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When to Neuter: The Controversy
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In this day of “pet overpopulation,” many alternatives are being sought to control the reproduction of domestic canines and felines. One alternative discussed often is that of early spaying and early castration. Early, in this case, is any time before the usually suggested six to eight months (before the first heat cycle in the females). In the summer of 1993 in Minneapolis, the AVMA voted to endorse the concept of early-age spaying/neutering1.

The topic of early spay/neuter always brings up the possible problems associated with this practice. Safe anesthesia in these juvenile patients is always a big concern, as is ease or ability to do the actual surgery. These concerns in kittens will be discussed in the following paragraphs. For the purpose of this discussion, a small, semi-scientific study was done.

Materials and Methods

From July 3, 1993 to August 5, 1993 twelve kittens were spayed or castrated. Of these kittens there were three groups.

Group 1

Group 1 consisted of six domestic shorthair kittens three of each from two different litters. They were all female. The dates of birth were April 15, 1993 and April 23, 1993. These kittens ranged in weight from .6kg to .8kg (1.25 pounds to 1.75 pounds). Group 1 had surgery on July 3 and July 4, making them eleven weeks and ten weeks of age respectively. One of the females from the younger litter was not spayed, but was kept as a control to be done at six months of age. Three of the six kittens, including the control, were given indoor homes and declawed at the time of spaying. The other three were returned to a barn which had been their home previously. All kittens in this group were vaccinated against feline viral rhinotracheitis, calicivirus, chlamydia, and panleukopenia as well as feline leukemia the day of surgery. The kittens did not receive prophylactic antibiotics.

Group 2

Group 2 consisted of four domestic shorthair kittens all from the same litter. The date of birth of these kittens was May 26, 1993. There were two females and two males. These kittens ranged in weight from .5kg to .6kg (1.1 pounds to 1.3 pounds). This litter was spayed and castrated on July 28, 1993 making them nine and a half weeks old at the time of surgery. One of the four kittens was given an indoor home and was declawed at the time of spaying. The remaining three were returned to the barn which had previously been their home. All of the kittens had ear mites. All of the kittens were vaccinated against feline viral rhinotracheitis, calicivirus, chlamydia, and panleukopenia at the time of surgery. The indoor kitten was also treated for the ear mites with a topical preparation. The kittens did not receive prophylactic antibiotics.

Group 3

Group 3 consisted of three domestic short hair kittens from one litter. These kittens were born on June 18, 1993. The litter consisted of two females and one male. The weights ranged from .22kg to .4kg (.5 pounds to .88 pounds). These kittens had surgery on August 5, 1993. They were seven weeks old at the time of surgery. All of these kittens were returned to the barn. They were not given any vaccinations. The kittens did not receive prophylactic antibiotics.

Anesthesia

The anesthesia used for all of these kittens was not altered from that which may be...
used on adult cats. This is a combination of ketamine and acepromazine given intramuscularly. The dosage is .1 mL of ketamine per pound of body weight and acepromazine to color. The kittens were not intubated or monitored. Of the kittens, three required halothane by mask during the surgery. Most of the kittens were deeply anesthetized by this combination, and recovery was within a reasonable period of time.

Surgery-females

The surgery performed on the female kittens was an ovariohysterectomy. The surgery was approached the same surgery as for an older cat. A ventral midline incision was made just caudal to the umbilicus. Once the linea alba was visualized, it was tented using forceps and a stab was made through it using a blade. The incision was continued using scissors. Often, upon entrance into the abdomen, a serous fluid was noticed. One uterine horn was found using either the fingers or a spay hook. If this was not successful, the bladder was pushed out of the way or exteriorized to facilitate visualization of the uterus. Quite often loops of bowel had to be fought because of the inability to fast the kittens.

Once a uterine horn was found it was followed cranially to the ovary. The suspensory ligament was broken down so the ovary could be better exposed. Three clamps were used, two on the ovarian pedicle and one just distal to the ovary. A ligature of 2-0 vicryl was placed on the ovarian pedicle just proximal to the most proximal clamp. It was tightened down as the clamp was removed. Often, a second ligature was attempted just distal to the first. The second clamp was left in place and a cut was made between the two remaining clamps but proximal to the ovary. The pedicle was checked for bleeding then returned to the abdominal cavity. The uterine horn was then followed around to the other ovary and the same procedure was done on the second side.

In the last three kittens a slightly different technique was tried. In these three kittens, the ovarian pedicle was clamped with crushing clamps. With the clamps remaining in place, the ovary was removed from the pedicle and the clamps remained until the rest of the uterus was removed. The clamps were then removed just prior to closure, and the ovarian pedicle checked for bleeding. They were found not to be bleeding, so they were replaced back into the abdominal cavity. These kittens had no complications following surgery.

All kittens were then closed using a two layer closure. The body wall was closed in a simple interrupted pattern using 2-0 vicryl. Due to the thin skin of the animals, the subcutaneous tissue could not be closed. Instead the skin was closed with a simple interrupted pattern using vetafil. No kittens chewed out sutures until the healing process was well under way.

Surgery-males

The castration done on the males was also the same done on adult tom cats. The testicles were first located to make sure they had both descended. All kittens had both testicles. The fur on the scrotum was then plucked and the area prepped. A scalpel blade was used to incise through the scrotum over one testicle. The testicle was prolapsed out of the scrotum and a curved hemostat was used to begin a knot to tie off the cord. Once the hemostat was secure, the testicle was removed using the scalpel blade and the knot was finished. The same procedure was used on the other testicle. The closed castration procedure was used and the scrotum was left open to heal by second intention. None of the kittens had any problem with bleeding post surgery.

Results

None of the kittens had any immediate post-surgical complications. All four of the kittens that had front declaws developed infected toes either due to contaminated glue or the early use of fine litter. They were all given lincomycin orally for seven days and had no further problems. Of the first group, none had any problems due to the ovariohysterectomy. In the second group, one of the females in the barn had a few sutures removed too early by the owner. She went on to heal by second intention in that area. The males in this group did well. One female in the third group was discovered in the litter immediately following
surgery and later developed an infected suture line. She was given lincomycin and recovered well. The male in this group had no problems.

Discussion
Anesthesia for these young kittens was uneventfull. Most were found to be in a deep-enough plane of anesthesia with just the ketamine and acepromazine. The few that were not, were easily masked down to a deep-enough plane to perform surgery. The use of halothane routinely, after a premedication dose of ketamine, acepromazine and glycopyrrolate, would be a better selection in the female kittens from the standpoint of the time involved to do the surgery. The ketamine and acepromazine seemed to work well for the shorter castrations.

Tiletamine and zolazepam IM at the dosage of 11 mg/kg has been suggested as the best method of anesthesia in the male kittens. For female kittens, one study found that no combination of IM anesthesia (tiletamine and zolazepam; midazolam and ketamine; atropine, midazolam, ketamine and butorphanol; or atropine, midazolam, ketamine and oxymorphone) alone provided enough anaesthesia. Therefore, it was necessary to use inhalation anesthesia as well as injectable. With this in mind, the best protocol was found to be midazolam at .22 mg/kg and ketamine 11 mg/kg followed by inhalation anesthesia.

None of the kittens were given presurgical antibiotics, and only one had a post-surgical complication due to the ovariectomy. This kitten, once treated with antibiotics, did well. The kittens had no incisional bleeding following ovariectomy. No difference in recovery was noted between the kittens that did not have the ovarian pedicle ligated and those that did. This is important because on an animal that weighs around one pound, the ovarian pedicle is difficult to ligate. Many of these ligatures most likely slip off in a short period of time due to the small size of the pedicle. In retrospect, the use of smaller suture material may have been preferable when dealing with these smaller tissues. Also, if the pedicle does not need to be ligated, the length of surgery could be shortened thereby shortening anestheisa time. One study suggested that the use of stainless steel hemostatic clips may be a better choice in ligation of the ovarian and testicular arteries in these young animals. They may hold better due to the construction of the clip and may be easier and gentler to use on the fragile arteries of these pediatric kittens.

The abdominal wall of all kittens was closed using a simple interrupted pattern of 2-0 vicryl. Due to the thinness of the muscle of these young cats, the entire muscle layer was included in the suture (as opposed to the external rectus sheath). The skin was closed using a simple interrupted pattern of vetafil. A two-layer closure is standard in cats due to their reactivity to suture material. One study suggested that rather than closing the skin, the subcutaneous tissues should be closed. This would prevent the chewing out of sutures by the kittens. Since this was not observed in this particular study, the use of skin sutures ensures that the kitten will return for suture removal and a check-up post surgery.

The biggest obstacle in the actual ovariohysterectomy procedure was the presence of large bowel loops. If a kitten was at all light under anesthesia, she would push loops of bowel out through the incision. These kittens were not fasted. This situation may be improved by fasting the kittens for at least a few hours prior to surgery then checking blood glucose values after surgery to evaluate the kittens' metabolic status. Kittens at this age have very little subcutaneous fat. This makes for easier and faster entrance into the abdominal cavity. Finding the small organs was not any more difficult than finding the uterus in a six month old cat. Visualizing the horns seemed to be the fastest and easiest way to locate and externalize them. Ligating the ovarian arteries was a challenge. In kittens less than twelve weeks of age, it may be possible to crush, rather than ligate, the ovarian artery and get satisfactory results.

The males that were castrated also had no post-operative complications. No unusual or excessive bleeding was noted. None of the males had prophylactic antibiotics, and no infections were noted post operatively. All castrations were done closed and the spermatic cords were tied upon themselves. The scrotum was left open to heal by second intention. The entire surgery was the same length in time that would be expected when doing surgery on an older tom cat.

Removing the fur from the scrotum turned out to be the most challenging part of the castration in these young males. A surgeon with large hands, however, may find difficulty in grasping the testicle to make the scrotal
incision. No problems were encountered with the use of knotting the spermatic cord upon itself. The tissue is fragile, but if worked with carefully it is no more difficult to tie than an adult cat. In fact, on these young cats, the testicles are much easier to remove and break down.

The control kitten was spayed at six months of age. She had ketamine, butorphanol and glycopyrrolate for a premedication and was masked down using halothane. She was then intubated and maintained on halothane.

Upon surgery, she was found to have a large amount of subcutaneous fat. The approach and surgical procedure was similar to the ovariohysterectomies on the other cats. One difference was that 2-0 chromic catgut was used in place of vicryl, and 3-0 nylon was used to close the skin. This kitten had no prophylactic antibiotics and no post-operative complications.

At the time this was written (March, 1994) none of the kittens were yet one year of age. The four indoor kittens appeared to be healthy and growing normally. Two of these kittens, both from group 1, live in the same household. Of these kittens, one is the control. Both of these kittens were overweight as a result of overfeeding and under-exercising. Neither of the other early-spayed kittens were overweight or underweight.

Based on the results of this limited study, the spaying and castrating of kittens seven weeks to eleven weeks of age seems to be realistic. The anesthesia of any animal needs to be a consideration, but if handled properly, anesthesia for pediatric kittens can be done safely. The surgery is only slightly more difficult than on a cat that is six months old. Some procedural changes need to be made, perhaps, because of the size of the organs. Post-operative complications are the same as in older cats, except for the possibility of hypoglycemia. Just as for any surgery, once several are done, the comfort level becomes higher.

Because of the overpopulation problem that exists at this time, real answers need to be sought. The use of early-age spaying/neutering is an acceptable alternative and possible answer. Animals can be neutered before they are adopted from animal shelters. Kittens that are brought in for declaws can be spayed or castrated at the same time. Animals could be neutered at the time of the last set of vaccinations. Along with the early-age spaying/neutering, education of clients is a must. Many will argue that the animal will become fat if neutered early. This can be prevented with use of a strict diet, and needs to be explained to the client. At this point, spaying/neutering animals at six months of age is still an option for the conscientious pet owner. Which is more cruel...early-age spaying/neutering or euthanasia?

References

