PEDIATRIC SPAY AND NEUTER

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Introduction

Each year in the United States millions of homeless or unwanted dogs and cats are euthanized in animal shelters and humane societies. While precise numbers are difficult to obtain the Humane Society of the United States estimates that between 3 and 4 million dogs and cats are euthanized each year. Many factors have led to the overpopulation of dogs and cats and the solution will be multifaceted. Until safe and effective chemical or immunological sterilization is available spay neuter will be the cornerstone of any program to reduce the overpopulation thereby reducing the numbers of animals relinquished and euthanized each year. One important component of the spay neuter efforts at reducing shelter relinquishment and euthanasia is pediatric spay and neuter.

Ovariohysterectomy and castration of pediatric dogs and cats (between 8 and 16 weeks of age) is supported by the AVMA and is becoming increasing popular especially in the shelter and high-quality, high-volume spay neuter environments. The AVMA position statement says, "Resolved that the AVMA supports the concept of early (8-16 weeks) ovariohysterectomies /gonadectomies in dogs and cats, in an effort to stem the overpopulation problem in these species. The concept is for the benefit of animal shelter and humane society spay/neuter programs. Individual veterinarians have the right/responsibility to decide on what age they will perform the procedure." Other organizations supporting pediatric neutering include the:

- Canadian Veterinary Medical Association
- British Small Animal Veterinary Association
- American Animal Hospital Association

and many more.

The most effective way to ensure that animals adopted from shelters do not reproduce is to spay or neuter them prior to adoption. The ASV Guidelines for Standards of Care in Animal Shelters states that "animal shelters should require that cats and dogs who are adopted into homes be spayed or neutered." Voucher programs or prepaid spay neuter programs in which arrangements to have an adopted animal spayed or castrated are made at the time of adoption simply do not work. Nationally compliance rate of these programs is less than 40%. With pre-adoption spay and castration there, obviously, is no compliance issue. In the shelter environment spay or neuter can be performed on puppies and kittens as young as 6 weeks of age. In a practice environment for owned animals the recommendation is to establish one more appointment at the end of the puppy/kitten vaccination series. In this manner puppies and kittens are spayed or neutered prior to 5 months of age, before sexual maturity.

Advantages of pediatric spay/neuter

There are several advantages to pediatric neutering. In addition to the commonly accepted health benefits associated with ovariohysterectomy and castration, such as reduction in incidence of mammary neoplasia and reduction in behavioral problems, pediatric neutering offers additional advantages. It is an effective tool in dealing with the overpopulation of unwanted dogs and cats. The surgical procedures

are easier, faster, and less expensive. With shorter surgery times and shorter anesthetic episode the incidence of perioperative complications is low (Howe LM 1997). Anesthetic recovery and healing time is shorter (Faggell AM 1994; Howe LM 1997).

Historical concerns:
Historically veterinarians have expressed concerns about pediatric neutering. Their concerns have focused on either anesthetic risk or potential long-term physiologic effects. The adverse physiologic effects mentioned have been obesity, stunted growth, musculoskeletal disorders, perivulvar dermatitis, puppy vaginitis, feline lower urinary tract disease, and urinary incontinence and most fears appear to be unfounded.

Obesity is a multi-factorial problem with a tendency to occur regardless of the age an animal is spayed. A long-term study conducted at Cornell found a decrease in obesity for both male and female dogs that had undergone pediatric ovariohysterectomy .

Initial concerns that pediatric neutering may result in stunted growth have proven to be false. Removal of the hormonal influence results in a delayed closure of growth plates. The long bones of animals that undergo pediatric neutering are actually a little longer than those of animals neutered after 6 months of age. There does not appear to be any clinical significance to the delayed physeal closure.

Some have questioned if early age spay neuter results in an increased incidence of hip dysplasia. Research on this has proven to be equivocal. A study at Texas A&M has shown no increase in hip dysplasia, while a study at Cornell showed a slight increase in incidence. Interestingly, the Cornell study also showed that dogs sterilized at a traditional age were 3 times more likely to be euthanized due to hip dysplasia than dogs sterilized at a pediatric age.

Perivulvar dermatitis has been documented in unspayed and spayed animals regardless of the age at which the surgery was performed. This condition is related to a recessed vulva and made worse by obesity. Age of neutering appears to have no significant influence on the incidence.

Suspicion that pediatric castration would result in decreased diameter of the penile urethra in cats and, therefore, lead to urinary obstruction has proven to be unfounded. The diameter of the penile urethra in the adult male cat does not vary between animals neutered at 7 weeks or 7 months or from intact males.

Studies have shown differing conclusions with respect to estrogen responsive urinary incontinence. The Cornell study revealed a slightly greater risk of urinary incontinence in dogs spayed earlier than 12 weeks of age. The Texas A&M student showed no difference while a study by Arnold et al in 1992 showed a higher incidence of urinary incontinence in dogs spayed after their first estrus cycle. Three studies with conflicting results. Obviously, more research needs to be done on this issue, but the key factor is that the incontinence is estrogen responsive. Even if the results eventually show a higher incidence in those dogs spayed at an early age, the condition is easily treated.

Anesthetic management
Anesthetic management in the pediatric patient can be very safe provided attention is paid to a few basic principles and appropriate attention is paid to the unique concerns associated with the pediatric patient. Given that metabolic development is largely complete by six weeks of age, the same anesthetic

protocols that are used in adults can be safely. Pediatric patients have lower percentage of body fat, a decreased ability to shiver and a larger surface area to volume ration. Each of these factors makes attention to maintenance of body temperature critical. Pediatric patients are, also, at a greater risk of hypoglycemia. These factors can be easily managed allowing surgical anesthesia with minimal risk .

According to the Association of Shelter Veterinarians guidelines for spay neuter programs "warmth is best preserved by reducing contact with cold surfaces, limiting body cavity exposure, and providing carefully protected contact with circulating warm water or heated containers, such as carefully monitored water bottles or rice bags. Forced hot air or convective warming can also be an effective means of maintaining body temperature perioperatively." These measures in conjunction with short surgical time and reversal of anesthetic agents at the completion of surgery minimize hypothermia.

Hypoglycemia can be avoided or minimized by restricting preoperative fasting to 2 to 4 hours, avoiding preoperative excitement, and feeding the animal immediately upon anesthetic recovery.

Many anesthetic protocols have been recommended for pediatric surgery. The most recommend protocols use multimodal analgesia and avoid the use of barbiturates. IM injection of a dexmedetomidine, butorphanol, ketamine HCl combination followed by maintenance with oxygen via either facemask or endotracheal tube and supplemented with Isoflurane®, if needed, is very safe and effective. Following IM injection, a surgical plane of anesthesia is achieved within 5 minutes and will last for up to 30 minutes. The dexmedetomidine can be reversed with atipamezole immediately after surgery and will frequently result in the patient being mobile within 5 to 10 minutes of the conclusion of the surgery. An NSAID like meloxicam should be administered after induction of anesthesia and prior to the start of surgery for post-operative analgesia.

Surgical Procedures
Videos of surgical procedures will be demonstrated.

Conclusions
Recognizing the shorter anesthetic and surgical times and lower complications rates for younger patients, many practitioners have begun performing spays and neuters at an earlier age in privately owned pets as well. Historically, practitioners have routinely seen kittens and puppies for a series of vaccinations and wellness visits between 6 and 16 weeks of age, and then advised owners to return a few months later for neutering. This gap in care may contribute to many pets being spayed or neutered following puberty and the birth of many unintentional litters. By spaying and neutering owned pets at 4-5 months of age following standard vaccinations, practitioners can allow time for them to develop immunity through vaccination while ensuring they are neutered prior to sexual maturity. And, because there is no gap in veterinary care between the vaccine series and the surgical appointment, owner compliance may be improved since the owner establishes a routine of veterinary appointments for their pet during the wellness visits. By performing spay-neuter surgery at this age, veterinarians are also able to ensure numerous health benefits for their patients, including dramatic reduction in the risk of mammary tumors and elimination of highly objectionable behavior including scent marking, spraying, fighting and roaming. Additional benefits include avoidance of the stresses and costs associated with spaying while in heat, pregnant or with pyometra. And, spaying and neutering young puppies and kittens is technically easier for the surgeon and more cost effective than neutering them once they are mature.

Reading List

AAHA (2010). "Pediatric Neutering (Gonadectomy/Overiohysterectomy/Orchiectomy) of Companion Animals Statement." from http://secure.aahanet.org/eweb/DynamicPage.aspx?site=resources&webcode=referenceDetail&postKey=1bc32a74-b97d-488f-8ae9-ec013839b1c7.

Arnold S, A. P., Hubler M et al (1992). "Urinary incontinence in spayed bitches: prevalence and breed predisposition." European Journal of Coompanion Animal Practice **2**: 65-68.

Association, B. S. A. V. (2006). "Policy on Neutering of Cats." from http://www.bsava.com/Advice/PolicyStatements/tabid/155/Default.aspx.

AVMA (1994, April 2009). "Pediatric Spay Neuter of Dogs and Cats." from http://www.avma.org/issues/policy/animal_welfare/spay_neuter.asp.

AVMA Policy on pediatric spay neuter

AVMA (1997). "National shelter census results revealed." Journal of American Veterinary Medical Association **210**: 160-161.

Bohling Mark W, R. B. Y. K., Bushby Philip A, Griffin Brenda, (2010). Veterinary Seminars In Spay-Neuter Surgeries: Pediatrics. Veterinary Seminars in Spay-Neuter. R.-B. Y. Karla.

Cistola AM, G. F., Levy JK, et al (2003). "Comparison of two injectable anesthetic regimes in feral cats at a large-volume spay clinic." Veterinary Anaesthesia and Analgesia **30**(2): 101-102.

CVMA (2006). "Dog and Cat Spay / Castration." from http://canadianveterinarians.net/ShowText.aspx?ResourceID=414.

Faggell AM, A. M. (1994). "Evaluation of anesthetic protocols for neutering 6 - 14-week-old pups." Journal of American Veterinary Medical Association **1994**(205): 308-314.

Griffin B, D. B., Bohling M, (2009). A review of neutering cats. Consultations in Feline Internal Medicine. August JR. St. Louis, Elsevier Saunders**:** 776-790.

Herron MA (1996). "The effect of prepubertal castration on the penile urethra of the cat." Journal of American Veterinary Medical Association **209**(11): 208-211.

Howe Lisa M, S. M. R., Boothe Harry W, Hobson H Phil, Holcom Jennifer L, Spann Angela C, (2001). "Long-term outcome of gonadectomy performed at an early age or traditional age in dogs." Journal of American Veterinary Medical Association **218**(2): 217-221.

Howe LM (1997). "Short-term results and complications of prepubertal gonadectomy in cats and dogs." Journal of American Veterinary Medical Association **211**(1): 57-62.

Howe LM (1999). "Prepubertal Gonadectomy in Dogs and Cats - Part I." Compendium of Continuing Education for the Practicing Veterinarian **21**(2): 103-111.

HSUS (2006). "Estimates of Pet Overpopulation." from http://www.humanesociety.org/issues/pet_overpopulation/facts/overpopulation_estimates.html.

Looney AL, B. M., Bushby PA, Howe LM, Griffin B, Levy JK, Edlestone SM, Weedon JR, Appel LD, Rigdon-Brestle YK, Ferguson NJ, Sweeney DJ, Tyson KA, Voors AH, White SC, Wilford CL, Farrell KA, Jefferson EP, Moyer MR, Newbury SP, Saxton MA, Scarlett JM (2008). "The Association of Shelter Veterinarians Veterinary Medical Care Guidelines for Spay-neuter Programs." Journal of American Veterinary Medical Association **233**(1): 74-86.

Manning AM, R. A. (1992). "Companion animal demographics and sterilization status: results from a survey in four Massachusetts towns." Anthrozoos **1992**(5): 192-201.

Newbury S, B. M., Bushby PA, Cox CB, Dinnage JD, Griffin B, Hurley K, Isaza N, Jones W, Miller L, O'Quinn J, Patronek GJ, Smith-Blackmore M, Spindel M (2010). Guidelines for Standards of Care in Animal Shelters.

Petsmart Charities (2010). "Motivators and Barriers for Pet Adoption and Spay/Neuter." from http://www.petsmartcharities.org/research/
.

Root Kustritz Margaret V (1991). "Early Spay-Neuter in the Dog and Cat." Veterianry Clinics of North America: Small Animal Practice **29**(4): 935-943.

Root MV, J. S., Johnston Gr et al (1996). "The effect of perpuberal and postpuberal gonadectomy on penile extrusion and urethral diamter in the domestic cat." Vet Radiol Ultrasound **37**: 363-366.

Salmeri Katharine R, B. M. S., Scruggs Sherry L, Shille Victor (1991). "Gonadectomy in immature dogs: Effects on skeletal, physical, and behavioral development." Journal of American Veterinary Medical Association **198**(7): 1193-1203.

Spain C. Victor, S. J. M., Houpt Katherine A. (2004). "Long-term risks and beneftis of early-age gonadectomy in dogs." Journal of American Veterinary Medical Association **224**(3): 380-387.

Stubbs WP, B. M., Scrugges SL, et al (1993). "Prepubertal gonadectomy in the domestic feline: Effects on skeletal, physical and behavioral development." Veterinary Surgery **22**.