Transdermal Atenolol and Feasibility of Transdermal Administration

Oral administration of atenolol at a median dose of 1.1 mg/kg every 12 hours (range, 0.8 to 1.5 mg/kg) in cats induced effective plasma concentrations at 2 hours after treatment in most cats. Transdermal administration provided lower and inconsistent plasma atenolol concentrations. Further studies are needed to find an effective formulation and dosing scheme for transdermal administration of atenolol.

"In theory, the transdermal route of administering medications has many potential advantages. It is noninvasive and not demanding technically, avoids first-pass hepatic metabolism and gastrointestinal breakdown, has potential for sustained release formulations, and can be administered over a large surface area. Transdermal administration of medication has been shown to achieve blood concentrations of drug that are considered to be therapeutic (eg, fentanyl) or efficaciously affect physiologic surrogates (eg, methimazole and lidocaine). Feasibility of transdermal medication varies on a drug-by-drug basis."

Discussion: In spite of these results, investigators did not conclude that transdermally administered atenolol is not feasible.Because two cats did achieve therapeutic blood concentrations of atenolol after transdermal administration, the authors called for further research to find a transdermal formulation and dosing regimen for atenolol that will consistently result in plasma atenolol concentrations of >260ng/ml.Investigators offered several considerations for future studies. This study utilized a hydrophilic carbomer/propylene glycol/glycerin gel vehicle which has been used in human delivery of transdermal medications. As pluronic lecithin organogel (PLO) is the transdermal vehicle used almost exclusively in veterinary medicine, investigators encouraged future transdermal atenolol research utilizing PLO as the vehicle. Investigators also noted that higher doses of atenolol (3mg/kg) have been reported to consistently result in blood levels providing adequate adrenergic blockade at 12 hours in all cats studied.Since the median atenolol dose administered in this study was 1.1mg/kg, researchers suggest studying transdermal atenolol at the 3.3mg/kg dose.

Because daily oral administration of atenolol to cats is challenging and often results in a lack of compliance, a non-invasive dosage form such as transdermal atenolol will most likely result in better compliance, less stress to the cat, and reveal a positive therapeutic effect.

Am J Vet Res. 2008 Jan;69(1): 39-44.
Comparision of pharmacodynamic variables following oral versus transdermal administration of atenolol to healthy cats.
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Transdermal Carbimazole Gel for the Treatment of Feline Hyperthyroidism

The aim of a study conducted by Buijtels et al. of Department of Clinical Sciences of Companion Animals, Faculty of Veterinary Medicine, Utrecht University, The Netherlands, and presented at the 16th ECVIM-CA Congress, 2006, was to develop a carbimazole gel for application at the inner pinna of the ear and to study its

effectiveness in cats with hyperthyroidism. The results of this study indicate that twice daily administration of carbimazole gel at the inner pinna of the ear is an effective treatment of cats with hyperthyroidism.

Tijdschrift voor Diergeneeskunde. 2006; 131(13):478-82
[Transdermal carbimazole for the treatment of feline hyperthyroidism]
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