising due to cardiovascular conditions (both acquired and congenital heart disease), cerebrovascular accidents, and from peripartum cardiomyopathy. In addition, the study also discovered the following: 30% of deaths were in women over age 35; non-Hispanic black women had 3.4 times higher risk of death than non-Hispanic white women; and 1 out of 6 women who died were obese. Most concerning is the fact that up to 50% of these deaths were most likely preventable.

Measures to Improve Maternal Outcome and Safety

California has been the only state in the U.S. to actually show a

reduction in maternal mortality over the past decade. Their success has been attributed to the California Maternal Quality Care Collaborative, a statewide initiative which created a series of "toolkits" that provide evidence based protocols, checklists, guidelines and educational material on "best practices" for a variety of maternal conditions. The most comprehensive collection of these safety "bundles" can be found on the National Partnership for Maternal Safety (NPMS) website: http://www.safecareforeverywoman.org/. Table 2 lists the safety bundles currently available.

A major factor in adverse maternal events is delay in recognizing that there is a problem. Therefore, a key initiative being taken is to develop and implement an early warning system, using maternal vital signs and symptoms that will identify pregnant women who may be developing critical illness. Often times, abnormal vital signs and symptoms are overlooked in the parturient because 1) pregnant women are presumed to be young and healthy, 2) critical illness is rare in this population, and 3) these women are thought to possess substantial physiologic reserve. Several screening tools have been developed and are in the process of being validated at a multitude of health centers.[3] One such screening tool, the Maternal Early Warning System (MEWS) is illustrated in Table 3.[4] If a parturient displays one or more of these criteria, her nurse is instructed to contact a clinician who should promptly perform a bedside evaluation, order further testing, coordinate therapeutic interventions, and escalate the level of care if deemed necessary. The goal is to prevent a delayed response to clinical warning signs and intervene early and thus avoid further deterioration.

There is strong evidence to support improved outcome when high risk parturients are transferred to a tertiary care center.[5,6] The benefit, specifically at our institution, lies in the multidisciplinary care they receive which consists of the following; 24/7 availability of in-house anesthesiologists, maternal fetal medicine specialists, intensivists, and perinatologists; twice daily "huddles" involving nursing staff from labor and delivery, antepartum and postpartum units, perinatology, anesthesiology, and maternal fetal medicine physicians; bedside emergency drills, use of "tool kits" and team training at our simulation training center. In addition, every patient admitted to the labor and delivery unit is seen in consultation by an anesthesiologist, regardless of their "birth plan". Many of our high risk parturients, especially those with cardiac disease, receive antepartum consultation by an anesthesiologist during one of their outpatient visits. Finally, our hospital is staffed with critical care physicians who are immediately available for consultation and transfer to the intensive care unit should the need to escalate care arise.

TABLE 1. CAUSES OF PREGNANCY-RELATED DEATH IN THE US

• CARDIOVASCULAR CONDITIONS	15.5%
• NON-CARDIOCASCULAR MEDICAL CONDITIONS	14.5%
• INFECTION	12.7%
• HEMORRHAGE	11.4%
• CARDIOMYOPATHY	11.0%
• VENOUS THROMBOEMBOLISM	9.2%
• HYPERTENSIVE DISORDERS	7.4%
• CEREBROVASCULAR ACCIDENTS	6.0%
• UNKNOWN	6.1%
• AMNIOTIC FLUID EMBOLISM	5.5%
• ANESTHETIC COMPLICATIONS	0.2%

TABLE 2. SAFETY BUNDLES CURRENTLY AVAILABLE ON THE NATIONAL PARTNERSHIP FOR MATERNAL SAFETY WEBSITE
http://www.safehealthcareforeverywoman.org

- MATERNAL MENTAL HEALTH: DEPRESSION AND ANXIETY
- MATERNAL VENOUS THROMBOEMBOLISM
- OBSTETRIC CARE FOR WOMEN WITH OPIOID USE DISORDER
- OBSTETRIC HEMORRHAGE
- POSTPARTUM CARE BASICS FOR MATERNAL SAFETY
- PREVENTION OF RETAINED VAGINAL SPONGES AFTER BIRTH
- REDUCTION OF PERIPARTUM RACIAL/ETHNIC DISPARITIES
- SAFE REDUCTION OF PRIMARY CESAREAN BIRTH
- SEVERE HYPERTENSION IN PREGNANCY
- SEVERE MATERNAL MORBIDITY REVIEW
- SUPPORT AFTER A SEVERE MATERNAL EVENT

TABLE 3. MATERNAL EARLY WARNING SYSTEM (MEWS)

SYSTOLIC BP; mmHg	<90 or >160
DIASTOLIC BP; mmHg	>100
HEART RATE; bpm	<50 or >120
RESPIRATORY RATE; bpm	<10 or >30
OXYGEN SATURATION; %	<95
OLIGURIA; ml/hr x 2	<35
MATERNAL AGITATION, CONFUSION, UNRESPONSIVENESS	

Maternal Hemorrhage

The leading cause of maternal mortality worldwide has been and continues to be postpartum hemorrhage. The American College of Obstetrics and Gynecology (ACOG) reVITALize initiative defines postpartum hemorrhage as blood loss greater than 1000 mL or blood loss accompanied by signs and symptoms of hypovolemia. Although older definitions separated vaginal and cesarean deliveries, visually estimated losses of greater than 500mL should alert the physician about ongoing blood loss. Estimating blood loss is difficult for health care providers as signs of hypovolemia do not appear until patients are symptomatic, which can make recognition and management of postpartum hemorrhage challenging.

Postpartum hemorrhage is divided into primary hemorrhage, defined as the first 24 hours after birth, and secondary, which can occur unto 12 weeks after delivery. The leading causes of primary postpartum hemorrhage



Figure 1. High risk breech delivery
source: https://emedicine.medscape.com/article/262159-overview#a2

include uterine atony, lacerations, retained placenta, abnormal adherent placenta, coagulation defects and uterine inversion. Secondary hemorrhage includes many of the same etiologies as primary causes, but also includes retained products of conception, infection and sub involution of the placental site. Figure 1.

Uterine atony remains the leading cause of postpartum hemorrhage accounting for 70-80% of cases of postpartum hemorrhage. Risk factor for developing atony include multiple gestation pregnancy, macrosomia, polyhydramnios, prolonged labor, prolonged oxytocin use and general anesthesia with volatile anesthetics.

Interventions to help in prevention of postpartum hemorrhage include the use of uterotonics, uterine massage, and umbilical cord traction. Prophylactic administration of oxytocin in the third stage of labor is recommended as the first drug for the prevention of postpartum hemorrhage. Additional uterotonics used in initial management of postpartum hemorrhage include methylergonovine, 15-methyl PGF2a and misoprostol. Up to 25% of patients with postpartum hemorrhage require a second medication in addition to oxytocin. Initial interventions include uterine massage, uterotonic drugs and bimanual compression. More invasive treatment options include intrauterine balloon device placement to tamponade the uterus, embolization of the uterine arteries, surgical procedures such as the B-lynch procedure and hysterectomy. Techniques of uterine tamponade for postpartum hemorrhage include the Bakri Balloon, ebb uterine tamponade system uterine packing and Foley catheter. If medical therapy and uterine tamponade techniques do not effectively manage hemorrhage then uterine artery embolization or surgical techniques such as vascular ligation, uterine compression sutures and ultimately hysterectomy should be considered.

The most significant advance in management of postpartum hemorrhage is the use of tranexamic acid. WOMAN trial.[7] The World Health Organization recommends early administration of tranexamic acid within 3 hours of birth for patients diagnosed with postpartum hemorrhage. While the routine use of prophylactic tranexamic acid is not recommended at this time, tranexamic acid is recommended for use in all cases of postpartum hemorrhage for women without a clear contraindication. Contraindications to tranexamic acid include known thromboembolic event during pregnancy, active intravascular clotting, history of coagulopathy, or known hypersensitivity to tranexamic acid.

When significant blood loss is anticipated, cell salvage is now considered a safe and effective method of transfusion in obstetric patients. Attempt should be made to sequester most of the amniotic fluid into a separate container before collecting the blood in the cell saver reservoir. The red cells are washed and a special filter is attached to the blood administration set to further decrease the risk of contamination with amniotic fluid. In the absence of cell salvage, acute hemorrhage and massive transfusion protocols should be in place to properly treat obstetric hemorrhage. In addition to laboratory analysis of complete blood count and coagulation profile, thromboelastography has been shown to be very valuable in management of obstetric hemorrhage. Massive transfusion is the transfusion of 10 or more units of packed red blood cells in 24 hours or defined as the transfusion of 4 units of packed red blood cells in 1 hour with ongoing transfusion requirements. When massive transfusion is required, transfusion ratios of 1:1:1 for packed red blood cells, fresh frozen plasma, and platelets are commonly utilized, as outlined by the American College of Surgeons transfusion guidelines in their Trauma Quality Improvement Program and others[8].

A multidisciplinary approach including obstetrics, anesthesiology, and critical care should be utilized to decrease the morbidity and mortality from postpartum hemorrhage. Worldwide efforts to implement a multidisciplinary team approach to managing obstetric hemorrhage is important to improvement of quality maternal healthcare. The California Maternal Quality Care Collaborative (CMQCC) is a multidisciplinary organization focused to improving morbidity and mortality in maternal

healthcare in California. Such efforts by the CMQCC have seen a decrease in maternal mortality of 55% from 2006 to 2013.

Maternal Cardiac Disease

Maternal death caused by cardiovascular disease is rising. In the past, valvular abnormalities resulting from rheumatic fever were the most common etiologies of maternal cardiac disease. In developing countries and in the immigrant population in the U.S., rheumatic heart disease is still of concern. However, the vast majority of maternal cardiac disease in the U.S. is either acquired (ischemic heart disease, peripartum cardiomyopathy, aortic dissection from connective tissue disease) or present from birth (congenital cardiac malformations).

Advances in surgical correction of congenital cardiac malformations have led to women now reaching adulthood with the desire to become pregnant. At Saint Luke's Hospital, we have developed a Heart Disease in Pregnancy Center to provide prenatal counseling and perinatal care to this unique population of women. Our multidisciplinary team consists of Maternal-Fetal Medicine specialists, Cardiologists, Anesthesiologists, nurses, nurse practitioners and social workers. We hold monthly meetings to address timing of delivery, mode of delivery (vaginal vs cesarean section), and location of delivery (labor unit vs cardiac intensive care unit and/or cardiac operating room). As in all pregnant patients, vaginal delivery is the preferred mode of delivery, since it entails lower blood loss, less fluid shifts, and less risk of infection compared to cesarean section. Often times, however, a "passive" second stage is beneficial to avoid the hemodynamic changes associated with the expulsive efforts of labor. This is best accomplished with continuous lumbar epidural analgesia to provide a dense sacral block which facilitates outlet forceps or vacuum extraction of the baby.

In addition to caring for women with congenital cardiac malformations, our Heart Disease in Pregnancy Center cares for a large number of patients who fall into the category of acquired heart disease. The rising epidemic of childhood obesity has led to women entering their childbearing years with chronic hypertension, adult onset diabetes, renal insufficiency, and coronary artery disease. Women who defer pregnancy until an advanced maternal age also have a high incidence of these co-morbidities. Peri-partum cardiomyopathy, defined as left ventricular ejection fraction less than 45%, is another condition best managed using a multidisciplinary approach. The etiology is most often idiopathic, but can be caused by viral infection (HSV, EBV, CMV, parvovirus), pre-eclampsia, genetic, or from valvular or ischemic heart disease. Hemodynamic changes of pregnancy (increased blood volume, increased cardiac demand) are poorly tolerated in these patients, resulting in a high risk of decompensation beginning in the second trimester and continuing through the postpartum period. The goals of caring for patients with peripartum cardiomyopathy are to optimize cardiac output with medical therapies such as beta-blockade, afterload reduction (nitrates and hydralazine), diuretic therapy, and anticoagulation. Finally, our Heart Disease in Pregnancy Center also cares for a large number of patients with connective tissue disease (Marfan's Syndrome, Loewy-Dietz Syndrome, bicuspid aortic valves). During pregnancy, these patients are at risk of aortic dissection and rupture due to 1) weakness in their vascular walls exacerbated by elevated levels of elastin and collagenase and 2) increased shear stress on the vessel wall due to increased cardiac output. In the antepartum period, these patients receive frequent transthoracic echocardiograms to closely monitor the extent of aortic dilatation and, at the time of delivery, are cared for in our Cardiovascular Intensive Care Unit with close proximity to our cardiovascular operating rooms.

Summary

Clinicians who care for pregnant patients are often faced with women with complex medical conditions. Maternal outcome is improved when these patients are cared for at a tertiary care center that has the resources, personnel, policies and procedures in place to address these issues in a multidisciplinary manner. Anesthesiologists, in their roles as obstetric anesthesiologists, critical care anesthesiologists, and cardiac anesthesiologists, play a vital role as members of obstetric multidisciplinary team.

References

1. Young, Alison. USA Today July 27, 2018. (USA.com)
2. Creanga A, Syverson C, Seed K, Callaghan W. Pregnancy-Related Mortality in the United States, 2011-2013. Obstet Gynecol 2017; 130:366-73.
3. Friedman A, Campbell M, Kline C, Wiesner S, et al. Implementing Obstetric Early Warning Systems. AJP Rep. 2018; 8(2):e79-e84.
4. Mhyre JM, D'Oria R, Hameed AB, Lappen JR, Holley SL, et al. The maternal early warning criteria: a proposal from the national partnership for maternal safety. Obstet Gynecol 2014; 124:782-6.
5. Kyser KL, Lu X, Santillan DA, Santillan MK, Hunter SK, Cahill AG, Cram P. The association between hospital obstetrical volume and maternal postpartum complications. Am J Obstet Gynecol 2012 Jul; 207:42, e1-17.
6. Hankins GD, Clark SL, Pacheco LD, O'Keeffe D, D'Alton M, Saade GR. Maternal mortality, near misses, and severe morbidity: lowering rates through designated levels of maternity care. Obstet gynecol. 2012 Oct; 120(4):929-34.
7. WOMAN trial Collaborators. Effects of early tranexamic acid administration on mortality, hysterectomy, and other morbidities in women with post-partum haemorrhage (WOMAN): an international, randomized, double-blind, placebo-controlled trial. Lancet 2017; 389 (10084): 2105-2116
8. Holcomb JB, Tilley BC, et al. Transfusion of plasma, platelets and red blood cells in a 1:1:1 vs a 1:1:2 ratio and mortality in patients with severe trauma; the PROPPR randomized clinical trial. JAMA 2015; 313 (5): 471-482

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The Era of Mass Casualty Events: Perspectives on Care Paradigms from a Critical Care Anesthesiologist

by Venkat Reddy Mangunta, MD & Dipesh Patel, BA

Anesthesiologists and intensivists must stay current with the diagnosis and treatment of chemical, radiological, and biological agent exposure.



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Abstract

The modern era has brought the concept of preparedness for mass casualties and disasters to the forefront of every health systems' concerns as one of their most urgent needs. Anesthesiologists, and the components of their departments, are vital to include in organizing and coordinating clinical and administrative services for an effective and comprehensive plan of action.

Need for Disaster Preparedness – Why Does it Matter?

The September 11th terrorist attacks brought to our shores much more than a sense of destruction and vulnerability – they opened our eyes to a world which requires us to be prepared, not only with defense, but also with our response. As anesthesiologist and intensivists, during a disaster response or mass casualty event (MCE), active involvement is essential. In the United States, anesthesiologists and intensivists are often not involved in hospital or community disaster response planning or drills.[1] In fact, at some institutions, during disaster drills, the anesthesiologists are notified the morning of the drill - a few hours before drill commencement. Intensivists are often unaware a trauma/disaster drill is taking place and are not included. These type of "drills," where communication between trauma surgery, the emergency department, hospital administration and perioperative physicians is poor only result in wasted effort and time. In the U.S. Navy, medical mass casualty drills are often conducted in concert with a ship-wide or station-wide disaster event. During these drills, regular operations continue, however, key personnel from each department and division are active participants in the drill. In the medical department, moulaged patients are brought in on stretchers and coordination between physicians aboard ship (ship's chief medical officer, general medical officers, surgeons, flight surgeons, anesthesiologists) as well as nursing staff, hospital corpsmen staff and medical service corps staff is instrumental in optimizing learning and honing skills during each drill.

Anesthesiologists, as resuscitative specialists, are uniquely suited to providing care at a multitude of locations. Marginalizing anesthesiologists from hospital and community disaster planning wastes a resuscitative physician capable of airway management, management of shock states, transfusion management, correction of coagulopathy, and difficult intravenous access. Additionally, anesthesiologists are accustomed to directing a team of personnel in the management

of operative patients. This skillset can be utilized in the direction of modular teams during a disaster. A hospital's disaster preparedness plan will only be useful if all key individuals are involved in the planning and execution of the plan. Failing to fully include anesthesiologists or intensivists from the development process and disaster drills effectively eliminates a valuable resource for the Hospital Incident Command System (HICS).[2]

In France, anesthesiologists and intensivists have been a part of the disaster response system for over 30 years. In fact, they remain a key element of the emergency medical service - Service d'Aide Medicale Urgente or SAMU.[3] Anesthesiologists are often the providers sent with SAMU units into the field to provide on scene care. SAMU teams coordinate on site with fire and police units and provide an advanced level of care at a location slightly removed from the disaster. In this way, the prehospital management and hospital management of the disaster/trauma patient are integrated.[3]

The French response was tested on November 13, 2015, when terrorists attacked multiple public venues in Paris simultaneously. In a time-span of 20-30 minutes, shootings had occurred at four different locations while explosive devices were detonated at three other public sites. The SAMU immediately mobilized and the Assistance Publique-Hopitaux de Paris (APHP) initiated its crisis center. The APHP crisis unit coordinates 40 hospitals (100,000 health professionals, 22,000 hospital beds, and 200 operating rooms).[4] Part and parcel of the French system is a nationwide disaster response plan – the red plan and the white plan.[3] The red plan refers to emergency search/rescue/fire response at the scene of the disaster and the commander of the red plan reports directly to the prefect of police, who reports directly to the prime minister. Within the red plan, fire and rescue personnel (first responders) provide basic medical care until SAMU units take over the medical care of the victims in the field. At this point the white plan is activated. The white plan is basically the hospital response to disaster – ensuring hospital staff are recalled, initiating crisis management units, opening up hospital resources (part of this entails, for example, working with intensivists to move non-critical patients out of the ICU to step down or floor beds to free up ICU beds, ventilators and other essential equipment), and coordinating the set up and throughput of decontamination and triage locations.[3] At Pitie-Salpetriere Hospital in Paris (one of the five level 1 trauma centers), a normal day includes running two operating rooms. However, once the white plan was activated, 10 operating rooms were functional.[3] Prior to the influx of patients, the post-anesthesia care unit (PACU) and ICUs were emptied of patients that could be managed elsewhere in the hospital. A rapid triage team outside the emergency department (ED), directed the most injured patients to the trauma units and the less injured patients to the ED. The trauma victims were each cared for by a team made up of an anesthesiologist, surgeon, fellow and nurse – all of whom worked together to make treatment decisions for the most critically injured patients.[4] Impressively, they ran 10 O.R.'s continuously for 9 hours and at that point they were able to decrease the number of O.R.'s to 6. Within 24 hours from the first patients arriving, all emergency surgeries had been completed.[4] Pitie-Salpetriere Hospital treated 302 injured patients during the hours of the attacks, with many more treated at the other trauma centers in Paris – all coordinated by the APHP white plan.[4]

As the French experience exemplifies, years of preparation and inclusion of all aspects of emergency care from emergency physicians, surgeons, anesthesiologists, intensivists, nurses, first responders and government officials led to a system which was ready upon activation. With U.S. surveys of anesthesiologists' attitudes toward emergency preparedness showing that only one third of residency programs provide disaster education, half having eliminated this training, anesthesiologists must reassess the direction they wish their field to take.[5] As perioperative physicians, anesthesiologists must take an active role in disaster contingency strategic planning within their hospitals and medical systems.

Disaster Management Basics - Preparation

Preparation for disasters begins years in advance. It involves not only hospital wide, but city, state and nation-wide planning. Government at the federal and state levels has established systems such as the National Incident Management System (NIMS), which falls under the U.S. Federal Emergency Management Agency (FEMA). NIMS was established to ensure a standardized method in which the federal government and state and local agencies can work together efficiently in the event of a crisis. Within this paradigm, the National Response Framework (NRF), functions as a guide to ensure mechanisms are in place for the federal government to provide aid to state and local jurisdictions. However, it is important to remember that these systems are in place to facilitate and assist. Local communities retain command over any relief and response operations within their jurisdictions.[2]

Disaster planning requires significant effort and hospital/community buy in at the local level. The disaster plan must

be comprehensive in its breadth and detailed enough in its depth that it provides true guidance to each entity involved in the response. However, there must also be room for flexibility such that local leaders and on-site personnel can work around unforeseen obstacles. This scope of planning requires commitment from community leaders, from municipal governments to local hospital, police, fire and utility administrators. Once the commitment is made, the challenge becomes in correctly identifying what problems a disaster, whether terrorism related or naturally occurring, poses for the community. To effectively do this, planners must critically analyze prior disasters, responses to events and any shortcomings that were previously identified.[6]

It is vital that all members involved in disaster planning remember that the delivery of medical care during a disaster shifts from focus on a few individual patients to the injured population at large. In a true mass casualty situation, medical personnel, supplies and resources must be utilized in a manner which allows for physicians to care for as many patients as possible.

Anesthesiologist/Intensivist Role

The anesthesiologist/intensivist's role in disaster management must always start with an understanding of the hospital's disaster and emergency operations plan and protocols. Many anesthesiologists do not know what their hospital's contingency plans are, who the HICS commander is, or the relationship between the community ICS and HICS. As previously stated, in many U.S. hospitals, anesthesiologists are not included in hospital disaster drills or emergency management plans.[1]

These concepts are critically important for the anesthesiologist and intensivist to understand as it is likely that during a disaster, anesthesiologists, as perioperative physicians, will be called upon to care for patients at the pre-hospital disaster site, E.D., decontamination area, triage, O.R., or in an expanded ICU setting. ICUs will need to augment their capacity during an emergency and ensure supplies and personnel are available to not only care for existing patients within the ICU but also for the influx of injured patients. In these scenarios, patients that can be sent to the floors or step-down units must be transferred to make room for critically ill patients. Essential equipment such as ventilators, infusion pumps etc., must be located quickly and efficiently and be ready for use.

Along these lines, as perioperative physicians and resuscitative physicians, anesthesiologists must reacquaint themselves with the fundamentals of disaster medicine – recognition, decontamination and treatment of chemical agent exposure, radiological exposure, biological agent exposure as well as penetrating and blast trauma. Courses offered by the Society of Critical Care Medicine (Fundamentals of Disaster Medicine), and other organizations can be invaluable in this process.[2]

Pre-Hospital Care

As discussed above, anesthesiologists have had a key role in the French pre-hospital emergency response to mass casualty events (MCE) for decades.[3] These events often involve a myriad of mechanisms for traumatic injury from blunt and penetrating trauma to chemical, biological and radiological exposures. An anesthesiologist or intensivist's role in the pre-hospital phase of treatment would be to identify patients with significant injury to the head or chest as well as injuries to the abdomen or limbs that can result in shock. The final common pathway in many traumatic and toxic states is shock leading to decreased delivery of oxygen (DO_2) which leads to tissue hypoxia.[3] Pulmonary edema, contusion and an intense inflammatory response may occur following blast injuries. These lung injuries may precipitate acute respiratory distress syndrome (ARDS) and require prolonged ventilatory support. These disease processes are intimately familiar to the anesthesiologist and intensivist. In France, the SAMU are medically controlled which allows for physician involvement in the field, thereby bringing the advanced care available in the ICU or ED to the patient at the disaster site.[3]

Triage

Anesthesiologists and Intensivists are ideally suited for triage. In a mass casualty situation, the Post Anesthesia Care Unit (PACU) or step-down unit maybe called upon to function as a triage site or serve as an expanded ICU. The goal of triage is to sort patients into groups based on severity of injury: immediate care, delayed care, first aid and expectant. Patients with injuries that are likely incompatible with life such as massive intercranial trauma, will get an expectant designation. Resources such as imaging, operative care and critical care are directed toward patients likely to survive. Expectant patients will be kept comfortable with adequate pain management. Triage decisions such as whether to take a patient to the operating room are made by the triage officer who should make the decision based on clinical factors such as refractory hypotension in hemorrhagic shock. Anesthesiologists and anesthesiology intensivists, as perioperative physicians, are well versed in identifying derangements in physiology and determining which patients would benefit from a trip to the operating room vs continued resuscitation in the ICU.[5]

Expanded ICU

With the ICU at capacity during a MCE, the PACU, ED and other areas of the hospital may serve as make-shift ICUs. The hospital disaster response plan must account for any additional equipment needed such as extra ventilators, infusion pumps, chest tube equipment, and an adequate drug supply. If these logistical contingency plans are not in place prior to a MCE, the hospital will be unable to manage the increased volume of casualties. In this sense, it is critical that during disaster management planning, personnel from each critical area of the hospital are involved so that needs can be identified and avenues to secure the necessary equipment can be developed ahead of time. Trauma coordinators can fill this gap by integrating critical care, anesthesiology, emergency medicine, nursing etc. into trauma and disaster planning. However, if trauma coordinators and departments are short sighted and do not involve these groups, adequate planning cannot occur. In an expanded ICU setting, the intensivists will lead overall management. However, numerous providers will need to step in to assist including anesthesiologists, hospitalists, pediatricians, nurse practitioners, physician assistants and other providers. As an anesthesiologist and perioperative physician, understanding the principles of critical care management including restoration and continuation of end organ oxygen delivery, reversing shock states, advanced airway management, correction of severe metabolic disturbances, and the treatment of common disease processes such as diabetic ketoacidosis, rhabdomyolysis, bacterial infections are essential.[2]

Summary

As the landscape of medicine continues to transform around us, anesthesiologists and critical care anesthesiologists must emerge from the ambulatory surgical centers, operating rooms and ICUs and become educated on their individual community and hospital disaster preparedness plans. It will only be through establishing common ground with trauma surgeons, emergency physicians and hospital and community leadership and by demonstrating our collective knowledge and ability as resuscitative physicians that anesthesiologists will become indispensable partners in disaster and trauma preparedness. Understanding the existing disaster management plans and developing ways in which to streamline and improve these plans through their knowledge of acute disease processes and medical utilization during the care of critically injured patients is key to their role in disaster preparedness. Anesthesiologists and intensivists must stay current with the diagnosis and treatment of chemical, radiological, and biological agent exposure. In 2017, the ASA Committee on Trauma and Emergency Preparedness (COTEP) published the results of a survey showing that there was significant disconnect between trauma surgeons and anesthesiologists regarding whether the anesthesiologists at their respective institutions were appropriately trained to manage trauma patients. 91% of practicing anesthesiologists believed they had the skill necessary to care for severely injured trauma patients, while only 69% of trauma surgeons felt that the anesthesiologists at their institutions had adequate training to manage patients with this level of injury.[7] Additionally, there is little focus in American anesthesiology residencies on trauma education.[5] It is essential that anesthesiologists and anesthesiology intensivists remain proficient in resuscitative medicine, transfusion medicine, management of shock states, coagulation disturbances, and acute traumatic injuries. To do this, anesthesiologists must also champion trauma and disaster education at their residency programs. This can start with ensuring every anesthesiology resident graduates with Advanced Trauma Life Support (ATLS) certification.

In its essence, the profession of anesthesiology is rooted in alleviating suffering and the management of critically ill patients. Anesthesiologists established the first critical care units in Europe many decades ago. Anesthesiology has also been instrumental in developing the paradigms of modern patient safety and quality metrics. In France, anesthesiologists are fundamental members of the trauma units. As perioperative physicians and intensivists, they must continue this trend, set tangible goals and lead by example in working with colleagues in acute care surgery and emergency medicine in championing the advancement of trauma and disaster medicine.

References

1. Murray MJ. Communicating during a disaster. Anesth Analg. 2010;110(3):657-658.
2. Geiling JA, ed. Fundamental Disaster Management. Mount Prospect, IL: Society of Critical Care Medicine; 2009.
3. Baker DJ, Telion C, Carli P. Multiple casualty incidents: the prehospital role of the anesthesiologist in Europe. Anesthesiology Clinics. 2007;25(1):179-188.
4. Hirsch M, Carli P, Nizard R, et al. The medical response to multisite terrorist attacks in Paris. The Lancet. 2015;386:2535-2538.
5. Kuza C, McIsaac J. Roles of the anesthesiologist during mass casualty events. ASA Monitor. 2017;81(4):14-17.
6. Waeckerle JF. Disaster planning and response. N Engl J Med. 1991;324(12):815-821.
7. Kaslow O, Kuza CM, McCunn M, et al. Trauma Anesthesiology as Part of the Core Anesthesiology Residency Program Training: Expert Opinion of the American Society of Anesthesiologists Committee on Trauma and Emergency Preparedness (ASA COTEP). Anesth Analg. 2017;125(3):1060-1065.

Disclosure

None reported.

MM

Perioperative Surgical Home, Fixing a Fragmented Process to Improve Quality of Care

by Michael J Duncan, MD

The future of perioperative care will involve greater coordination and less fragmentation of perioperative care through the perioperative surgical home model.



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Abstract

The practice of Perioperative Medicine is in need of greater coordination and organization. The traditional model of perioperative patient care, scheduling surgical care based primarily on surgeon/patient availability, along with the operative need, with little thought for coordination and planning to ensure that patients can safely undergo surgery and expect the best possible outcome, is in need of a paradigm change. Return to the highest level of functionality should be the patient centered approach.

Introduction

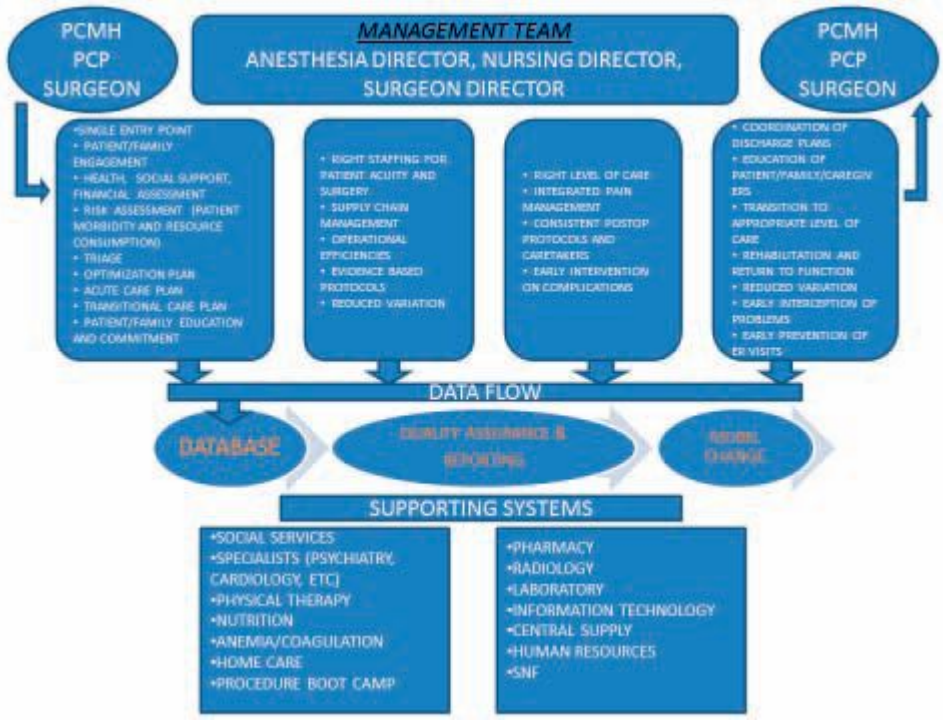
From the days of ether masks and copper kettles, the study and practice of anesthesiology has expanded to include a variety of sub specialties, an emphasis on quality improvement and patient safety, and technological innovation. Anesthesiologists can now be found outside operating rooms running preoperative clinics, intensive care units, pain clinics, palliative care teams, and involved in health system administration. The practice of anesthesiology now embraces the use of ultrasound and point of care exams. However, as the roles of anesthesiologists have expanded throughout the healthcare environment, we find that within our area of inception – where we emerged as a specialty, namely the practice of surgical anesthesiology – anesthesiologists continue to operate within a fragmented system of care coordination.

The practice of Perioperative Medicine is in need of greater coordination and organization. The traditional model of perioperative medicine, placing a patient onto an operative schedule based on availability and need, is sometimes void of consideration as to whether that patient can safely undergo surgery. For a period of our history the provision of anesthesiology started by contacting patients by phone or in person in their hospital room the night prior to surgery, then caring for them on the day of surgery, and finally rounding on them to follow up during the days following their procedure. As Warner and Apfelbaum suggest, a shortage of young physicians choosing anesthesiology as a specialty in the 1990s led, in part, to a "retrenchment of anesthesiologists into traditional operating room settings" and a reduction in practitioners "seeking training beyond clinical intraoperative anesthesia."[1] Whether for this reason of others, anesthesiologists have indeed become very good at training residents to be excellent

in the practice of intraoperative care, but not necessarily in perioperative care.

Today we find ourselves in a necessarily changing healthcare environment. Health Care spending in the U.S. is nearly 17% of GDP according to the World Bank Indicators.[2] While health care in the United States is more expensive, it is not more likely to provide high-quality outcomes than the less expensive healthcare in other Western democracies.[3] It is widely recognized that there is a need to reduce waste in our healthcare system, and inefficiencies have been recognized as a leading driver for excessive costs of surgical procedures.[4,5] Without a doubt, the fragmented system for perioperative care is one area where costs, quality, and health outcomes can and should be improved.

Figure 1. Elements of a Comprehensive PSH model



The concept of the perioperative surgical home (PSH) was a product of the Committee on Future Models of Anesthesia Practice developed by the American Society of Anesthesiology (ASA) in 2011. This concept followed similar models developed for primary and pediatric patient-centered medical homes of previous decades. The purpose of this committee was to address the role anesthesiologists will have in future healthcare models, where health care episodes are imagined as continuums and health care reimbursements accordingly reward for the outcomes rather than the procedures themselves – the so called "bundled payment" models. Perioperative and peri-procedure care accounts for the majority of health care expenditures and the concept of the PSH aligns with reducing these by improving its value to each individual patient. The PSH aims to reduce complications, one of the ways to derive greater value. Nationally, for the sustainability of our health care system, there is an imperative to have a well-designed, patient centric, value based, coherent, continuously measurable and improving model of perioperative care coordination. This committee suggested the PSH as a model for providing patient centered, physician led, and interdisciplinary coordination of care for patients during the perioperative period. The ASA suggests this model will achieve the triple aim of improving health, improving the delivery of healthcare, and reducing the cost of care.

This orchestrated effort requires someone knowledgeable in complex perioperative issues and who is able to integrate care across various healthcare professionals.[6] Anesthesiologists, with a unique set of skills and training including knowledge of perioperative patient care, management of OR personnel and resources, and an understanding of surgical practices, are uniquely poised to manage patient care through the PSH.

Since 2014, two learning collaboratives have been undertaken to define and hone the idea of the perioperative surgical home. Since the ASA's first iteration of the PSH collaborative in 2014, the PSH has existed in

various forms and functions. As Mariano et al point out, there are no guidelines to direct the creation of a PSH.[7] This has led to a variety of models with variable emphasis including some that are in reality only preanesthesia clinics, while others are simply an emphasis on enhanced recovery protocols. While both preanesthesia clinics and the use of enhanced recovery protocols have a place within the PSH model, Mariano et al suggest that limited implementation of PSH concepts may limit the realization of the benefits of the PSH.[7]

What then is the PSH? As Kain et al summarize, the "underlying tenet of PSH is improved coordination of care throughout the entire perioperative continuum, from the minute the surgeon/proceduralist and patient decide a procedure is needed until the patient is safely home and fully recovered."[8] The PSH model does in fact include a pre anesthesia clinic and the use of enhanced recovery protocols, but also includes greater coordination throughout the perioperative period between all professionals involved. This greater coordination beyond the already existing preanesthesia clinics should focus on identifying complications and failure of adherence, reducing costs, and making data driven decisions, all with the goal of improving patient care and outcomes. One model of the PSH involves coordination of care between anesthesiologists, surgeons, nurses, pharmacists, physical therapists, case managers, social workers, and information technology experts.[9] Another includes internists, laboratory technologists, radiologists, and pharmacists.[10] Whatever the model, it must be flexible in its complexity to account for different clinical care needs (Joint replacement surgery vs. GI endoscopy, e.g.). However, the basics of the model will always include a management process, data collections and quality improvement.

Preoperative Care

Kain et al. eloquently summarize the approach of the PSH within the preoperative period in the following way: "In this model, preoperative clinics will no longer focus on 'clearing the patient for surgery' but rather 'optimizing the patient for surgery.' The focus shifts from 'can the patient medically tolerate the procedure?' to 'how can we help the patient thrive throughout the perioperative period?'"[8] This shift in attitude should drive every patient care decision we make in the PSH model. We must see the value in treating the patients' illnesses prior to having surgery rather than acutely correcting a lab abnormality just prior to going to the operating room.[11] Additionally, the preoperative period can be used to identify high risk patients and assessing for pain management needs, and the need for nutritional support or social support.[11]

Preoperative care in the PSH model also emphasizes patient education and involvement in decision making and treatment planning. Patient preferences and values are considered in all health care decisions.[9] Realistic goals and expectations are established. The patient's healthcare literacy can be evaluated and optimized to make them active participants in their care, improve satisfaction, and reduce postoperative events.[12]

Improved care in the preoperative period under the PSH model also involves improved algorithms and a more conscientious approach to what testing is done in the preoperative period. Every patient may not need a full battery of tests or a full set of labs. Consideration should be given to type of surgery, coexisting medical conditions, and medications being taken. Both perioperative care and costs can be improved through intentional consideration as to whether a particular avenue of testing will affect such things as the decision to undergo surgery, the type of anesthesia that will be administered, and what problems can be foreseen in the intraop and postoperative period.

Intraoperative/Day of Surgery Care

Intraoperative care then strives to reduce variance and carry out care goals that were established preoperatively including optimizing fluid and pain management, and minimizing the use of drains and nasogastric tubes.[11] One existing model for the PSH describes physician leadership and a consensus approach to proceeding with elective cases, as well as reducing cancellations and delays by utilizing disease specific and consistent preoperative testing.[13] As those same authors describe, elimination of overuse, underuse, and misuse of care will reduce costs and add value.

The use of "enhanced recovery after surgery" (ERAS) protocols assists in achieving the goals stated above. Enhanced recovery protocols aim to apply evidence based, standardized care to improve maintenance of normal physiology and shorten the time to recovery after surgery. These protocols include standardized approaches to perioperative nutrition, intraoperative fluid management, avoidance of post-operative nausea and vomiting,

temperature management, and the use of multimodal analgesia. A standardized approach to multimodal analgesia is, in fact, a hallmark of ERAS protocols and intraoperative care in the PSH model. In light of the current state of opioid use and abuse in the United States, and for the sake of our patients, it is essential that we maximize the use of opioid sparing techniques. Consideration is given to the appropriate use of regional anesthesia, NSAIDS, ketamine, dexmedetomidine, lidocaine, acetaminophen, gabapentin, and other non-opioid adjuvants. Efforts to increase the use of these adjuvants intraoperatively will require consensus from pharmacy as well as hospital administration and nursing.

Postoperative Care

The focus of the PSH on the postoperative period is again to standardize what has been a disjointed system in the past. The focus is on coordinated execution of previously determined plans for analgesia, early ambulation, nutrition management, identification of and rescue from complications, and transitions to an appropriate discharge setting. As part of the PSH, UC Irvine calls each patient's primary care provider and provides him or her with a functional based perioperative summary rather than a tradition surgical report.[11] Crosby et al argued in 2014, "the perioperative surgical home might decrease hospitalization expense but is unlikely to materially improve outcomes or significantly reduce overall costs unless it thinks about and takes responsibility for post-discharge, long-term results."[14] The PSH model should continue physician led, coordinated interdisciplinary care in the postoperative period to include a smooth transition to care outside of the hospital. Figure 1 is a graph of the elements to a successful PSH, and what the patient flow can be imagined to look like.

Some barriers exist to implementation of the PSH and improvement of health outcomes in the perioperative period. These include achieving consensus from all parties involved including hospital administration as well as challenges with staffing of the program, given that many of the coordinating activities are not billable. Additionally, as mentioned above, the lack of clear directives on what makes up a PSH can lead to incomplete implementation or failure to implement at all. As Mariano et al suggest, the PSH is best built on existing best practices with physician leadership driving continual improvement.[7] Improvement can be measured by metrics such as patient experience, costs analysis, quality metrics, and outcomes. Some current PSH models have shown decreases in length of stay, more patients discharged to home, increased on-time surgery starts, reduced anesthesia-related delays and day-of-surgery cancellations, and lower costs of care.[15,16,17,18]

At our department, we have embraced the tenets of the PSH and are working to imbed them in our hospital, Saint Luke's Hospital of Kansas City. Presently, we have expanded the presence of anesthesiologists in the Preoperative Assessment Center (PAC – previously called Preop Testing) to daily involvement, where there was none previously. We have assigned an attending anesthesiologist as our Liaison to the PAC, who outlines, coordinates and approves the rules and algorithms the PAC staff use as screening tools for all preop patients. These actions have allowed us to address issues well in advance, typically 2 or more weeks for cases that are so scheduled, to identify those patients that may require further thoughts about their readiness for surgery, rather than 1-3 days before, which was the norm before. ERAS protocols for selected patient populations are also highlighted prior to surgery. Intraoperatively, these pathways for enhanced recovery are followed, as are protocols to reduce narcotic use while enhancing multimodal non-narcotic therapies that are embedded in our IT platforms. Adding further resources to the PAC will allow us to begin to address not only assessment but preoperative enhancement processes, to better prepare patients for their surgeries and allow them to have the opportunity for the best surgical outcome (decreased LOS, lower surgical complication rates, lower infection rates, quicker PT/OT rehabilitation, among others). To address perioperative pain management, we have formed and have in place in a very robust Acute Pain Service that has a dedicated attending anesthesiologist performing pre-, intra-, and postoperative selective peripheral and central nerve blocks to control procedural pain in the perioperative period, either with single shot or continuous catheter based local anesthetics. This service aims to quicken the time to recovery, lessen the need for narcotics, address postoperative rehabilitation sooner, and ultimately return the patient to functionality. In addition, our department has an extensive intensive care presence, responsible for managing the majority of our hospital's ICU patients in the daytime hours and all ICU patients at nights. Together with their collaborating APPS,

they help manage the care and throughput of critically ill patients in a timely fashion using evidenced based, best practice guidelines and standards, all in an attempt to decrease complications and hasten recovery to step down or discharge status. They serve as the hospital's evolving acuity of care resource 24/7, allowing us to intervene and limit both rapid response and code blue responses by timely intervening. They have also begun to plan for management of short stay ICU patients who are discharged out of the hospital directly from the ICU, to skilled care facilities or home. Together, these efforts at our hospital point to the many ways anesthesiologists trained in the modern era can be a vital part of the perioperative care team, and can enhance the pathway of care for perioperative and peri-procedure patients as highlighted by the ideas within the PSH model.

Conclusion

The future of perioperative care will involve greater coordination and less fragmentation of perioperative care through the PSH model. The PSH has been endorsed by several medical societies, including the American Academy of Orthopaedic Surgeons, American Academy of Physical Medicine and Rehabilitation, and American Urological Association.[19] Beginning in 2020 the third iteration of the ASA learning collaboratives will assist participating institutions with PSH pilot implementation, optimization, and expansion into new service lines or system-wide implementation.[19] As a specialty, anesthesiology looks forward to leading the further expansion of the PSH model to improve patient care while helping to control costs in the perioperative period

References

1. Warner MA, Apfelbaum JL. The Perioperative Surgical Home: A Response to a Presumed Burning Platform or a Thoughtful Expansion of Anesthesiology? Anes Analg 2015;120:1149-1151
2. The World Bank Indicators, Available at: https://data.worldbank.org/indicator/SH.XP D.CHEX.GD.ZS?end=2015&locations=US&start=2011. Accessed Aug 22, 2018
3. Butterworth JF, Green JA. The Anesthesiologist-Directed Perioperative Surgical Home A Great Idea that will succeed only if it is embraced by hospital administrators and surgeons. Anes Analg 2014;118:896-897
4. Berwick DM, Hackbarth AD. Eliminating waste in US healthcare. JAMA 2012;307:1513-6
5. Fry DE, Pine M, Jones BL, Meimban RJ. The impact of ineffective and inefficient care on the excess costs of elective surgical procedures. J Am Coll Surg 2011; 212(5):779-86
6. Colquhoun AD, Zuelzer W, Butterworth JF. Anesthesiology 2014;121:1144-46.
7. Mariano ER, Vetter TR, Kain ZN. The Perioperative Surgical Home Is Not Just a Name. Anes Analg 2017;Vol 125:1443-1445.
8. Kain ZN, Hwang J, Warner, MA. Disruptive Innovation and the Specialty of Anesthesiology: The Case for the Perioperative Surgical Home. Anes Analg 2015;120:1155-7.
9. Kain ZN, Vakharia S, Garson L, Engwall S, Schwarzkopf R, Gupta F, Cannesson M. The Perioperative Surgical Home as a Future Perioperative Practice Model. Anes Analg 2014;118:1126-30.
10. Chen J, Liu H. Is perioperative home the future of surgical patient care? J Biomed Res 2015;29:173-175.
11. Saver C. Perioperative surgical home optimizes patient care, Part 2. OR Manager 2015;31:1-5.
12. Goeddel LA, Porterfield JR, Hall JD, Vetter TR. Ethical opportunities with the perioperative surgical home: disruptive innovation, patient-centered care, shared decision making, health literacy, and futility of care. Anes Analg 2015;120:1158-62.
13. Vetter TR, Goeddel LA, Boudreaux AM, Hunt TR, Jones KA, Pittet JF. The Perioperative Surgical Home: how can it make the case so everyone wins? BMC Anesthesiol 2013;14:13-16.
14. Crosby G, Culley DJ, DexterF. Cognitive outcome of surgery: Is there no place like home? Anesth Analg 2014;118:898-900
15. Chimento G, Duplantier N, Sumarriva G, Meyer MS, Thomas L, Dias D, Schubert A. The perioperative surgical home pathway for total hip arthroplasty patients produces improved outcomes. Orthopaedic Proceedings 2018;99-B:77
16. Vetter TR, Barman J, Hunter JM Jr, Jones KA, Pittet JF. The Effect of Implementation of Preoperative and Postoperative Care Elements of a Perioperative Surgical Home Model on Outcomes in Patients Undergoing Hip Arthroplasty or Knee Arthroplasty. Anes Analg 2017;124:1450-58.
17. Qiu C, Rinehart J, Nguyen VT, Cannesson M, Morkos A, LaPlace D, Trivedi NS, Mercado PD, Kain ZN. An Ambulatory Surgery Perioperative Surgical Home in Kaiser Permanente Settings: Practice and Outcomes. Anes Analg 2017;124:768-74.
18. Englesbe MJ, Grenda DR, Sullivan JA, Derstine BA, Kenney BN, Sheetz KH, Palazzolo WC, Wang NC, Goulson RL, Lee JS, Wang SC. The Michigan Surgical Home and Optimization Program is a scalable model to improve care and reduce costs. Surgery 2017;161:1659-66.
19. Pomerantz P. The Transformative Power of the Perioperative Surgical Home. ASA Monitor 2018;82:10-11.

Disclosure

None reported. **MM**

ECMO for Adults with Severe Respiratory Failure

by Jonathan Kozinn, MD & W. Cole Wrisinger, DO

Extracorporeal Membrane Oxygenation is being utilized with increasing frequency to treat adults with respiratory failure who have failed conventional therapy.



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Abstract

The technology to provide Extracorporeal Life Support (ELS) has existed for over four decades. Its use has increased markedly in the last decade, initially in response to severe Acute Respiratory Distress Syndrome (ARDS) in adults during the 2009 H1N1 influenza epidemic and continuing with the increasing acceptance of Extracorporeal Membrane Oxygenation (ECMO) for the treatment of severe respiratory failure in adults from other causes.[1] We highlight the use of ECMO, particularly at our institution.

Introduction

With the recent publication of the ECMO to Rescue Lung Injury in Severe ARDS (EOLIA) trial which compared early ECMO for severe ARDS with conventional ventilation, there now have been two randomized, controlled trials suggesting a benefit with the use of ECMO for severe ARDS, the first being the CAESAR trial published in 2009[2,3]. In the EOLIA trial, the early ECMO group's mortality benefit did not reach statistical significance, and the trial was stopped at the fourth interim analysis. Patients in the conventional ventilation group were allowed to crossover into the ECMO group at the discretion of the treating physicians, which made it difficult to draw definitive conclusions regarding the benefit of early ECMO. The trial investigators believed that not allowing crossover would be unethical, despite recognizing the potential difficulty it would cause in analyzing the data. There was a statistically significant benefit of ECMO in regards the secondary end-point of treatment failure, which was defined as death in the ECMO group and either death or crossover to ECMO in the conventional ventilation group.

Because placing an adult on ECMO is no longer considered to be experimental, it is likely that an increasing number of community-based physicians will either take care of patients who may benefit from ECMO or provide care to post-ECMO survivors. In this article, we will attempt to give a basic description of the mechanics of ECMO, the indications for ECMO, the decision making that goes into patient selection, and describe the clinical course and expected recovery for a patient that is placed on ECMO for respiratory failure.

Mechanical Considerations

Conceptually, an ECMO circuit is a simple device. It consists of a large drainage cannula that removes blood from a patient, a pump that moves blood forward, an oxygenator that adds oxygen to blood and removes carbon dioxide (CO_2), and a return cannula that returns

the oxygenated blood to the patient.[4] It is the location of the drainage and return cannulas that determines the type of support that ECMO provides.

If the drainage cannula is in a vein and the return cannula is in an artery, this is known as veno-arterial ECMO (VA ECMO). This type of support bypasses both the heart and lungs and provides both circulatory and respiratory support. It is VA-ECMO that was used on the first adult who survived ECMO in 1971; a patient who developed severe ARDS from traumatic lung injury due to a motor vehicle injury.[5] VA-ECMO continued to be the primary mode of ECMO for both cardio-pulmonary failure and isolated respiratory failure up until the early 2000s.



Figure 1. VA-ECMO Cannulation

Unfortunately, VA ECMO has significant drawbacks when used for isolated respiratory failure. The first and most obvious drawback is that VA ECMO requires a large bore catheter – often 14 French or larger – to be placed in an artery, typically the left common femoral artery (CFA). Concomitant with this, is the risk of bleeding from the arterial cannulation site and limb ischemia from impaired distal blood flow.[6] At our institution, we typically attach a Dacron graft in an end-to-side anastomosis to the CFA and place the return cannula in this graft with the tip of the cannula laying just inside the artery (Figure 1). We have found that distal blood flow is excellent and arterial bleeding can be directly controlled at the arterotomy site, which is not achievable with percutaneous cannulation.

Two less obvious drawbacks to VA-ECMO occur as a result of the ECMO circuit being in parallel to the cardiopulmonary circulation. The first is VA-ECMO causing left ventricular (LV) distension (Figure 2). As the arterial circulation is a high-pressure system, and VA ECMO returns blood under pressure to this system in a retrograde fashion, the LV faces increasingly high afterload (afterload is not synonymous with systemic vascular resistance, but rather reflects increased LV wall tension induced by the returned blood). This is particularly relevant in cases of impaired cardiac function as the heart may not eject blood with every beat. When blood does not eject from the LV, there are areas of stagnant blood flow within the heart that are prone to thrombus formation. Additionally, as LV cavity pressure increases, coronary perfusion pressure is reduced and coronary blood flow may become impaired.[6,7] Several strategies have been developed to combat LV distension including judicious use of inotropes, intra-aortic balloon pump counterpulsation, and percutaneous left ventricular assist devices such as the Impella.[7]

The second of these drawbacks is that of "red-blue mixing." The first vessels arising from the ascending aorta are the coronary arteries with the next major vessel being the brachiocephalic (innominate) artery. In contrast to LV distension, red-blue mixing is more likely to occur as cardiac function normalizes. If cardiac function is normal, the blood in the aorta will be a combination of antegrade flow from the patient's own cardio-pulmonary system and retrograde flow from the ECMO circuit. In a patient with severe lung injury, this antegrade flowing blood will be poorly oxygenated, despite blood from the ECMO circuit having a saturation of 100%. The poorly oxygenated blood will be most concentrated in the ascending aorta, with the coronary arteries and brachiocephalic artery being most affected and thus potentially delivering poorly oxygenated blood to the coronary and cerebral circulation.[5,6]

Veno-venous (VV-ECMO) avoids both of these issues. Unlike VA ECMO, both the drainage and return cannulas are in veins. At our institution, we typically implement an upper body single-site cannulation approach via the right internal jugular vein using a double lumen bicaval canula (Avalon Elite cannula [Maquet]). The drainage lumen has orifices that sit in both the superior and inferior vena cava, while the return lumen has a single opening in the right atrium directed towards the tricuspid valve. The distal end

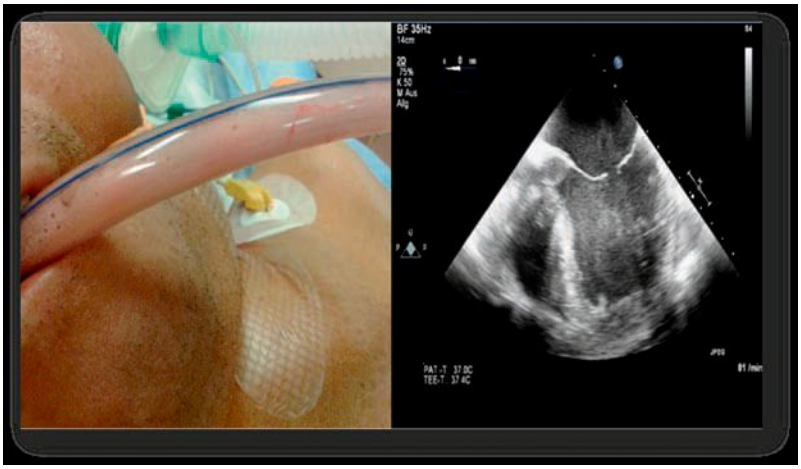


Figure 2. Pulmonary edema secondary to Left Ventricular distension on VA. ECMO and associated TEE image of the LV demonstrating stagnant blood in the LV cavity.

of the cannula, when properly placed, is located in the IVC caudal to the hepatic vein.

In addition to avoiding complications associated with arterial cannulation, VV ECMO also provides an advantage to VA ECMO in the treatment of respiratory failure because the circuit is in series with the patient's lungs. The practical effect of this is that blood is oxygenated by both the circuit and the lungs, not the circuit or lungs alone. As such, the ECMO circuit essentially pre-oxygenates blood and allows the lungs to further oxygenate and remove CO_2 from the blood. This avoids the "red-blue mixing" seen with VA ECMO and because the arterial system is not accessed, LV distension does not occur. Additional advantages of VV ECMO include lower anti-coagulation needs and the ability to decannulate at the bedside after lung recovery. The primary disadvantage of VV ECMO is that it cannot augment cardiac output, and so does not benefit a patient with combined cardio-pulmonary failure.

Indications and Patient Selection

The indications for VV ECMO for adults with respiratory failure are expanding. The three most common indications are severe ARDS, COPD exacerbations, and as a bridge to lung transplantation.[8] VV ECMO can provide complete pulmonary support allowing for adequate oxygenation and CO_2 removal without exposing the patient to potential ventilator associated lung injuries associated with conventional mechanical ventilation techniques.

In 2009, with the publication of the CAESAR trial in Lancet, the authors proposed several inclusion and exclusion criteria. The main inclusion criteria were severe respiratory failure with a Lung Injury Severity Score greater than 3.0 or uncompensated hypercapnia with a pH $<$ 7.20.[2] Exclusion criteria included contraindications for anti-coagulation, age $>$ 65, mechanical ventilation at high settings for greater than one week, and suspected non-reversibility of respiratory failure.[2] While the CAESAR trial's results were promising, not all of the patients in the ECMO group actually received ECMO therapy and lack of standardization of mechanically ventilated patients limited the trial.[3]

As institutions became more comfortable with ECMO, exclusion criteria have loosened. In 2014, Schmidt et al. performed a multi-factorial retrospective analysis for patients placed on ECMO looking for characteristics favorable or unfavorable for survival. Using logistic regression analysis, the RESP score was developed, and has been prospectively validated. Several poorly prognostic characteristics stand out as not favoring survival such as pre-existing neurological disability, advanced age, and prolonged periods on mechanical ventilation. Factors such as young age, asthma exacerbation, and others are favorable for survival.[9]

A patient undergoing ECMO is susceptible to a similar pro-inflammatory response syndrome to those patients undergoing cardiopulmonary bypass. This is mounted by the complement system leading to leukocyte activation, widespread endothelial cell injury, and upregulation of pro-inflammatory mediators.[10] Regardless of predictive scores, a patient who undergoes ECMO must be prepared for an extended recovery, often requiring weeks to months of rehab. Caution must therefore be used in placing patients with multiple severe, co-morbid medical conditions on ECMO.

ECMO in itself is strictly a life support device. It does not promote lung healing absent its ability to reduce the risk of ventilator associated lung injury. For this reason, ECMO should be used in patients with known or highly suspected etiologies of severe respiratory failure such as infection, trauma, or chemical irritation which are known to be reversible.[5] Patients whose respiratory failure is due to progression of chronic lung diseases such as COPD or interstitial lung disease should rarely be placed on ECMO as the potential for successful weaning is extremely low in these clinical scenarios.

Maintenance of the Patient on ECMO

Care for the patient on ECMO requires a multidisciplinary critical care team with additional training in management of ECMO patients. The circuit design of VV-ECMO is straightforward. Blood is pumped across a polymethylpentene (PMP) diffusion membrane countercurrent to a sweep gas containing a mixture of oxygen and air. In most critically-ill adult patients, blood will be fully oxygenated with as little as 3 ml/kg/min of oxygen flowing across the diffusion membrane. It is CO_2 removal that requires increased gas flow. Similar to minute ventilation on a ventilator, increasing the flow of gas across the diffusion membrane (sweep) reduces $PaCO_2$. For VV ECMO, we typically keep the gas blend between 90 and 100% O_2 with sweep adjusted to maintain normocapnia. Blood flow through the ECMO circuit should be maintained at greater than 60% cardiac output. If flow is significantly less than this, the ratio of oxygenated blood in the right atrium from the ECMO circuit and poorly oxygenated blood that entered the right atrium from the IVC or SVC and did not go through the drainage cannula becomes unfavorable to support adequate systemic oxygenation.

The time that a patient remains on ECMO is highly variable as ECMO does not provide lung healing, just prevention of further injury. The shortest successful ECMO run at our institution has been 48 hours, with our longest approaching 49 days. While on ECMO, the critical care provided to patients by our pharmacists, nutritionists, and physical therapists who are comfortable caring for ECMO patients becomes invaluable. Due to the membrane oxygenator, the pharmacokinetics of many drugs are altered when administered to an ECMO patient. Pharmacists with ECMO experience and knowledge are critical to optimizing outcomes.

ECMO patients are often kept sedated, however, some institutions are studying VV ECMO as first line therapy for certain pathologies while keeping the patient awake.[11, 12] More research is needed in this area, though. Cannulation strategy planning must take into account the patient's need for physical therapy and possible awake ambulation as early mobilization helps preserve functional status and optimization for transplant if being bridged.[13]

Bleeding is always a concern for patients on ECMO. This is due to both the need for anti-coagulation and alterations in blood composition from the ECMO circuit. Von Willebrand's factor is cleaved by the circuit, thrombocytopenia is common and a "circuit DIC" can develop. Heparin resistance occurs with relative frequency requiring increasing heparin doses or transfusion of anti-thrombin III. Occasionally, spontaneous bleeding occurs absent significant clotting abnormalities. The most serious of these is intracranial hemorrhage which is responsible for over ten percent of deaths on VV-ECMO. When needed, heparin-free ECMO can be performed, but there is an increased risk of circuit thrombosis.

Once a patient has demonstrated signs of lung recovery, the sweep can be turned off, and the patient can be supported solely on a ventilator. If the patient maintains acceptable oxygenation and normocapnia for approximately 24 hours, decannulation occurs. At our institution, this is performed at the bedside, negating the need for transport or operating room time.

Our center uses a single caregiver model to care for patients on ECMO. The nurses at St. Luke's care for both the patient and the circuit. This is in contrast with other institutions in which there is both a bedside nurse and a separate ECLS specialist. Our nurses go through an intensive training course complete with simulation and drills prior to being allowed to care for patients on ECMO. Since we do not have perfusionists in house at all times the nurses are trained to both troubleshoot the circuit and provide rescue maneuvers such as deairing a circuit, manually pumping a circuit, and stopping a leak. This training has been successfully used on several occasions.

Our critical care physicians manage both the critical care needs of the patient and the ECMO circuit. This includes both cannula insertion and decannulation of VV-ECMO. Cardiac surgeons and perfusionists are on call, but not in house, at all times to assist with the management of these patients if needed.

Conclusion

ECMO is being utilized with increasing frequency to treat adults with respiratory failure who have failed conventional therapy. The successful initiation, maintenance, and weaning of ECMO requires a multidisciplinary team of nurses, pharmacists, physical therapists, nutritionists, and physicians working in concert. As ECMO is no longer an experimental therapy, the number of patients who are candidates to be treated with ECMO and who are successfully weaned, will likely increase. Community-based physicians will serve an important role in the future directions of ECMO therapy as they will frequently be the first to recognize the need for ECMO, initiate consultations with ECMO centers, and prepare patients for a successful transport. Additionally, community-based physicians will be key players in the

recovery of ECMO patients, not only from a physical medicine perspective but also from a psychiatric standpoint as ECMO patients have a higher incidence of PTSD and development of new psychiatric pathology.[14] The future of ECMO will include continuing to optimize patients' physical status during cannulation and recovery, prevention and management of coagulopathy associated problems, improving cannulation strategies, and development of portable extracorporeal oxygenators. Despite the increased success in treating patients with ECMO, additional randomized trials must be performed to optimize its success and resolve controversy regarding ECMO's efficacy. In the recent EOLIA trial there was a non-statistically significant trend towards benefit of early ECMO with severe ARDS.[8] While the trial admittedly had several significant limitations that perhaps diluted ECMO's apparent benefits, it demonstrates the necessity of ECMO referral centers continuing to enroll their patients in the extracorporeal life support organization's (ELSO) databases for future studies.

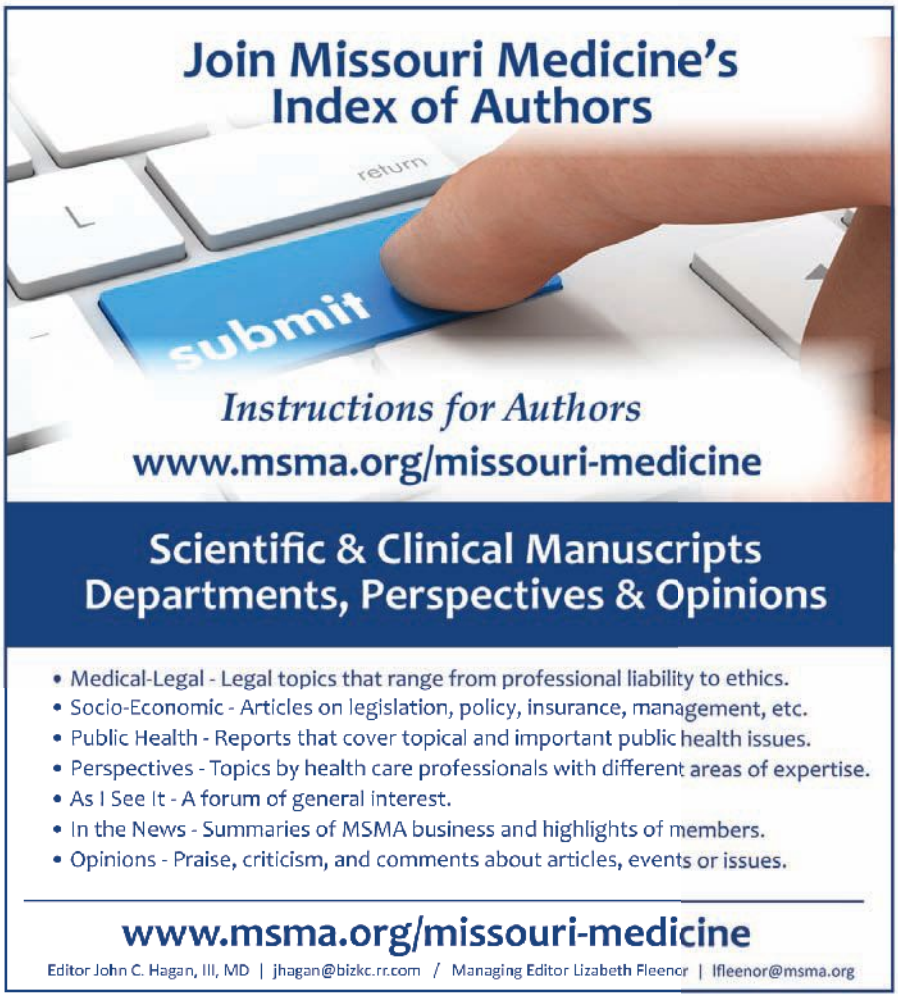
A list of registered ECMO referral centers in Missouri can be found at www.elso.org.[15]

References

1. Cooper DJ, Hodgson CL. Extracorporeal membrane oxygenation rescue for H1N1 acute respiratory distress syndrome: equipoise regained. American Journal of Respiratory and Critical Care Medicine. 2013;187:224-226.
2. Banfi C, Matteo P. Veno-venous extracorporeal membrane oxygenation: cannulation techniques. Journal of Thoracic Disease. 2016;8(12):3762-3773.
3. Makdisi G, Wang I. Extracorporeal membrane oxygenation (ECMO) review of a lifesaving technology. Journal of Thoracic Disease. 2015;7(7):E166-176.
4. Expert Analysis: Indications and complications for VA-ECMO for cardiac failure. American College of Cardiology website. http://www.acc.org/latest-in-cardiology/articles/2015/07/14/09/27/indications-and-complications-for-va-ecmo-for-cardiac-failure. Published July 14, 2015. Accessed May 5, 2018.
5. Meani P, Pappalardo F. The step forward for VA-ECMO: left ventricular unloading!. Journal of Thoracic Disease. 2017;9(11):4149-4151.
6. Abrams D, Brodie D. Extracorporeal membrane oxygenation for adult respiratory failure 2017 update. Chest. 2017;152(3):e57-e76.
7. Peek G, Mugford M. Efficacy and economic assessment of conventional ventilatory support versus extracorporeal membrane oxygenation for severe adult respiratory failure (CESAR): a multicentre randomised controlled trial. The Lancet. 2009;374:1351-1363.
8. Combes A, Hajage D. Extracorporeal membrane oxygenation for severe acute respiratory distress syndrome. New England Journal of Medicine. (2018);378(21):1965-1975.
9. Schmidt M, Bailey M. Predicting survival after extracorporeal membrane oxygenation for severe acute respiratory failure. The respiratory extracorporeal membrane oxygenation survival prediction (RESP) score. American Journal of Respiratory and Critical Care Medicine. 2014;189:1374-1382.
10. Millar J, Fannig J. The inflammatory response to extracorporeal membrane oxygenation (ECMO): a review of the pathophysiology. Critical Care. 2016;20(387).
11. Langer T, Santini A. "Awake" extracorporeal membrane oxygenation (ECMO): pathophysiology, technical considerations, and clinical pioneering. Critical Care. 2016;20(150).
12. Abrams D, Javidfar J. Early mobilization of patients receiving extracorporeal membrane oxygenation: a retrospective cohort study. Critical Care. 2014;18(1).
13. Lehr C, Zaas. Ambulatory extracorporeal membrane oxygenation as a bridge to lung transplantation: walking while waiting. Chest. 2015;147(5):1213-1218.
14. Hodgson C, Hayes K. Long-term quality of life in patients with acute respiratory distress syndrome requiring extracorporeal membrane oxygenation of refractory hypoxaemia. Critical Care. 2012;16:R202.
15. ELSO Centers ID List.https://www.elso.org/Registry/SupportDocuments/CenterIDList.aspx. Accessed May 22, 2018.

Disclosure

None reported. **MM**



The Role of Anesthesiology Assistants in the Anesthesiology Patient Care Team

by Matthew Pinegar, MD & Ty Townsend, CAA

Anesthesiology Assistants work collaboratively with physician anesthesiologists to provide the very highest in patient care in the myriad of clinical care arenas.



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Abstract

The profession of Anesthesiology Assistant has emerged in the past several decades as a vital component member to the anesthesiology care team model of care. Anesthesiology Assistants work collaboratively with physician anesthesiologists to provide the very highest in patient care in the myriad of clinical care arenas that the specialty is asked to be involved in, particularly as anesthesiology services expand outside of the traditional OR setting.

Introduction

The year 2018 marks a significant milestone for the School of Medicine here at the University of Missouri Kansas City (UMKC). Ten years ago, the university welcomed its inaugural class of Master of Science in Anesthesia students, to begin training to become anesthesiologist assistants (AA). The program has grown considerably since then, and is heartened by the ever-increasing quality of its graduates. It is possible that many health care physicians are unfamiliar with the term anesthesiologist assistant or the role that they play in the perioperative arena. If so, they are not alone. As an anesthesiologist and an anesthesiology assistant, we find ourselves elucidating their roles frequently to patients and healthcare workers alike. Despite not being universally known and recognized, anesthesiologist assistants play an integral role in the perioperative care of patients in the Saint Luke's healthcare system and in the training of future UMKC graduates. At UMKC and in the Saint Luke's system our experience with AAs has been overwhelmingly positive, and as the program continues to grow we expect that their presence will continue to grow in the state of Missouri. We are pleased to be provided this opportunity to expound about the profession and our training program at UMKC.

Genesis of Anesthesiology Assistant Programs

The role of the anesthesiologist assistant was first conceived by three chairmen of academic anesthesiology departments, Joachim Gravenstein, MD at the University of Florida, John Steinhaus, MD, at Emory University, and Perry Volpitto, MD at the Medical College of Georgia. As early as the 1960s they became concerned by a shortage of anesthesiologists and collectively sought a solution to the problem. They made a detailed

study of the skill set required for anesthesia delivery and of the training methods then in place for both anesthesiologists and nurse anesthetists. The result of their work was the creation of a new entity for anesthesia delivery – the anesthesiologist assistant. This entity, beginning with an undergraduate science background, focused on graduate level clinical training and culminated in a master's degree level anesthesia provider who practiced under the direction of a physician anesthesiologist. Some parallels can be drawn with physician assistants, a term which many physicians may be more familiar with. Both are advanced practice clinicians with master's degree level training. However, the training and certification processes are distinct, as are their scopes of practice.

Emory University and Case Western Reserve University were the first two training programs for AAs, starting in 1969 and 1970, respectively. There was not a third program until South University in Savannah, Georgia started in 2004. In 2008 UMKC became the fifth training program in the country, and the first one located west of the Mississippi river. Currently, there are nine programs in existence with 12 training locations:

- South University (Savannah, GA)
- Emory University (Atlanta, GA)
- University of Colorado (Denver, CO)
- Quinnipiac University (North Haven, CT)
- University of Missouri (Kansas City, MO)
- Nova Southeastern University (Tampa, FL; Fort Lauderdale, FL)
- Case Western Reserve University (Cleveland, OH; Houston, TX; Washington, DC)
- University of Indiana
- Medical College of Wisconsin (Milwaukee, WI)

To understand the growth of the UMKC program it helps to understand that AAs have only been practicing in Missouri for about 15 years. In 2003, Governor Bob Holden signed House Bill 390 into law, allowing for the licensure and practice of AAs throughout the state. UMKC saw the growing need for anesthesia care team providers and looked to address the shortfall by training them locally. With only three AAs in Kansas City, and a total of five in all of Missouri, UMKC's program began with a class of four students. Since then the program has graduated 79 students and anticipates 12-16 graduates currently yearly and in the years to come.

Educational Requirements for Anesthesiology Assistants

Today's applicants to the UMKC program generally present with a background of science-related studies. A baccalaureate degree from an accredited college or university in the US or Canada is required. While any degree is accepted, all applicants will need to have completed the core requirements for application to most US medical schools. This includes taking the Medical College Aptitude Test (MCAT). All applicants, regardless of undergraduate degree will have successfully completed undergraduate courses in Biology, Chemistry, Biochemistry, Organic Chemistry, Physics, Calculus and Human Anatomy and Physiology. While not required, completion of Advanced Statistics is encouraged. A solid understanding of the profession is also a prerequisite and all applicants are required to have observed or shadowed practicing AAs in an operating room environment.

All anesthesiologist assistant training programs, UMKC's included, are accredited by the Commission of Accreditation for Allied Health Education Programs (CAAHEP). CAAHEP is the accrediting body for over 2200 programs in over 23 different allied health program types, including paramedic, surgical assistant, respiratory therapist and perfusionist training programs. The American Society of Anesthesiologists is a member of CAAHEP and participates in the accreditation process. Among the standards for accreditation, an anesthesiology assistant program must be supported by the anesthesiology department of a medical school that has been accredited by the Liaison Committee on Medical Education, and must meet the requirements that the Accreditation Council for Graduate Medical Education (ACGME) mandates for sponsorship of an anesthesiology residency program. The curriculum requires at least two full academic years. UMKC's program currently takes 28 months to complete and all graduates receive a Master's degree.

Prerequisites for Admissions to UMKC AA Program

- Applicants for admission to the MSA program must have earned, or will soon earn, a baccalaureate degree or higher from a regionally-accredited U.S. or Canadian college/university.
- It is recommended that applicants earn a cumulative GPA of 3.0 or higher.
- Applicants must complete the following pre-requisite courses prior to matriculation, with a pre-requisite GPA of 3.0 or higher. It is required that applicants receive a grade of C or better in pre-requisite courses:
    - Two semesters of biology with lab
    - Two semesters of general chemistry with lab
    - One semester of organic chemistry I with lab
    - One semester of organic chemistry II with lab
    - Two semesters of physics (sophomore level) with lab
    - One semester of biochemistry (upper-level)*
    - One semester of human anatomy
    - One semester of physiology*
        - One semester of human anatomy and physiology (4+ credit hour course) may be accepted for one semester of human anatomy and one semester of physiology.
    - Two semesters of mathematics (calculus, pre-calculus, statistics, college algebra or trigonometry)
    - One course in medical terminology

**Those courses marked with an asterisk must have been completed within five years of the application deadline.*

- The MSA program will allow a student to complete any missing required courses after the application deadline. Any offers of admission will be contingent upon successful completion of the required courses by the end of the fall semester before matriculation in January. Once enrolled in the course(s), a student must submit, prior to the interview, a transcript to the School of Medicine Office of Admissions showing the course(s) in progress. A final transcript with a final grade in the course(s) must be submitted upon completion of the course(s).
- Advanced Placement or International Baccalaureate credit is accepted for pre-requisite courses; however grades earned in such courses will not be used when calculating the pre-requisite GPA.
- Due to the knowledge base of each semester building on the knowledge base from the previous semester, it is vital that all students in the UMKC Master of Science in Anesthesia program complete the courses required within the curriculum in the prescribed sequence. Advanced placement, transfer of credit from other educational programs, or substitution of coursework based on prior academic or clinical experience will not be accepted in place of the prescribed courses in the MSA program curriculum.

MCAT Score

- The Medical College Admissions Test is required.
- MCAT scores must have been earned within three years of the application deadline. The latest MCAT score accepted for the Final Application deadline is the May MCAT.
- Currently, there is no minimum score required for admission. The recommended minimum on the MCAT taken in 2014 or before is a 22 composite score. The recommended minimum on the 2015 MCAT is a 494 composite score.
- When the MCAT has been taken more than once, component scores from different exams may not be combined. The highest MCAT score earned by an applicant will be used in the application.
- All applicants must submit official MCAT scores to CASAA after self-reporting their MCAT scores and entering their AAMC ID number into the CASAA application. Applicants should contact AAMC to request their official scores to be released to CASAA following the self-reporting of their score and identification information.

Shadowing Experience

- Experience shadowing an anesthesia provider (anesthesiologist, Anesthesiologist Assistant or CRNA) is required prior to the application deadline.
- A minimum of ten (10) hours of shadowing experience is required.

Before that occurs, each AA student must complete 2000 hours of clinical training. AA students will be trained in every facet of anesthesia delivery.

Procedures:

- Airway management
- Neuraxial anesthesia
- Regional anesthesia
- Arterial line placement
- Central line placement

Surgical types:

- Cardiothoracic
- ENT
- Orthopedic
- General
- Urologic
- Obstetrics/Gynecology
- Transplant

Following graduation from an accredited program, AAs must maintain certification in order to practice. The certification exam is administered by the National Commission for Certification of Anesthesiologist Assistants (NCCAA), an organization comprised of representatives from the American Society of Anesthesiologists (ASA) and the American Academy of Anesthesiologist Assistants (AAAA). Certified AAs are permitted to use the designation CAA to indicate that they are currently certified. AAs are required to demonstrate 40 hours of Continuing Medical Education every two years for recertification. AA certification is time limited to six years. Thus, AAs must take and pass a Continued Demonstration of Qualifications (CDQ) exam in that time period. Of note, AAs were the first of the anesthesia related professions to require a written exam as a condition of recertification.

Scope of Practice

Once certified, AAs may begin to practice. An AA practices as an advanced practice clinician under the medical direction of a physician specifically trained in the delivery of anesthesia – an anesthesiologist. This is part of the profession's commitment to the ASA's recommendation that an anesthesiologist be involved in the perioperative care of every patient to ensure safety and quality of care. At Saint Luke's Hospital, the scope of practice of the anesthetists is the same, whether the anesthetist is trained through the AA or CRNA pathway. AAs support the practice of the physician-led anesthesia care team model. This model permits the medical direction by a single anesthesiologist of up to 4 AAs and/or nurse anesthetists simultaneously. At Saint Luke's Hospital of Kansas City, a Becker's Hospital Review top 100 hospital in the country and regional leader in quality care (one of only 15 academic medical center hospitals in the country with a CMS 5 star rating), all anesthetics are practiced within this model of medical direction.

UMKC is proud of the accomplishments of the AA training program since its humble beginnings 10 years ago. Since then, the number of providers in the state has gone from 5 to 163 active Missouri licensed AAs. Since 2005 UMKC has graduated 79 from its MSA program, 63 of which accepted clinical positions in Missouri immediately following graduation. UMKC's program boasts a 100% pass rate on the certifying exam as well as a 100% job placement upon graduation. At Saint Luke's Hospital of Kansas City we currently employ 18 AAs full time, 15 of whom are graduates of the UMKC program. They help to provide compassionate, consistent high quality anesthesiology care to an untold number of patients here in Missouri, and elsewhere in the country.

If you haven't seen an Anesthesiology Assistant practicing with your physician anesthesiology colleagues in your health care facility in Missouri, keep an eye out for them - they will be coming to you soon!

Sources

UMKC School of Medicine
http://med.umkc.edu/msa/

Commission on the Accreditation of Allied Health Education Programs
https://www.caahep.org/About-CAAHEP/Committees-on-Accreditation/Anesthesiologist-Assistant.aspx

American Academy of Anesthesiologist Assistants
https://www.anesthetist.org

American Society of Anesthesiologist
http://www.asahq.org

Missouri General Assembly
http://www.moga.mo.gov

National Commission for Certification of Anesthesiologist Assistants
http://www.aa-nccaa.org

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Sleep Medicine Single Series

Sleep Medicine: Insomnia and Sleep

by Pradeep C. Bollu, MD & Harleen Kaur, MBBS

Chronic insomnia is a rising public health concern affecting the quality of life of up to one-third of the population of the United States. It can be associated with psychopathology along with a variety of systemic disorders.



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Abstract

Insomnia disorder is an economic burden and public health concern affecting up to one-third of the population of the United States. It is mostly seen in older age groups, and often considered a normal aging phenomenon. The diagnosis and treatment of insomnia rely mainly on a thorough sleep history to address the precipitating factors as well as maladaptive behaviors resulting in poor sleep. It is important for clinicians to recognize and manage the symptoms of insomnia to prevent the morbidity associated with it. This review aims to highlight the pathophysiology, associated comorbidities, clinical evaluation and effective management strategies for insomnia disorder.

Introduction

Insomnia is a public health concern and one of the most common complaints in medical practice. The disorder is characterized by difficulty with sleep quality, initiating or maintaining sleep, along with substantial distress and impairments of daytime functioning.[1] Studies have established insomnia to be a very common condition with symptoms present in about 33–50% of the adult population.[2] Its prevalence ranges from 10 to 15% among the general population, with higher rates seen among females, divorced or separated individuals, those with loss of loved ones, and older people.[3] There is also an increased risk of depression, anxiety, substance abuse, suicide, motor vehicle accidents and possible immune dysfunction with chronic insomnia.[4] Initially considered to be a symptom, insomnia is now defined as a disorder and classified separately in DSM-V (Diagnostic and Statistical Manual of Mental Disorders-5th edition) and ICSD-3 (International Classification of Sleep Disorders-3rd edition).

Pathophysiology

The genetic factors responsible for insomnia were identified from work on "insomnia-like Drosophila flies" (ins-l flies), which had traits similar to human insomnia. The genes associated with insomnia are Apolipoprotein (Apo) E4, PER3 (Period Circadian Regulator 3), Clock (Clock Circadian Regulator) and 5-HTTLPR(Serotonin Transporter Linked Polymorphic Region) genes. There is also a close association between insomnia and HLA-DQB1*0602.

The molecular factors responsible for the sleep-wake regulation include the wake-promoting chemicals like orexin, norepinephrine, and histamine, and sleep promoting chemicals like GABA (Gamma AminoButyric Acid), adenosine, melatonin, and prostaglandin D2. The orexin mediated increased neuronal firing in the wake-promoting areas (tuberomammillary nucleus,

dorsal raphe and locus coeruleus) and inhibition of the sleep-promoting areas (ventrolateral preoptic nucleus and median preoptic nucleus) is one of the possible mechanisms contributing to insomnia (sleep switch model).[5] Other possible mechanisms noted in the literature are briefly illustrated in Figure 1.

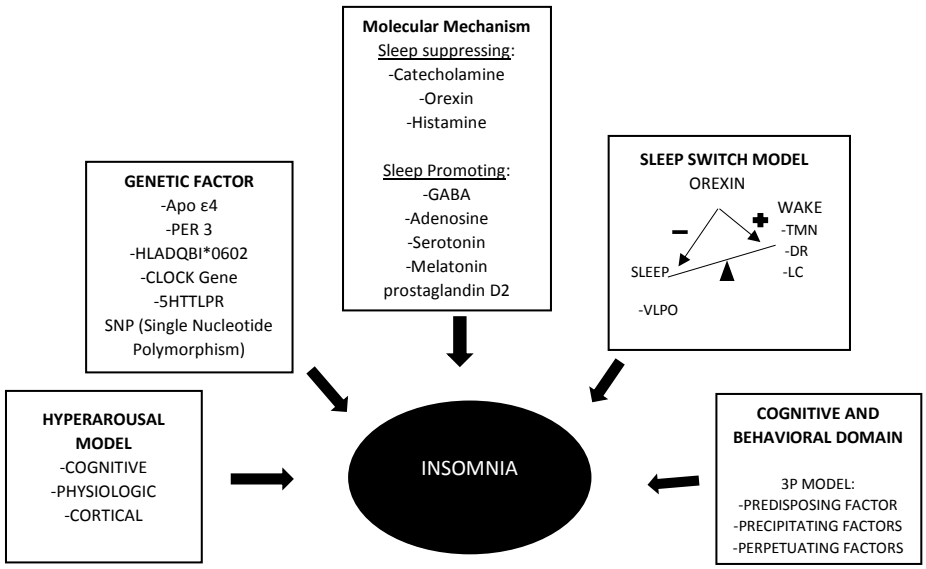


Figure 1. Pathophysiology of insomnia (VLPO: ventrolateral preoptic nucleus; TMN: Tuberomammillary nucleus; DR: dorsal raphe; LC: Locus coeruleus; GABA: gamma-aminobutyric acid)

Classification

According to the International Classification of Sleep Disorders-3rd Edition (ICSD-III), insomnia disorder can be classified as:

1. Chronic Insomnia Disorder

Patient experiences sleep disturbances for the last three months affecting the night time sleep for at least three times a week.

2. Short-term Insomnia Disorder

Sleep disturbances experienced within three months.

3. Other Insomnia Disorder

Sleep disturbances that do not meet the criteria for chronic insomnia or short-term insomnia disorder are classified under this category.

The International Classification of Sleep Disorders, 2nd Edition describes the various subtypes of insomnia as:

1. Psychophysiological Insomnia

It is characterized by increased levels of cognitive and somatic arousal at bedtime. Such individuals describe excessive worrying about sleep along with difficulty with sleeping in their home environment. They may sleep easily in any other environment or when not planning to sleep.

2. Idiopathic Insomnia

It is characterized by sleep disturbances occurring early in childhood and persisting over a lifelong period. It may be associated with congenital or genetic variations in the sleep-wake cycle.

3. Paradoxical Insomnia

In this type of insomnia, the patients underestimate the total amount of sleep they obtained. They usually have a good night sleep which they perceive as the time of wakefulness. Paradoxical insomnia can be confirmed by polysomnography or actigraphy.

4. Inadequate Sleep Hygiene

Sleep hygiene highlights the effect of daily activity on the quality of sleep. Excessive daytime napping, evening consumption of alcohol or caffeine, watching television till late at night, working on electronic gadgets just before bedtime can negatively affect the sleep quality.

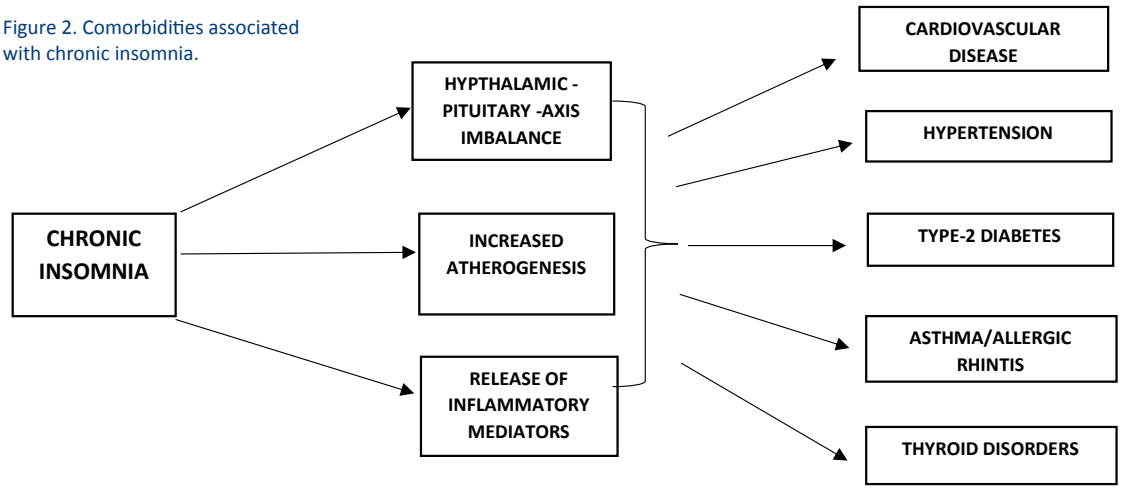
5. Behavioral Insomnia of Childhood

Insomnia in children may be affected by their dependency on certain stimulations, objects, environmental settings, disruption of which can result in significant delay in falling asleep (Sleep onset association type) or may show resistance to go to bed (Limit setting type) or both (mixed type).

Precipitating Factors

Although insomnia can affect any age group, women and elderly (>65 years) are the population more susceptible to the development of insomnia. Psychosocial factors like the stress of work, shift work, loss of a loved one, divorce, domestic abuse can lead to significant sleep disturbances. Developmental issues in children like delayed milestones, hyperactive behavior, separation anxiety can precipitate sleep disturbances in children.

Figure 2. Comorbidities associated with chronic insomnia.



Certain personality traits like excessive worrying, repressed personality, perfectionism, neuroticism can have a disturbing effect on sleep. Psychiatric comorbidities like depression, mood, and anxiety disorders, post-traumatic stress disorder can increase the risk of insomnia. Alcohol and substance abuse/dependence, excessive caffeine intake, excessive smoking can potentially affect the sleep-wake cycle.

Clinical Features

The sleep disturbances in insomnia can manifest as difficulty in falling asleep (Sleep Onset Insomnia), maintaining the continuity of sleep (waking up in the middle of the night and difficulty in returning to sleep) or waking up too early in the morning well before the desired time, irrespective of the adequate circumstances to sleep every night (Early Morning Insomnia). Insomnia can significantly impact the daytime functioning resulting in waking up tired in the morning, decreased workplace productivity, proneness to errors and accidents, inability to concentrate, frequent daytime naps and poor quality of life.

In children, insomnia can be reported as frequent nighttime awakening, resisting to go to bed and sleep independently. Children may have a dependency on certain stimulations (rocking, storytelling), objects (bottle feeding, favorite toy) or room setting (parents in the room) to fall asleep, and lack of these stimulations can create anxiety and fear in them and result in sleep disturbances. Insomnia can affect their school performance, daily activity of playing, inability to concentrate and behavior problems.

Co-Morbidities Associated with Chronic Insomnia

Chronic insomnia disorder is a considerable risk factor for cardiovascular disease, hypertension, type 2 diabetes, gastroesophageal reflux (GERD) and asthma, the details of which are discussed under the following headings (Figure 2).

Insomnia and Cardiovascular Disease

Insomnia is a risk factor for cardiovascular morbidity and mortality.[6] The underlying pathophysiology that explains this increased risk is mainly due to dysregulation of the hypothalamic-pituitary axis with increased release of adrenocorticotropin hormone, increased sympathetic nervous system activity, elevation of inflammatory cytokines and a rise in C-reactive protein level (CRP).[7,8] Chronic insomnia is also noted to increase the risk of hypertension, reduce heart rate variability and increased atherogenesis.[9,10] The HUNT Study noted a 27-45% increased risk of myocardial infarction in patients with chronic insomnia.[11] Even though the prospective data suggests a significant association of chronic insomnia with cardiovascular disease, further research is required to understand how the management of insomnia can impact the cardiometabolic health in these patients.

Insomnia and Type-2 Diabetes Mellitus

It is estimated that chronic insomnia increases the risk of type 2 diabetes mellitus (T2D) by 16%, in the adult population.[12] In a recent study by Lin et al., the risk of developing T2D was proportional to the duration of insomnia. They observed that in patients with chronic insomnia of <4, 4-8 and >8 years, the risk of T2D

increased by 14%, 38%, and 51% respectively.[13] The multiple mechanisms that might be involved in the pathogenesis include dysregulation of the hypothalamic-pituitary axis with an increase in the cortisol level, impairment in glucose metabolism, an imbalance in the leptin- ghrelin system that increases the appetite and risk of obesity resulting in insulin resistance and unstable blood sugars level. [7,14]

Insomnia and Gastroesophageal Reflux Disease

A bidirectional association is noted between Gastroesophageal Reflux Disease (GERD), symptoms and sleep disturbances.[15] In 2009, Mody et al., noted the effect of GERD on sleep quality. Out of 11,685 individuals with GERD, 88.9% experienced sleep disturbances, out of which 49.1% complained of difficulty in initiating sleep, and 58.3% had difficulty in maintaining sleep.[16] In the same year, a cross-sectional cohort study by Jansson et al. on 65,333 patients with GERD observed, that there was three times increase in the risk of GERD in patients with insomnia.[17] Further, the treatment of GERD with proton pump inhibitor has shown to improve the sleep disturbances in these patients significantly.[18]

Insomnia and Asthma

A potential risk of asthma and allergic rhinitis is noted in patients with chronic insomnia.[19] Though the exact mechanism is not known, the various factors responsible may include the release of inflammatory mediators like interleukin 6 (IL-6), nuclear factor kappa-B cell (NF-κβ) in chronic insomnia resulting in allergic airway inflammation.[20,21] It is also noted that chronic insomnia may reduce interferon-γ production that reduces the airway epithelial inflammation and thereby increasing the risk of reactive airway disease in patients with insomnia. Optimal management of chronic insomnia may prevent the release of such inflammatory mediators reducing the risk of airway inflammation.

Insomnia and Thyroid Disorders

The risk of thyroid disorders with chronic insomnia is not very well known. However, studies have shown that the dysregulation in the hypothalamic-pituitary axis in chronic insomnia increases the levels of corticotrophin-releasing hormone (CRH), thyrotropin-releasing hormone (TRH) and cortisol, resulting in fluctuation in thyroid hormone levels. The abnormal levels of TRH and thyroid stimulating hormone (TSH) are also noted higher in patients with insomnia with comorbid depression.[22]

Clinical Assessment

A detailed sleep history is a key to the evaluation of insomnia. Clinicians should be able to recognize the sleep disturbances and rule out other sleep-related disorders like restless leg syndrome, sleep apnea, periodic limb movements, and nocturnal leg cramps that may be contributing to the sleep fragmentation. Complete laboratory workup should be helpful to evaluate any underlying medical conditions contributing to insomnia. Furthermore, questionnaires, sleep logs, and actigraphy can be helpful tools for the assessment of insomnia.

A self-reported questionnaire can be helpful to evaluate the quality of sleep in chronic insomnia. Epworth Sleepiness Scale (total score 0-24; score>15 considered for severe daytime sleepiness) and Pittsburgh Sleep Quality Index (score > five is considered poor sleep score) are the two most widely used assessment tools in doctor's office visits.[23]

Sleep diaries are another cost-effective way to evaluate the sleep-wake disturbances in the patients. It is helpful to determine the total sleep time (TST), wakefulness after sleep onset (WASO), sleep efficiency and circadian rhythm disturbances. They also include information about caffeine consumption, medications daytime napping and bedtime activities which are helpful to assess the sleep hygiene in these patients.[24]

Wrist actigraphy is a noninvasive tool that records the gross motor activity during sleep and wakefulness. It is useful to estimate the sleep parameters like sleep duration, wakefulness after sleep onset (WASO), sleep latency. Maintaining sleep diaries along with actigraphy can provide complementary information.[25] Further, actigraphy is not helpful to asses periodic limb movements or abnormal breathing patterns for which, polysomnography should be chosen. However, polysomnography is not routinely recommended for the initial assessment of insomnia.

Non-Pharmacological Management

1. Sleep Hygiene

Sleep hygiene includes educating the patients about lifestyle modifications like limiting the daytime naps, avoiding late night dinner, restricting the use of electronic gadgets/smartphones during bedtime or evening intake of alcohol, caffeine, or smoking. Certain practice scales

like sleep hygiene index and the sleep hygiene awareness scales are useful to assess the sleep hygiene. However, sleep hygiene alone is ineffective in managing patients with chronic insomnia and should be used with other aspects of cognitive behavior therapy.[26]

2. Sleep Restriction Therapy

This therapy aims to reduce sleep time by limiting the number of sleeping hours. Reduced sleep time can improve the homeostatic sleep drive and result in a more consolidated sleep. The major limitation of this therapy is an increased chance of daytime sleepiness due to sleep loss.

3. Stimulus Control Therapy

Stimulus Control involves restriction of maladaptive behaviors like eating or reading in bed, late night use of digital devices in bed and promoting the use of bed for sleeping and only when feeling drowsy.

4. Relaxation Therapy

Regular practice of breathing exercises, meditation or yoga can help to improve the sleeping pattern and reduce underlying anxiety and stress. Studies have shown that management of stress with relaxation and mindfulness training helps to improve focused attention and reduce pre-sleep arousal and worry in insomnia patients.[27]

5. Cognitive Behavioral Therapy for Insomnia

Cognitive behavioral therapy for Insomnia (CBTi) is the mainstay of management of insomnia. Effective CBTi can show significant improvement in sleep onset latency (SOL), wakefulness after sleep onset (WASO) and total sleep time (TST). Studies have shown CBTi is superior to pharmacotherapy in the management of chronic insomnia.[28] It is typically delivered in six sessions over six- to eight-week period by either health care nurse, sleep therapist, physician assistant, or even a social worker. The sessions include sleep education, relaxation techniques, sleep restriction therapy, stimulus control therapy, cognitive. and behavioral therapy. It can also be provided through the telehealth (video conferencing) or internet-based versions that are beneficial for those who are hesitant to visit a therapist in person. "SHUTi" is an online internet-based CBTi program proven for insomnia. "Sleep Ninja" is a smartphone app, that delivers CBTi over the phone.[29] However, the major limitation of these web-based versions is that a lot of self-encouragement is required to follow through the entire length of the programs regularly. Another limitation of the CBTi program is a shortage of efficient therapists to deliver the therapy effectively along with a higher out of pocket costs, which further restrict the patients from the benefits of the program.[30]

Pharmacological Management

Drugs Acting on GABA-A Receptors

The benzodiazepines (BZD) and benzodiazepine receptor agonists (BzRA or non-BZD) both act on the gamma-aminobutyric acid (GABA) receptor sites thereby exerting sedative, anxiolytic, muscle relaxant, and hypnotic effects. One significant difference between the two groups is the affinity for different subtypes of GABA alpha subunit. While all the BZD have similar affinity to various subtypes of alpha subunits, BzRA have a varying affinity to different subtypes of alpha subunits. For example, zolpidem, zopiclone, and zaleplon have higher affinity to alpha-1 subunit and lower affinity to alpha-2 and alpha-3 subunit; whereas, eszopiclone has higher affinity to alpha-2 and alpha-3 subunit of GABA receptor.[31] The adverse effects associated with BZD like rapid development of tolerance, the risk of abuse or dependence, the occurrence of rebound insomnia after drug discontinuation, and cognitive impairment further limit the use of BZD over BzRA

BzRA are approved by the Food and drug administration (FDA) for the management of insomnia. They are rapidly absorbed, relatively short-acting (as compared to benzodiazepines) and have better side effect profiles. They are effective in treating sleep onset insomnia, sleep maintenance insomnia or both.

Zolpidem binds selectively to the alpha-one subtype of GABA-A receptor. It has a short half-life of 2.5 hours and is available in immediate-release (IR) formulation of 5-mg and 10-mg doses, which are effective for the treatment of short-term insomnia. The controlled-release (CR) form is available in 6.25-mg and 12.5-mg dosage for sleep onset and sleep maintenance insomnia. A sublingual form (doses in male 3.5 mg and female 1.75 mg) is available for the treatment of middle of night awakenings and difficulty in returning to sleep and should be used if there is a minimum of 4 or more hours of intended sleep time. The adverse effects associated with zolpidem are headache, falls, somnolence, and antegrade amnesia. (Table 1).

Zaleplon has the shortest duration of action with the half-life of one hour and is available at the doses of 5 mg, 10 mg, 20 mg for the treatment of insomnia. The adverse effects associated with it are a headache, drowsiness,

nausea, and worsening of depressive symptoms in patients with the comorbid depressive disorder.

Eszopiclone helps to improve sleep efficiency, daytime functioning along with a reduction in sleep onset latency and wakefulness after sleep onset. It is used for management of sleep onset insomnia (2 mg) and sleep maintenance (3 mg) insomnia. It acts on the alpha-2, and alpha-3 receptors subtype of the GABA-A receptors, thereby exerting anxiolytic and antidepressant effect respectively, and hence, is effective in the management of insomnia with comorbid depression or generalized anxiety disorder. Common adverse effects associated with eszopiclone are unpleasant metallic taste, headache, dizziness, and somnolence.[32]

Table 1. The table summarizes the drug therapy approved for chronic insomnia along with their brand names and half-life elimination. (GABA: gamma-aminobutyric acid; BzRA: Benzodiazepine receptor agonist)

Drugs acting on various receptors	Elimination half-life(hour)
GABA receptors	
Benzodiazepines	
Triazolam (Halcion®)	1.5-5.5
Temazepam (Restoril®)	3.5-18.4
Estazolam (ProSom®)	10-24
Flurazepam (Dalmane®)	48-120
BzRA	
Zolpidem -*oral* (Ambien®)	2.5
Zolpidem- *oral spray* (Zolpimist®)	2.8
Zolpidem-*extended release* (Ambien CR®)	2.8(1.6-4.5)
Zolpidem -*Sublingual*(Intermezzo®)	2.5
Eszopiclone (Lunesta®)	6-9
Zaleplon (Sonata®)	1
Histamine-1 receptor antagonist	
Doxepin (Silenor®)	15.3
Melatonin receptor agonist	
Ramelteon (Rozerem®)	1-2.6
Orexin receptor antagonist	
Suvorexant (Belsomra®)	12

Drugs Acting on Melatonin Receptors

Melatonin is a natural hormone produced by the pineal gland. The circadian system in the hypothalamus and the suprachiasmatic nucleus (SCN) regulates the levels of this hormone throughout the day and night. Melatonin is available over the counter and is approved by FDA for treatment of insomnia, especially in older adults. A dose range of 2 to 8 mg is effective in treating circadian rhythm sleep-wake disorders. However, food can delay the absorption of melatonin, and a gap should be maintained between the last meal of the day and the intake of melatonin.

Ramelteon, melatonin receptor agonist decreases the sleep latency by acting on the melatonin MT1 and MT2 receptors in the SCN with higher affinity than melatonin itself.[33] The FDA recommends a dosage of 8 mg for the management of sleep onset insomnia. It exerts minimal adverse effects including somnolence, fatigue, and dizziness.

Tasimelteon is another melatonin receptor agonist effective in improving sleep initiation and maintenance particularly in blind patients with Non-24-hour sleep-wake circadian rhythm disorders.[34]

Drugs Acting as Orexin Receptor Antagonist

Suvorexant is a dual orexin receptor antagonist (OX1 and OX2 receptor) which counteracts the orexin/hypocretin system that plays an important role in wakefulness. It is effective in doses of 5 mg, 10 mg, 15 mg, and 20 mg for the management of sleep onset and sleep maintenance insomnia. A dose of 15 mg and 20 mg has shown improvement in total sleep time and a reduction in sleep onset latency. However, the FDA does not recommend a higher dose of 30 mg or 40 mg of suvorexant because of safety concerns, with an increased risk of next day driving difficulty, increased daytime somnolence and narcolepsy-like symptoms (hypnogogic-hypnopompic hallucinations, cataplexy, and vivid dreams). Also, suvorexant is contraindicated in patients with narcolepsy because of possible underlying mechanisms of orexin antagonism.[35]

Drugs Acting as Histamine-1 Receptor Antagonist

Doxepin is a tricyclic antidepressant, but at a low dose of 3 mg and 6 mg, it is effective in the management of sleep maintenance insomnia. It causes improvement

in total sleep time, wakefulness after sleep onset and sleep efficiency. At low doses (3 mg and 6 mg), Doxepin acts as pure H-1 receptor antagonist being 800 times more potent than diphenhydramine for H-1 receptors, and at high doses of 25 mg to 300 mg daily (antidepressant dosage), it exerts antihistaminic, antiserotonergic, anticholinergic and antiadrenergic activity. The adverse effects associated with doxepin at low doses are headache and somnolence.[36]

Off-Label Drugs

1. Antidepressants: trazodone, mirtazapine, and amitriptyline are most commonly used antidepressants for the management of insomnia at low doses mainly because of their antihistaminic effect. Studies have shown a 50 mg once a day dose of trazodone has proved to be effective in improving sleep latency, wakefulness after sleep onset and duration of sleep.[37]
2. Atypical antipsychotics: Olanzapine and quetiapine can be useful in the treatment of insomnia with comorbid psychotic conditions. They exert a sedative effect at low doses mainly by their antihistaminic, anti-adrenergic and antidopaminergic properties.[38]
3. Anticonvulsants: Gabapentin has shown to improve the sleep efficiency and decrease the wakefulness after sleep onset. It can be effective in managing insomnia in patients with alcohol dependence. Pregabalin increases the total sleep time, stage N3, sleep efficiency and decreases sleep onset latency and REM sleep. It is helpful in improving sleep in patients with generalized anxiety disorder and fibromyalgia. [39]

The American Academy of Sleep Medicine (AASM) has proposed a PICO (Patient, population, problem, Intervention, Comparison, and Outcomes) template, based on the patient-oriented tools to determine the outcomes in response to the treatment given for insomnia. The four most critical outcomes useful for clinical decision-making are sleep latency (SL), wake after sleep onset (WASO), total sleep time (TST), and the quality of sleep (QoS) (Figure 3).[40]

Figure 3. Effect of various pharmacological agents on Total Sleep time (TST), Wakefulness after sleep onset (WASO), Sleep latency (SL), Quality of Sleep (QOS).



Conclusion

Chronic insomnia is a rising public health concern affecting the quality of life of up to one-third of the population of the United States. It can be associated with psychopathology along with a variety of systemic disorders. Genetic and environmental factors play a role in the pathogenesis of this problem. Cognitive behavioral therapy is still the first line treatment for insomnia though the scarcity of therapists and the high costs make it less practical in many cases. Pharmacotherapy can be effective in many patients and should always be used in conjunction with sleep hygiene.

References

1. Mellinger, G. D., et al. Insomnia and its treatment: prevalence and correlates. Archives of general psychiatry 1985; 42(3): 225-232.
2. Ancoli-Israel, S. and T. Roth. Characteristics of insomnia in the United States: results of the 1991 National Sleep Foundation Survey. I. Sleep 1999; 22: S347-353.
3. Dollander, M. Etiology of adult insomnia. L'Encephale 2002; 28(6 Pt 1): 493-502.
4. Taylor DJ, Lichstein KL, Durrence HH. Insomnia as a health risk factor. Behavioral sleep medicine 2001; 1(4): 227-247.
5. Levenson JC, Kay DB, Buysse DJ. The pathophysiology of insomnia. Chest 2015 Apr;147(4):1179-1192.
6. Javaheri S. and Redline S. Insomnia and risk of cardiovascular disease. Chest 2017; 152(2): 435-444.
7. Castro-Diehl C, Diez Roux AV, Redline S, Seeman T, Shrager SE, Shea S. Association of sleep duration and quality with alterations in the hypothalamic-pituitary adrenocortical axis: The multi-ethnic study of atherosclerosis (MESA). J Clin Endocrinol Metab 2015 Aug;100(8):3149-58.
8. Vgontzas AN, Bixler EO, Lin HM, et al. Chronic insomnia is associated with nyctohemeral activation of the hypothalamic-pituitary-adrenal axis: clinical implications. J Clin Endocrinol Metab 2001; 86(8): 3787-3794.
9. Bonnet, M. H. and D. Arand. Heart rate variability in insomniacs and matched normal sleepers. Psychosomatic medicine 1998; 60(5): 610-615.
10. Vgontzas AN, Liao D, Bixler EO, Chrousos GP, Vela-Bueno A. Insomnia with objective short sleep duration is associated with a high risk for hypertension. Sleep 2009; 32(4): 491-497.
11. Krokstad S, Langhammer A, Hveem K, et al. Cohort profile: the HUNT study, Norway. International journal of epidemiology 2012; 42(4): 968-977.
12. Kawakami N, Takatsuka N, Shimizu H. Sleep disturbance and onset of type 2 diabetes. Diabetes care 2004; 27(1): 282-283.
13. Lin CL, Chien WC, Chung CH, Wu FL. Risk of type 2 diabetes in patients with insomnia: A population-based historical cohort study. Diabetes Metab Res Rev 2018; 34(1): e2930.
14. Spiegel K, Tasali E, Penev P, Van Cauter E. Brief communication: sleep curtailment in healthy young men is associated with decreased leptin levels, elevated ghrelin levels, and increased hunger and appetite. Annals of internal medicine 2004;141(11): 846-850.
15. Stein, E. and Katz PO. GERD: GERD and insomnia—first degree relatives or distant cousins? Nat Rev Gastroenterol Hepatol 2010; 7(1): 8.
16. Mody R, Bolge SC, Kannan H, Fass R. Effects of gastroesophageal reflux disease on sleep and outcomes. Clinical Gastroenterology and Hepatology 2009; 7(9): 953-959.
17. Jansson C, Nordenstedt H, Wallander MA, et al. A population-based study showing an association between gastroesophageal reflux disease and sleep problems. Clinical Gastroenterology and Hepatology 2009; 7(9): 960-965.
18. Johnson DA, Orr WC, Crawley JA, et al. Effect of esomeprazole on nighttime heartburn and sleep quality in patients with GERD: a randomized, placebo-controlled trial. The American journal of gastroenterology 2005; 100(9): 1914.
19. Lin YC, Lai CC, Chien CC, et al. Is insomnia a risk factor for new-onset asthma? A population-based study in Taiwan. BMJ open 2017; 7(11): e018714.
20. Neveu WA, Allard JL, Raymond DM, et al. Elevation of IL-6 in the allergic asthmatic airway is independent of inflammation but associates with loss of central airway function. Respiratory research 2010; 11(1): 28.
21. Ather JL, Hodgkins SR, Janssen-Heininger YM, Poynter ME. Airway epithelial NF-κβ activation promotes allergic sensitization to an innocuous inhaled antigen. American journal of respiratory cell and molecular biology 2011; 44(5): 631-638.
22. Xia L, Chen GH, Li ZH, Jiang S, Shen J. Alterations in hypothalamus-pituitary-adrenal/thyroid axes and gonadotropin-releasing hormone in the patients with primary insomnia: a clinical research. PloS one 2013; 8(8): e71065.
23. Johns MW. Sleepiness in different situations measured by the Epworth Sleepiness Scale. Sleep 1994 Dec;17(8):703-10.
24. Carney CE, Buysse DJ, Ancoli-Israel S, et al. The consensus sleep diary: standardizing prospective sleep self-monitoring. Sleep 2012 Feb 01;35(2):287-302.
25. Martin JL and Hakim AD. Wrist actigraphy. Chest 2011; 139(6): 1514-1527.
26. Irish LA, Kline CE, Gunn HE, Buysse DJ, Hall MH. The role of sleep hygiene in promoting public health: A review of empirical evidence. Sleep Med Rev 2015; 22:23-36.
27. Ong JC, Shapiro SL, Manber R. Combining mindfulness meditation with cognitive-behavior therapy for insomnia: a treatment-development study. Behav Ther 2008 Jun; 39(2):171-82.
28. Sivertsen B, Omvik S, Pallesen S, et al. Cognitive behavioral therapy vs zopiclone for treatment of chronic primary insomnia in older adults: a randomized controlled trial. Jama 2006; 295(24): 2851-2858.
29. Werner-Seidler A, O'Dea B, Shand F. A smartphone app for adolescents with sleep disturbance: development of the sleep ninja. JMIR Ment Health 2017 Jul 28;4(3):e28.
30. Praharaj SK, Gupta R, Gaur N. Clinical practice guideline on management of sleep disorders in the elderly. Indian J Psychiatry 2018 Feb;60(Suppl 3): S383-S396.
31. Nutt DJ and Stahl SM. Searching for perfect sleep: the continuing evolution of GABAA receptor modulators as hypnotics. J Psychopharmacol 2010; 24:1601–1612.
32. Becker PM, Somiah M. Non-Benzodiazepine receptor agonists for insomnia. Sleep Med Clin 2015 Mar;10(1):57-76.
33. Kato K, Hirai K, Nishiyama K, et al. Neurochemical properties of ramelteon (TAK-375), a selective MT1/MT2 receptor agonist. Neuropharmacology 2005; 48:301–310.
34. Neubauer DN. Tasimelteon for the treatment of non-24-hour sleep-wake disorder. Drugs Today (Barc). 2015 Jan;51(1):29-35.
35. Citrome L. Suvorexant for insomnia: a systematic review of the efficacy and safety profile for this newly approved hypnotic - what is the number needed to treat, number needed to harm and likelihood to be helped or harmed? Int J Clin Pract 2014 Dec; 68:1429–1441.
36. Yeung WF, Chung KF, Yung KP, and Ng TH. Doxepin for insomnia: a systematic review of randomized placebo-controlled trials. Sleep Med Rev 2015; 19:75–83.
37. Walsh JK. Drugs used to treat insomnia in 2002: regulatory-based rather than evidence-based medicine. Sleep 2004; 27:1441–1442.
38. Cohrs S, Rodenbeck A, Guan Z, Pohlmann K, Jordan W, Meier A, Rüther E. Sleep-promoting properties of quetiapine in healthy subjects. Psychopharmacology (Berl) 2004 Jul;174(3):421-9.
39. Lo HS, Yang CM, Lo HG, Lee CY, Ting H, and Tzang BS. Treatment effects of gabapentin for primary insomnia. Clin Neuropharmacol 2010; 33(2):84–90.
40. Sateia MJ, Buysse DJ, Krystal AD, Neubauer DN, Heald JL. Clinical Practice Guideline for the Pharmacologic Treatment of Chronic Insomnia in Adults: An American Academy of Sleep Medicine Clinical Practice Guideline. J Clin Sleep Med 2017 Feb 15;13(2):307-349.

Disclosure

None reported. **MM**

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