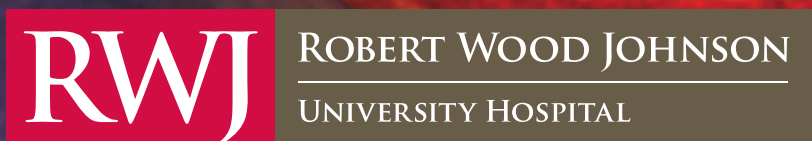


Fall 2015

CARDIOVASCULAR CONNECTION



NEW BRUNSWICK • SOMERSET

RUTGERS

Robert Wood Johnson
Medical School

Referring physicians, please call 732-418-8030

TABLE OF CONTENTS

2

Leadership Spotlight

3

Cath Lab Enhancements:
Somerset Campus

4

Cardiac Surgery:
Latest Generation Robot

5

Technology Upgrade:
Image Sharing Capabilities

6

Custom-Fitted Surgical
Solutions for Abdominal
Aortic Aneurysms

7

Electrophysiology:
V-Drive Robotic Navigation

8

Comprehensive Mechanical
Circulatory Support Program

10

New Nuclear Camera Comes With
Shorter Exam Times, Lower Radiation

11

Register Now!
Cardiovascular Symposium

Welcome New Physicians

12

Highlighting our Cardiology Specialists:
Heart Failure



Stephern Allison, PA

LEADERSHIP SPOTLIGHT:
CAMPUS-TO-CAMPUS
CARDIOVASCULAR SERVICES

Dear Colleagues:

The past year brought quite a bit of change for Robert Wood Johnson University Hospital’s (RWJ’s) cardiovascular service line. Perhaps the most significant enhancement to our portfolio came with the addition of an entirely new campus of physicians, staff and services as a result of our merge with RWJ Somerset. Since the merger, I am very proud to report we have made significant progress unifying the programs and services offered on both campuses and we have addressed the need to improve campus-to-campus communications among physicians.

To reach the pinnacle and provide the highest quality patient care, we must ensure that our program offers the latest generation technologies, the most advanced, minimally-invasive approaches, and highly-trained specialists.

With that in mind, I’m excited to share with you in this issue, some of our program’s recent developments which include:

- Increased patient access with the addition of RWJ Somerset cardiologists.
- The recruitment of several niche cardiology specialists at RWJ New Brunswick trained in the fields of structural heart disease and congestive heart failure.
- Moving the needle with a revolutionary, custom-fitted endograft system for use in abdominal aortic aneurysm treatment.
- The first recorded mitral valve repair/replace procedures in New Jersey using the latest generation robotic surgical system.
- Installation of a lower radiation SPECT/ CT nuclear camera at RWJ Somerset.
- Upgraded cardiovascular IT software that now offers real-time image sharing between campuses and physician offices.
- An update from our leaders on the latest advances in the field of cardiogenic shock.

These accomplishments could not have been possible without the support of our leadership and the dedication of the entire cardiovascular team from both campuses, who seek opportunities on a daily basis to exceed my expectations.

Please enjoy reading about our programs and services and we look forward to hearing from you. Feel free to stop by, call or email us at your convenience.

Kind regards,

Stephern Allison, PA
Vice President, Cardiovascular Services

Stephern can be reached at 732-937-8748 or stephern.allison@rwjuh.edu

RWJ WELCOMES NEW CARDIOVASCULAR
SERVICE LINE STAFF

STEPHANIE SAWON, Operations Manager, Cardiac Cath Labs, RWJ Somerset

LEROY FRANCIS, Operations Manager, Cardiovascular Services, RWJ New Brunswick

CANDACE SCHUIERER, Director, Cardiovascular Services, RWJ New Brunswick

DEBRA HURLEY, Operations Manager, Electrophysiology/Cardiac Cath Lab, RWJ New Brunswick

BRINGING STATE-OF-THE-ART TECHNOLOGY TO ANOTHER RWJ CATH LAB

The heartbeat of a cardiac catheterization laboratory (cath lab) is arguably its imaging capabilities. Clear, crisp images drive both the diagnostic and therapeutic endeavors taking place in the lab.

A commitment was made following the merger last summer to dedicate resources from the cardiovascular service line to enhance the program at RWJ Somerset by providing the necessary technology, equipment and facility upgrades. The first project was to renovate and install a new imaging system in the last of the cath labs to receive it. Each of RWJ Somerset's labs now features technology and imaging equivalent to that available at RWJ New Brunswick.



The new system, an Allura Xper FD10 (Phillips; Andover, MA), was installed at RWJ Somerset in January 2015.

“Now their imaging systems are equivalent to my imaging systems at the New Brunswick campus,” says Michael Kochanek, MBA, RN/BC, BSN, RCIS, Director, Cardiac Cath Lab, RWJ New Brunswick. “Patients now have quicker, closer access to all the same capabilities without traveling the extra miles.”

The heart of the Allura system is the Clarity imaging system with Xres. Whether cardiologists are performing coronary or peripheral endovascular diagnostic or interventional procedures, the system provides greater image contrast and sharpness while decreasing noise. At the same time, DoseWise technology enables the system to achieve excellent image quality while significantly decreasing the amount of radiation exposure to patients and physicians.

“The system's contrast injection system, made by ACIST (Eden Prairie, MN), allows for precise contrast volume delivery to minimize the amount of contrast that's utilized for the patient. That reduces the risk of acute kidney injury during coronary diagnostic procedures and PCIs,” notes Kochanek.

The Phillips Hemodynamic Monitoring system was also added to this room. “Most cath lab documentation systems are similar—they'll provide you with advanced pressures and interoperable cardiovascular dynamics,” says Kochanek. “But it's the structured reporting



itself that allows the specialist to give optimal feedback to the referring physician in a more timely manner.”

“This state-of-the-art system is as good as any system in the area,” says Jason Hall, MD, Chief, Division of Cardiology at RWJ Somerset. “It makes a tremendous difference to the physicians doing the procedures. We get extremely good visualization of the coronary arteries during angioplasties and stenting. Having the latest equipment benefits us and the patients in better procedures, safer performance, and optimal outcomes.”

“Somerset was already one of the busiest labs in the area that didn't have onsite backup cardiothoracic bypass surgery,” Hall continues. “This upgrade further expands our ability to run more cases in

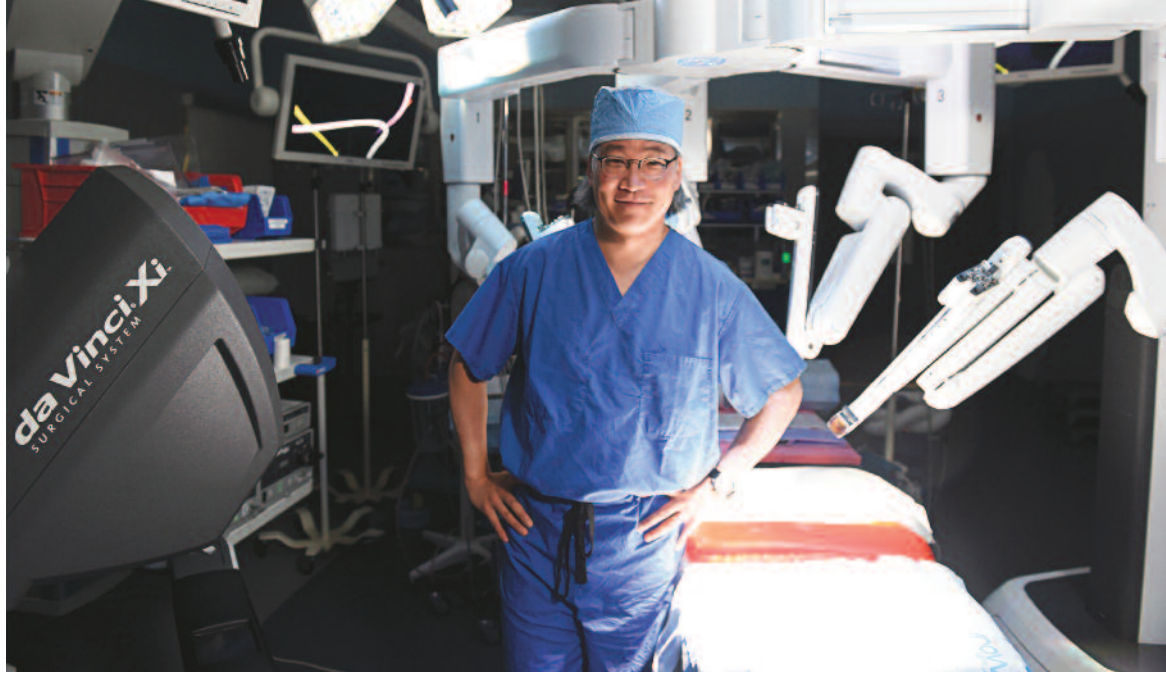
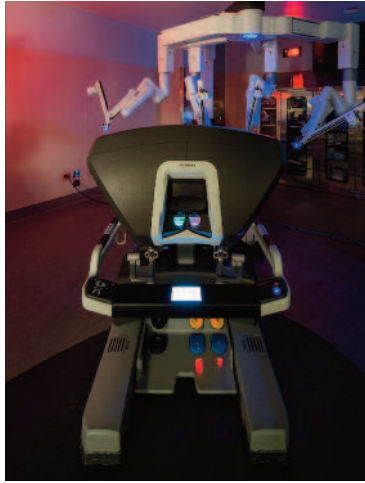
the lab and do them with greater ease. Patients can be scheduled sooner, which improves patient satisfaction. We can do most procedures for acute cardiovascular care here—with the exception of implantable defibrillators, TAVR, and complex procedures reserved for tertiary care centers like RWJ New Brunswick.”

RWJ Somerset houses two cardiac cath labs; the other one was previously outfitted with equivalent technology. Both labs and their staff now offer the latest in diagnostic and interventional cardiac procedures, mirroring the technology and expertise of RWJ New Brunswick physicians.



And, when needed, seamless no-wait transferring to the New Brunswick campus is available 24/7.

RWJ Somerset's increased cath lab capacity extends beyond scheduling efficiency and the facility's bricks and mortar. Referring physicians can be confident in knowing that not only the technology—but also the people wielding it—are among the most highly skilled in the area.



FOURTH-GENERATION ROBOTIC SURGERY TAKES MINIMALLY INVASIVE MITRAL VALVE REPAIR AND REPLACEMENT TO THE NEXT LEVEL

ACC/AHA guidelines classify approximately 10 percent of all patients with heart failure as Stage D: advanced failure due to severe left ventricular dysfunction. As this population of patients continues to grow, so does its burden on their quality of life and healthcare resource utilization. While heart transplantation is the gold standard for patients with severe heart failure, many contraindications for that exist, and a scarcity of donors poses hurdles to effective treatment.

For patients with mitral valve regurgitation who do not respond to optimized pharmacological interventions, mitral valve repair or replacement is an increasingly utilized option. Within that milieu, minimally invasive robotic surgery is working wonders to decrease patient recovery time as well as healthcare costs.

RWJ New Brunswick is leading the way with the latest iteration of the *da Vinci*® robotic system (the Xi; made by Intuitive Surgical; Sunnyvale, CA). “I started utilizing the robot about six months ago and the results have been outstanding,” says Leonard Lee, MD, James W. Mackenzie, MD, Chair in Surgery and Interim Chair, Department of Surgery, Rutgers Robert Wood Johnson Medical School and Chief, Cardiothoracic Surgery, RWJ.

“One big difference between minimally invasive versus robotic surgery is that it allows us to further expand our minimally invasive capabilities,” Lee explains. “Another advantage is the robot’s view of the valve—the visibility is unbelievable: a 3D view with the camera, plus it’s really magnified. It’s like you’re sitting inside the atrium looking at the mitral valve; you can see the anatomy so well and so fully ascertain the problem that you’re fixing. It’s an amazing technology to be four feet away from the patient at a console

while actually operating on the patient—manipulating the arms for very fine movements in very confined spaces.”

Robotic mitral valve surgery also saves costs. Patients are extubated typically within an hour after surgery and remain in the ICU, on average for only six hours. Total hospital length of stay averages a day less than with other methods. Also, patient pain is lower and their quality of life is higher. Recovery time is only two to four weeks (two-thirds less recovery time compared to open sternotomy).

Quick Facts: *da Vinci*® Xi

- scalable
- overhead boom allows greater access to patients from any angle
- greater ROM
- improved reach inside the body
- docking foci by laser targeting system
- can insert the endoscope into any of the arms

Whenever possible, mitral valves are repaired instead of replaced because “a repair gives the patient a more durable result and preserves ventricular function,” Lee notes. Exceptions to this are in cases of stenosis or ischemia, which cause left ventricle remodeling and its sequelae. Those situations are best remedied by mitral valve replacement, which also can be done with robotic surgery.

RWJ New Brunswick is a very high-volume center for mitral valve surgery. According to the Society for Thoracic Surgeons, a high-volume center does 20 mitral valves per year

and a high-volume surgeon performs five of those procedures per year. In contrast, Lee points out, “Last time I checked, our center did more than 100 mitral valves per year, with most of those being done in a minimally invasive manner.”

RWJ New Brunswick is the first center in New Jersey to perform mitral valve repair on the Xi model of the *da Vinci*®. Only three other centers within the tristate area offer robotic mitral valve surgery.

Most patients with mitral valve regurgitation can be candidates for valve repair. In rare cases, prior heart surgery, significant right chest scarring and extreme obesity can make the surgery more challenging. However, no case is turned away.

“Forty percent of our volume comes from outside hospitals,” Lee notes. “We have a very active transfer center and the answer is always ‘yes.’ As a high-volume center, we have all the quality and performance metrics in place to ensure patient outcomes and follow-up. However, we also make a very concerted effort to get the patients back to their cardiologists.”

The first true endoscopic mitral valve repair using an early prototype of the *da Vinci*® Surgical System was performed in 1998. Today’s *da Vinci* Xi represents fourth-generation technology for mitral valve procedures. As the evolution of robotic surgery and its utility with mitral valve interventions increases, Lee says it makes for exciting times and is glad to be at the forefront of it.

To refer a patient or inquire more about robotic mitral valve procedures, call: 732-235-7806.

REAL-TIME IMAGE SHARING IMPROVES DIAGNOSES, PATIENT OUTCOMES

Communication among healthcare providers is always key. Whether a patient is in acute cardiac distress or has decompensating chronic heart failure, coordinated, timely communication among all healthcare providers is crucial for optimal outcomes. To further enhance communications and information sharing, RWJ recently installed the latest iteration of CPACS (Cardio Picture Archiving and Communication System;) as part of the cardiovascular program on its Somerset campus. The enhancement allows images to be shared between the New Brunswick and Somerset campuses in real time. The clinical advantages are significant: now, any complex case that needs a consult or potential transfer can be discussed immediately with specialists on both ends viewing the same images. The net result is greater responsiveness to patient needs, faster diagnoses and faster initiation of treatment plans.

This is a major step forward for RWJ Somerset, which previously could only burn disks of images and courier them via security staff to RWJ New Brunswick or to community physicians. The New Brunswick campus has had a CPACS in place since 2008.

“The installment of CPACS allows us to look at EKGs and images of vascular and cardiac procedures done in any RWJ cath lab, whether you are in Somerset or New Brunswick,” says Jeff Taylor, MD, Vice Chair, Department of Medicine, RWJ Somerset. The system can capture and display waveforms, hemodynamic and other procedural data, as well as produce reports.

With the click of a mouse, CPACS also lets physicians quickly compare results from more than one type of cardiac study, improving diagnostic accuracy. Similarly, studies done at different times can be compared side by side to track changes in a patient's condition—simply by choosing from a menu on the computer screen. With a secure network all its own, dedicated workstations, and archiving abilities, CPACS can capture, store, display and share all types of cardiovascular images internally and externally. Although patients don't see all those technical details, they benefit from a seamless experience because access to tertiary heart care physicians is immediate when necessary.

“Being able to look at patient images in real time means immediate consults, no waiting,” Taylor explains. “For example, if RWJ Somerset performs a cardiac catheterization and they discover a patient may need a stent, I no longer have to come all the way from my office to review the images to decide. Eliminating that lag time shortens the time to diagnosis and treatment, provides better coordination of care and ultimately the best possible patient care.”

All RWJ physicians, regardless of their locations, have access codes to CPACS. Community physicians can view the same images when given a temporary passcode.

The CPACS also enables images to be imported and viewed in the patient's electronic medical record, which fulfills one of HITECH's requirements for compliancy with “meaningful use” (as defined by the Centers for Medicare and Medicaid Services.)



Jeff Taylor, MD

CUSTOM-FITTED SURGICAL SOLUTIONS FOR ABDOMINAL AORTIC ANEURYSMS

The challenging pathologies of abdominal aortic aneurysms (AAA) may leave physicians with few options for intervention. Sometimes open surgery may be too risky or not feasible. Similarly, standard endovascular repair may not work—for example, with short-neck aneurysms in which the weakened vessel wall is close to the renal and superior mesenteric arteries.

In such cases, a standard device to treat an AAA would not work because the two pieces of the device would have to oppose and open at the top in a normal-diameter aorta (between the renal aorta and the neck of the aneurysm). When the aneurysm's neck is very short, insufficient length exists for a seal (typically at least 1 to 1.5 centimeters). That would result in a leak. “A workaround would be to employ the stent higher to achieve a seal. But by doing that, you’d cover the openings to both renal arteries, which, of course, is not acceptable,” explains Saum Rahimi, MD, Assistant Professor of Surgery, Rutgers Robert Wood Johnson Medical School and Interim Chief of Vascular Surgery, RWJ New Brunswick.

Enter the Zenith Fenestrated AAA endovascular graft (Cook Medical; Bloomington, IN): a three-piece system consisting of a proximal body graft (upper “main body”), distal bifurcated body graft (lower “main body”) and an iliac leg graft. The Zenith is the only FDA-approved endovascular stent graft that can be used above the renal arteries and can treat AAAs where at least four millimeters of neck are present. (Most other devices require a large neck size.)

The fabric-and metal graft stent is unique because it is custom-fitted to each person’s aorta—with openings for the renal and mesenteric arteries. Not only does every

aneurysm require differing lengths of stents, but also the clock positions of the renal arteries differ for each patient. Fitting the stent to each patient’s anatomy calls for precise measurements, achieved through contrast CT scanning.

“We measure the diameter of the neck of the aneurysm and then oversize the device by 10 to 15 percent,” explains Rahimi. “For example, if the neck is 24 millimeters, we’ll select a 28-millimeter device. The blood vessel’s elasticity increases the seal and the graft’s ability to adhere to the lumen of the vessel. The graft’s radial force and anchoring struts also help fixate the device inside the aorta so it doesn’t migrate.” However the fenestrations put the Zenith in a class by itself. Calculations from the CT are used to position the holes for the renal and mesenteric arteries. All the measurements are sent to a facility in Australia, which creates the custom device to each patient’s specifications.

The fenestrations allow the device to be aligned so it opens above the renal arteries. At the fenestration sites, leakage around the renal arteries is averted by deploying another type of covered stent called a Zenith Alignment Stent, which seals the stent graft to the renal arteries.

The endovascular procedure offers many advantages over open surgery:

- **Shorter hospital length of stay**
(1 – 2 days vs. 5 – 10 days)
- **Less pain**
- **A two-week recovery time**
(vs. 6 – 12 weeks)

For high-risk patients who are poor candidates for open aneurysm repair, this is a good option with durable results. Mid-term results show the Zenith device is equally effective to open aneurysm repair.

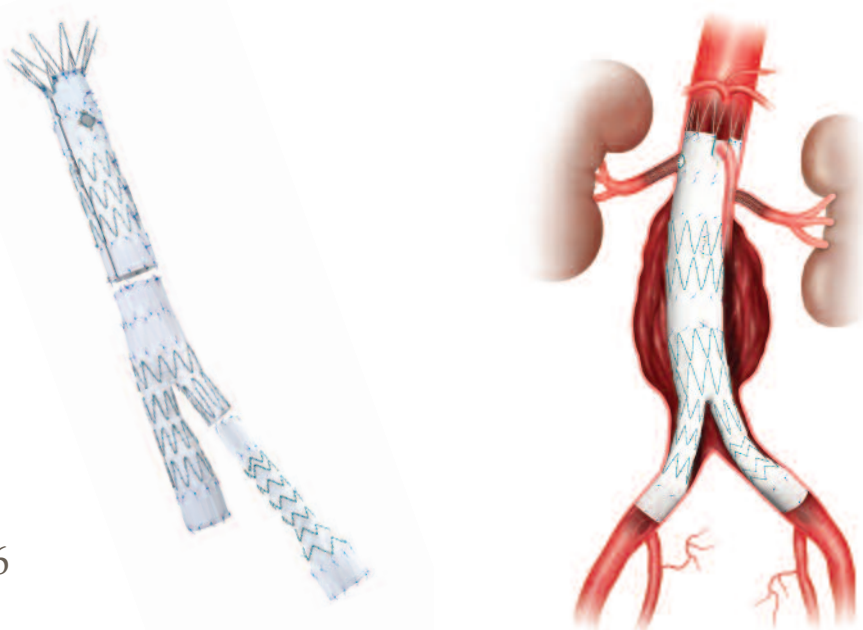
Contraindications to this procedure are few. Occasionally, small-sized access vessels could limit groin access. If the patient has very small or diseased iliac arteries, the 20-French sheath (8 mm diameter) may not be able to traverse the artery.

At RWJ New Brunswick, patients are followed closely after this surgery. A repeat CT scan is performed at six weeks post-op to ensure no leakage is present and the aneurysm is not increasing in size. Another CT is done six months after surgery, then annually thereafter. If everything remains stable over several consecutive years, only annual ultrasounds are performed. Approximately 10 to 15 percent of patients may require a potential secondary intervention, like maintenance of the stent graft. If that is needed, the correction is minimally invasive, with no chance of mortality.

Rahimi is one of only a few physicians in the state of New Jersey who is credentialed to use this device. Use of the stent-graft system requires specialized physician training. Rahimi has been performing this procedure for more than a year and is the first RWJ New Brunswick physician to be credentialed to use the device. The procedure is a valuable addition to the Division of Vascular Surgery’s treatment options for complex aortic pathologies.

RWJ New Brunswick is a high-volume aortic facility, collectively performing 150 aneurysm repairs annually.

Saum Rahimi, MD





V-DRIVE ROBOTIC NAVIGATION

Joysticks are a principal control device in aircraft cockpits, underwater unmanned vehicles, wheelchairs, cranes, even zero-turning radius lawn mowers—and now, stereotactic surgery.

RWJ New Brunswick is the first hospital in the Northeast to implement the V-drive, the newest entry in the EPOCH platform—the 4th-generation Robotic Navigation System from Stereotaxis (St. Louis, MO). Similar to a joystick with a Star Wars look, the V-drive has been called “a major step toward the goal of exceeding the human hand.”

Stereotaxis is a minimally invasive surgical intervention that uses a 3D coordinate system to locate small targets and perform finely tuned actions. In the arena of cardiology, it is used for ablations—and the technology has greatly increased the safety and precision of ablation therapy. Adding the V-drive to this system further enables physicians to focus on patient outcomes over procedural mechanics.

The V-drive enables users to independently manipulate diagnostic (circular mapping) catheters, magnetic ablation catheters and sheaths in a single interface from a remote location. The V-drive precisely controls the movement of each catheter while maintaining its stability.

“Previously a motor drive sat outside of the patient’s body on the leg and pushed the catheter forwards or backwards to advance or retract the catheter. That was the only control you had,” explains Amardeep Saluja, MD, Assistant Professor of Medicine, Rutgers Robert Wood Johnson Medical School and Medical Director, Clinical Cardiac Electrophysiology Lab, RWJ New Brunswick. “We would have to go back into the room to move things by hand. But now that’s changed with the V-drive system. We can do it all from an adjoining control room.”

The V-drive achieves this by controlling numerous catheters in different ways. Push a button, nudge the stick, and the V-drive sends commands to the drive unit for one catheter shaft. Push another button and it directs a different catheter. Disposable drive units translate system commands to

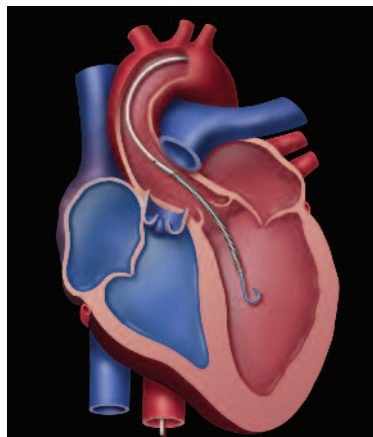
catheter handle units. In addition to advancing and retracting catheters (via the V-CAS catheter advancement system), the V-drive can control the rotation of the sheath that the ablation catheter goes through. The V-drive also can control other catheters, like the lasso catheter. Called the V-loop, that circular mapping catheter performs a complicated motion that previously could be controlled only by hand. The V-drive controls the V-loop’s advancement, retraction, rotation, tip deflection and loop size. An ultrasound catheter manipulator (called the V-sono) is also part of the system.

The computer screen displays and the real-time information they generate are the Odyssey component of the system. (In the vernacular, you may hear some people talk about “the Odyssey system,” but they’re referring to the entire Robotic navigation system as a whole.)

All of this technology translates to many patient advantages. Precision, accuracy and safety are increased. Procedure times, probability of overall complications and anesthesia times are decreased. From a physician standpoint, it decreases radiation exposure because the physician is not moving component arms by hand.

Future planned developments for the system include an ultrasound arm that can automatically follow along with the ablating catheter to keep the catheter tip in focus. Although that timeline for development is not yet known, Saluja is excited about that prospect of further innovations.

RWJ New Brunswick is currently the national leader in Stereotaxis ablations, performing approximately 250 per year. (Another 250 ablations are done using other methods.) In contrast, the Heart Rhythm Society considers 50 ablations per year to be a high volume. At least three physicians at RWJ New Brunswick individually do that many annually. Between 2009 and 2014, RWJ New Brunswick physicians using Stereotaxis to perform ablations have completed more than 1,120 routing and complex cases, treating conditions like atrial fibrillation, left- and right-sided atrial flutter, supraventricular tachycardias and other heart conditions.



Jesus Almendral, MD



COMPREHENSIVE OFFERINGS AVAILABLE FOR MECHANICAL CIRCULATORY SUPPORT: BRINGING HEARTS BACK TO LIFE

Cardiogenic shock is a life-threatening complication of acute myocardial infarction (AMI) or decompensated chronic heart failure. Up to 10% of the AMI population will go into cardiogenic shock—and, in the absence of highly experienced, aggressive, technical care, mortality rates in that subpopulation range from 50% to 90%.

A progressive decline in cardiac function, despite escalating support, requires emergent action to restore coronary blood flow, rest the heart and limit end-organ damage including renal failure. In addition, eagle-eye discernment is needed to differentially diagnose or rule out various cardiomyopathies, pericarditis, valvular dysfunctions and other emergent problems.

Ventricular assist devices (VADs) can effectively unload a stressed heart and restore blood flow to the body. The pivotal SHOCK trial demonstrated that either percutaneous coronary intervention (PCI) or coronary artery bypass graft (CABG) is the treatment of choice for cardiogenic shock and both can markedly decrease mortality rates at one year. Ideally, PCI should be initiated within 90 minutes of presentation of cardiogenic shock; however, it is still an effective acute intervention if performed within 12 hours of presentation.

VADs are effective in both short-term acutely hemodynamically decompensated patients as well as long-term Stage D chronic HFrEF patients—and RWJ New Brunswick Mechanical Circulatory Support (MCS) Program, part of the Advanced Heart Failure and Transplant Cardiology Program has the entire gamut of best-practice clinical and surgical care at their disposal.

RWJ New Brunswick sees the most complex of these cases daily and has become a regional referral center for treating cardiogenic shock. Importantly, the MCS staff have a message for community physicians: if

you suspect this kind of problem, get the patient here as soon as possible. Recovery of ventricular function IS possible—and cardiac recovery IS sustainable—if aggressive measures are taken.

***Our message to community physicians?
If you suspect cardiogenic shock, get the patient
to RWJ New Brunswick as soon as possible.
Recovery of ventricular function IS possible—
and cardiac recovery IS sustainable—if
aggressive measures are taken.***

Benefits of early intervention

RWJ New Brunswick's MCS department has extensively tracked the outcomes from treating this seriously ill population. Their data, as well as that of others nationally, shows that VAD therapy for AMI-related cardiogenic shock is often seriously delayed. In a delayed-treatment cohort of patients, recovery often requires prolonged support, which, from experience, averages approximately 25 days and consumes tremendous healthcare resources. However, the opposite is true when minimally invasive VAD options are used early for cardiogenic shock.

"In this population, people are dead without acute support," explains George Batsides, MD, Surgical Director, Mechanical Circulatory Support, Rutgers Robert Wood Johnson Medical School, and Chief, Section of Cardiac Surgery, RWJ New Brunswick. "Not only can we insert these devices fairly quickly, but patients don't have to be put on cardiopulmonary bypass. That eliminates a lot of inflammatory response cascade. We can unload their hearts quickly, facilitate reperfusion, and thus reduce the infarct size. All of this increases their chances of survival and gains us valuable bridge-to-decision time."

"The challenge involved in implanting a temporary device is not primarily the

technical aspects of the implant but to make sure the patient isn't too sick to undergo the procedure," adds Jesus Almendral, MD, Medical Director, Mechanical Circulatory Support and Heart Transplant program, Rutgers Robert Wood Johnson Medical School and the Heart Transplant Center at RWJ New Brunswick. "Early referral is key if you want to maximize the outcome."

Take, for example, a patient who had been admitted to another facility with presumed pneumonia but had sustained a large AMI. By the time he was transferred to RWJ, he was profoundly hypotensive and in biventricular failure. After going into cardiac arrest shortly after arriving at RWJ, emergent CABG x2 surgery and implant of an Impella 5.0 left ventricular device were performed. With support and revascularization, right ventricular function recovered. Inotropes and pressors were weaned; the Impella was explanted six days later, and the patient left the hospital with near-normal heart function.

VADs buy both patients and physicians time—for patient recovery and decisions regarding transition to definitive management. Sometimes VADs are a bridge to candidacy, as in the case of patients with severe pulmonary hypertension, which makes them transplant-ineligible. However, the implant of a short-term VAD can give them a chance to recover enough to bridge them to a heart transplant. That was the case with a patient with decompensated ischemic cardiomyopathy who was unresponsive to diuretics and could not be started on inotropes due to angina and renal complications. Due to a very low flow state, an Impella was implanted emergently. Within



George Batsides, MD

Table 1: RWJ 2014 VOLUMES FOR IMPLANTABLE DEVICES AND HEART TRANSPLANT				
CATEGORY	AVERAGE DURATION	EXAMPLES	VOLUME DISPLACEMENT / PUMP MECHANISM	CAN LEAVE HOSPITAL W/ IT?
Short-term	5 – 7 days	Impella 2.5	2.5 Lpm / microaxial	Yes
		Impella 5.0	5 Lpm / microaxial	Yes
		AB5000*	6 Lpm / pneumatic	No
Mid-range	1 – 3 months	CentriMag*	≤ 9.9 Lpm / centrifugal	No
Long-term	1 – 3 years**	HeartMate II	10 Lpm / axial	Yes
Permanent	lifetime	Heart transplant	5 – 6 Lpm at rest	Yes

NOTES:
Most of the short-term VAD implants were Impellas. The first Impella RD and HeartWare implants were performed in Q1 2015. The Impella RD can pump 4 Lpm; the HeartWare can pump 10 Lpm.
* An extracorporeal system that can provide left-, right- or biventricular support to patients.
** RWJ statistics averages. Longer durations may apply to other facilities.

two weeks, the patient recovered enough to receive a HeartMate II (a durable LVAD). Four months later, the patient received a heart transplant and is doing well today.

A short-term VAD is not always the first step. The aortic valve must be competent before an LVAD can be placed; otherwise, aortic regurgitation will distend the left ventricle and overload the volume that the VAD can pump. Similarly, an intracardiac shunt (such as patent foramen ovale) or a septal defect must be corrected before mechanical support is instituted, and existing renal insufficiency needs to be determined as secondary to poor perfusion or due to irreversible causes.

To that end, RWJ New Brunswick employs a multidisciplinary team that sees each patient. “We have a committee that meets every week to review each case and determine the best option for each patient,” says Almendral. This carefully coordinated effort between the clinical and surgical aspects of Mechanical Circulatory Support is a prime example of RWJ New Brunswick’s seamless patient care.

Yin and Yang

One could say that Drs. Batsides and Almendral are the yin and yang of the Mechanical Circulatory Support Division of the Advanced Heart Failure Program. While Batsides and his team represent the comprehensive surgical solutions that they employ daily in the OR, Almendral and his team are in charge of everything medically that is not considered surgery. Almendral

sees all patients as soon as they come out of surgery. He optimizes every patient’s medications, whether they have had a VAD implanted or need to be managed in other ways until they are healthy enough for a VAD. When Batsides and his team aren’t in surgery or the outpatient clinic, they do rounds in the hospital.

Almendral emphasizes, “Our surgeons are available 24/7 and I’m always available to have a discussion with any referring physician over the phone. We never say ‘no’ to a patient. We accept patients no matter what. “And we always keep an open line of communication with the referring physician on the patient’s progress as we care for their acutely ill patients.”

When the right ventricle needs help

Right ventricular infarction occurs in up to 30 percent of patients with inferior myocardial infarction and becomes hemodynamically unstable in 10 percent of those patients. Until now, no percutaneous right-sided equivalent existed of an LVAD—and a left-sided device can’t support the right ventricle because the two ventricles vary in size, volume, wall thickness, and other parameters. However, in late January 2015, under a Humanitarian Device Exemption, the FDA approved the first percutaneous right-sided VAD. Batsides was the first surgeon in New Jersey to implant it. The new Impella RP (Abiomed Inc.; Danvers, MA), capable of augmenting blood flow by up to four liters per minute, can be used for up to 14 days in adult and pediatric patients.

Table 2: Guidelines for Referrals	
A patient is considered at high risk for advanced heart failure if:	
Documented Class III or IV heart failure	1 or more of the following
	• Inability to walk one block without shortness of breath
AND	• One or more heart failure-related hospital admissions in the past 6 months
	• Diuretic dose > than 120mg/day (Furosemide or escalating doses needed for control)
	• Intolerant or refractory to ACE inhibitors, angiotensin receptor blockers, or beta blockers
	• CRT nonresponders
	• Serum sodium < 136 mmol/L
	• BUN > 40 mg/dL or serum creatinine > 1.8 mg/dL
	• Hematocrit < 35%

“Right now, we’re the only hospital in the state with the right-sided device, which makes us the only hospital in the state that can support biventricular failure through totally minimally invasive approaches,” Batsides notes. “We can place an Impella via axillary access to unload the left side of the heart and use the femoral vein to place an Impella RP for the right side,” he adds.

High-volume, high-expertise

RWJ New Brunswick is one of the nation’s five highest-volume facilities for use of the left-sided Impella 5.0—the world’s smallest internal, short-term, axial-flow pump that provides left-sided cardiac support of up to 5 liters of flow. RWJ New Brunswick’s survival rate with left-sided Impella devices is approximately 72 percent — which is exceptional compared to a national average of approximately 50 percent survival for patients in cardiogenic shock. (See Table 1 for more details.)

Other leading-edge technology

RWJ New Brunswick is also leading the way with another new implant, a durable VAD called the HeartWare Ventricular Assist System (HeartWare; Framingham, MA). “It’s another bridge to transplant,” Almendral explains. “Since 2009, we’ve been using the HeartMate II for that. We implanted our first HeartWare in March, and we expect to do this more in the future. The HeartWare is a smaller, lighter device that’s easier to im-plant—it goes directly into the apex of the left ventricle. You don’t need a pocket for the pump like the HeartMate II needs. In addition, the operating time is shorter and the patient’s recovery is quicker with this newer device.”

Leaders in Technique and in Training Others

Batsides is a national training expert on Impella devices. He speaks across the country on the subject and also hosts animal labs for training. In addition, he trains surgeons so that their facilities can become Joint Commission certified on the HeartMate II, a durable LVAD.

This and the collective expertise of RWJ New Brunswick’s heart failure program have created a regional referral center for patients in cardiogenic shock. “I think there are about 12 other heart programs in the state; we’ve gotten referrals from nine of them in the past few years,” Batsides notes. “It goes to show that we can help the sickest patients in the state recover their hearts.”

Guidelines for referrals

The best intervention for someone at high risk of advanced heart failure is an early intervention. Batsides and Almendral reiterate, “We can’t emphasize enough the need to refer patients before they become too sick.” To take the guesswork out of that decision-making process, see Table 2, Guidelines for Referrals.

SHORTER EXAM TIMES, LOWER RADIATION WITH NEW NUCLEAR CAMERA AT SOMERSET

Because organ function generally changes before morphological changes are detectable, nuclear medicine imaging can provide a way to identify early functional changes. However, it lacks the anatomic details that CT scans can provide regarding structural pathology (namely, anatomic localization and characterization). The two combined can complement each other to help diagnose certain health problems earlier than many other methods. Recently the Somerset campus of RWJ Somerset installed a new hybrid SPECT/CT nuclear camera to provide state-of-the-art fusion imaging for patients undergoing nuclear medicine examinations.

The Optima NM/CT640 SPECT/CT System (GE Healthcare; Garrettsville, OH) offers many advantages over the Forte system that it replaced. At the forefront of those advantages is the Optima's new auto-body contouring and Evolution technology. Collectively, this eliminates the tradeoffs that previously existed between acquisition time, isotope dose and image quality. The distance between the patient and the detectors improves resolution, while

SPECT-optimized collimators precisely detect clinically significant events. The net result is that the patient's table time and/or isotope dose may be reduced up to 50 percent—without sacrificing image quality.

“Now we have the capability to perform bone scans in half the time whereby a whole-body scan can be accomplished in 10 to 12 minutes,” says Lisa Fletcher, MHA, CRA, R.T. (R),(M),(CV), Director, Radiology Operations, RWJ New Brunswick and Somerset. “The Optima has outstanding image quality that allows the radiologist to provide more precise imaging results. And, although every patient situation is unique, there now exists the opportunity to lower radiation dose or decrease the time patients spend on the camera without sacrificing image quality.”

The Optima's newly developed 4-slice CT is designed for hybrid use. That, plus a “cardiac package” offers several advantages for cardiovascular studies:

- The combined SPECT/CT capabilities enable the CT data to be used for attenuation correction, which decreases the false-positive rate.

- The technology helps decrease image blur from the patient's heart motion.
- Scan results can be used for calcium scoring.
- For stress testing, “stress-only” imaging can be done, which would cut the exam time in half and lower the amount of radioactive tracer used.

With a one-second CT rotation speed, patient comfort is increased because of the shorter scan time. In addition, the imaging system's design is Somerset's first that can accommodate bariatric patients. The Optima supports patients up to 2 feet and 595 pounds.

RWJ Somerset's installation of the Optima was completed shortly before Christmas 2014. New Brunswick will get the same model of nuclear camera this year.

HIGHLIGHTS

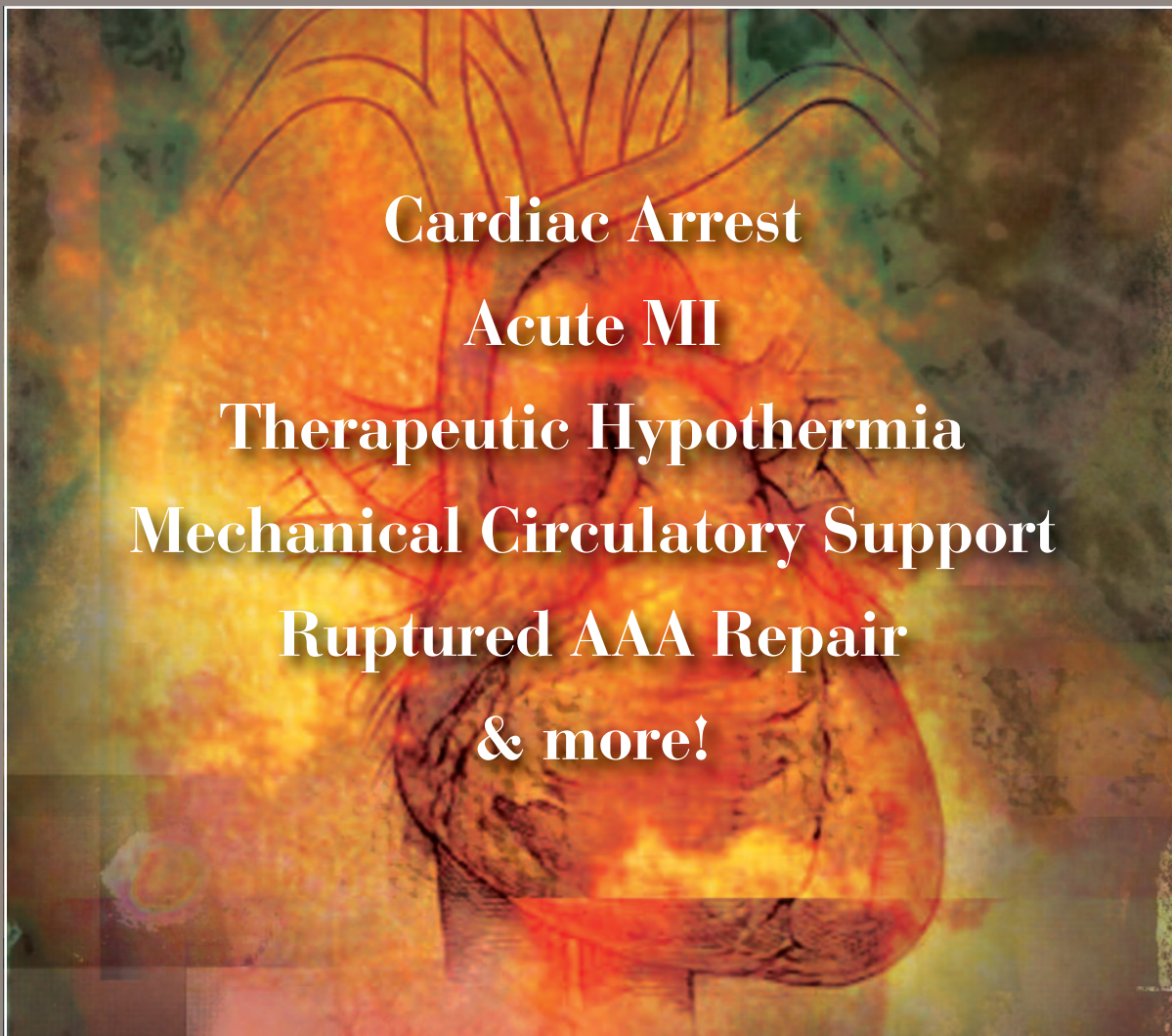
Optima NM/CT 640 Nuclear Camera recently installed at RWJ Somerset:

- Fast rotation image capture reduces motion artifacts for more precise images
- A meaningful reduction of scan times may improve patient experience
- 40% faster imaging time, reducing some procedure times



EXPERT APPROACHES TO CARDIAC EMERGENCIES

Join the nation's leading authorities for an interactive forum to discuss the latest advances in cardiovascular emergency care.



Saturday, October 17, 2015
7 a.m. to 2:15 p.m.

Keynote Speaker:
Robert Myerburg, MD
University of Miami

Register now:
www.rwjuh.edu/innovations

The Heldrich
New Brunswick, NJ



RUTGERS
Robert Wood Johnson
Medical School

A CME Certified Activity Jointly Provided by Rutgers Robert Wood Johnson Medical School, Center for Continuing and Outreach Education at Rutgers Biomedical and Health Sciences, and Robert Wood Johnson University Hospital

WARM WELCOME: NEW PHYSICIANS JOIN RWJ MEDICAL STAFF

CARDIOLOGY

Andrey Espinoza, MD | 1100 Westcott Drive - Suite G3, Flemington, NJ 08822

Daniel Frenkel, MD | 225 Jackson Street, Bridgewater, NJ 08807

Hemal Gada, MD, Assistant Professor of Medicine, Rutgers Robert Wood Johnson Medical School

Deepa Iyer, MD, Instructor of Medicine, Rutgers Robert Wood Johnson Medical School

Pravien Khanna, MD | 75 Veronica Ave, Suite 101, Somerset, NJ 08873

William Kostis, MD, Assistant Professor of Medicine, Rutgers Robert Wood Johnson Medical School

Kanika Mody, MD, Assistant Professor of Medicine, Rutgers Robert Wood Johnson Medical School

Anita Ravi, MD | 102 James Street, Suite 302, Edison, NJ 08820

CARDIAC SURGERY

Takashi Nishimura, MD, Assistant Professor of Surgery, Rutgers Robert Wood Johnson Medical School

PRODUCED BY

Stephern Allison, PA-C, MSM, MBA
Vice President, Cardiovascular Services

Lana Christian
Medical Writer

Tara Ramirez
Creative Services Manager/Design

Melissa Ruzbarsky
Senior Marketing (Project) Manager



One Robert Wood Johnson Place, New Brunswick, NJ 08903

PRESORTED
FIRST CLASS MAIL
US POSTAGE PAID
PERMIT #1512
NEW BRUNSWICK, NJ

HIGHLIGHTING OUR HEART FAILURE CARDIOLOGY SPECIALISTS:



Kandika Mody, MD

Kanika Mody, MD, is an Assistant Professor of Medicine, Rutgers Robert Wood Johnson Medical School and a cardiologist with the Advanced Heart Failure, Mechanical Support and Heart Transplant Cardiology Program at RWJ New Brunswick. She is also the Medical Director of the Cardiac Care Unit at RWJ. Prior, Dr. Mody was the Assistant Attending for the Mechanical Circulatory Support Program at New York-Presbyterian Hospital/Columbia University Medical Center in New York.

Dr. Mody completed her internal medicine residency at Saint Michael's Medical Center, Newark, NJ. She completed her cardiovascular fellowship at Winthrop-University Hospital in Long Island, NY, with a subsequent fellowship in advanced heart failure and transplant at New York-Presbyterian Hospital/Columbia University, New York City.

Dr. Mody's clinical interests include the management of acute cardiogenic shock and short-term mechanical support. Her primary research interest is studying how mechanical circulatory support (specifically, LVAD) affects the immune system before and after heart transplant.

Dr. Mody is a member of the American College of Cardiology and the International Society of Heart and Lung Transplantation. Her work has appeared in several journals including *Circulation*, and she has served as an invited reviewer for the *Journal of Cardiac Failure*.



Deepa Iyer, MD

Deepa Iyer, MD, is an Instructor of Medicine, Rutgers Robert Wood Johnson Medical School and a cardiologist with the Advanced Heart Failure, Mechanical Support and Heart Transplant Cardiology Program at RWJ New Brunswick.

Prior, she was Chief Cardiology fellow at Newark Beth Israel Medical Center, Newark, NJ where she completed her fellowship in cardiovascular disease. She also completed a Clinical Research fellowship in Cardiac CT and Research at St. Luke's-Roosevelt Hospital Center, New York City, and a fellowship in Advanced Heart Failure and Transplant at Rutgers RWJ Medical School.

Dr. Iyer completed her internship and residency training at RWJ, where she was awarded Outstanding Intern and subsequently the Charles Ream Resident of the Year.

Dr. Iyer's clinical interests include heart failure in women with peripartum cardiomyopathy, management of patients with acute cardiogenic shock and study of cardiac recovery in patients with mechanical assist devices. Her research interests include assessing long-term patient outcomes in those who have transitioned from VADs to transplant.

She is a member of the American College of Cardiology and the International Society for Heart and Lung Transplantation.