Traditional surgical and laparoscopic vasectomy in dogs and cats

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Abstract

Loss of male reproductive hormones is associated with increased risk of several important clinical conditions in dogs and cats and alters normal behaviors. Vasectomy provides sterilization without loss of hormones and is being requested by pet owners with increasing frequency. This review is designed to introduce surgical vasectomy by both traditional and laparoscopic methods.

Keywords: Laparoscopic, vasectomy

Introduction

Sterilization of male dogs by gonadectomy has been considered standard of care in the United States for many years. Proponents argue that loss of reproductive hormones after gonadectomy is advantageous in that several disorders, including benign prostatic hypertrophy, prostatic abscess, perineal hernia, testicular tumors and perianal adenomas are seen with decreased frequency or eliminated. Recently, however, consequences of loss of reproductive hormones have been met with increased scrutiny. Elimination of reproductive hormones is associated with increased risk of several important clinical conditions, including various neoplasia (hemangiosarcoma, osteosarcoma, transitional cell carcinoma of the bladder and urethra, prostate cancer), orthopedic diseases (torn cranial cruciate ligament, hip dysplasia) and cognitive impairment.[1] Gonadectomy predisposes animals to obesity, likely the most important clinical entity seen in small animal practice.[2]

Effect of gonadectomy on behavior of male dogs is debated and somewhat poorly understood. Despite common belief, male dogs do not necessarily behave better after castration. Loss of testosterone is only expected to potentially decrease sexually dimorphic behaviors such as roaming, mounting and urine marking. Aggression may or may not be affected by gonadectomy, and in certain circumstances may actually be increased.[3] Furthermore, dogs that have been castrated tend to be more fearful and sensitive to handling.[4]

Vasectomy provides guaranteed infertility, while maintaining reproductive hormones.

Vasectomy in dogs using traditional surgical procedure

Vasectomy in male dogs is a simple, quick and atraumatic procedure easily performed by general practitioners. In most dogs, spermatic cords can be palpated as they extend from the scrotum towards the inguinal rings and aids in orientation. A 3 - 5 cm prescrotal midline skin incision is made just cranial to the location of a routine castration. Careful dissection in a lateral direction exposes the spermatic cord. If localization is difficult, it is sometimes useful to manipulate the testicle caudally and cranially to tense and relax the cord. Visualization is improved by separating the incision with Gelpi or Weitlaner retractors. Once spermatic cord is identified it is isolated by circumferential passage of a hemostat. A small incision is then made in the vaginal tunic with a tenotomy scissor or performed bluntly with fine hemostats. Extreme care should be taken to avoid any disruption of the pampiniform plexus. Ductus deferens with its associated deferent artery is easily identified as a turgid white structure. Circumferential ligatures are placed 1 - 2 cm apart and a short section of ductus deferens excised between them. Closure of the vaginal tunic is not necessary. Several interrupted absorbable sutures are placed to eliminate dead space, and the subcutaneous tissue closed in a continuous pattern. An intradermal pattern with fine absorbable suture is used to close the skin.

Complications of vasectomy are rare and generally limited to incisional problems similar to routine gonadectomy. Sperm granulomas have been reported histologically, but clinical sequelae of these changes appear extremely rare if the procedure is performed correctly.[5] Interval from vasectomy to azospermia in the dog is variable but is generally reported to be 2 - 4 weeks. Flushing the ductus deferens at the time of surgery may decrease time to azoospermia to ~ 6 days.[6]

Vasectomy in dogs by laparoscopic surgery

General laparoscopic methods have been described in depth and many training courses and laboratories are available.[7] In clinical practice, laparoscopic (as opposed to routine surgical) vasectomy is most commonly indicated when combined with a separate laparoscopic abdominal surgery such as prophylactic gastropexy.

Briefly, the urinary bladder is first emptied by either manual expression or catheterization. Patient is placed in a dorsal slightly head-down (Trendelenburg) position with the optical tower located towards the feet. Abdomen is distended with CO_2 using either a closed (Veress needle) or open (Hasson) method. Intraabdominal pressure between 10 and 13 mm Hg maximizes working space while minimizing detrimental physiologic effects. After distension is obtained, either a single or double port method can be employed.

For the single port method, a specially designed access port allowing passage of up to three separate devices is utilized (SILS Port™, Medtronic, Minneapolis, MN). The port is placed just caudal to the umbilicus. After camera insertion, the ductus deferens is easily identified as it passes towards the inguinal ring on the affected side(s). Unlike after passage through the inguinal ring, the ductus deferens is distinctly separate from other structures of the spermatic cord in this location. A vessel-sealing device (Ligasure Dolphin Tip™, Medtronic) is passed through a second opening in the port and is used to simultaneously cut and seal the structure. If a vessel-sealing device is not available, endoscopic cautery (Valleylab™ Laparoscopic Electrode, Medtronic) can used in a similar fashion. A final option is to place two endoscopic vascular clips (Endo Clip™, Medtronic) and use endoscopic scissors for cutting the ductus. In any of these situations, graspers can be placed through the third port opening to grasp and stabilize the ductus if necessary.

For the double port method standard single access laparoscopic ports are utilized. The camera port is placed just caudal to the umbilicus. After identification of the ductus deferens, a second port (VersaOne™, Medtronic) is placed under direct visualization 4 - 8 cm lateral to the camera port. A vessel sealing device, endoscopic cautery or vascular clips/scissors are then used to transect the ductus, as with the single port method. If additional stabilization of the ductus is necessary, a grasper can be passed through a third port 4 - 8 cm lateral to the camera port on the opposite side.

Vasectomy in cats

Vasectomy likely has limited application in house cats, but may be indicated in certain situations for barn cats, zoo cats and in research settings. Vasectomy may also be useful for management of feral cat populations.

Despite application of substantial resources over prolonged intervals, there is little evidence that current methods of feral cat control are effective at eliminating feral cat populations. Trap neuter release (TNR) is frequently recommended, but often fails because cats have high intrinsic growth rates and it is difficult or impossible to capture all resident cats. TNR programs may increase both adult and kitten survival rates, which further counteracts attempts at population control.[8,9] In addition, immigration of new cats, usually be abandonment is common.[10] Lethal control methods can cause rapid temporary depopulation but have rarely proven effective in the long term, and are unacceptable to a large proportion of people.[11]

Management of feral cat colonies by sterilization with maintenance of reproductive hormones (trap vasectomy hysterectomy release, TVHR) has been predicted by computer simulation to cause more rapid population decline, because normal social behavior is maintained.[12] Vasectomized dominant male cats still compete for females, use up females receptive time, fight off fertile males attempting to copulate and may better prevent immigration of intruding males into the colony. Following copulation with a vasectomized male, fertile females enter a prolonged period of sexual non-receptivity (pseudopregnancy), reducing the chance for fertile breeding. After hysterectomy, females continue to attract males and compete with fertile females for male courting and breeding time. Vasectomy and hysterectomy do not increase survival of either adults or kittens, as with TNR.

Vasectomy in cats is quite simple and can easily be performed by general practitioners without advanced training or major equipment needs. A bilateral inguinal approach has been reported,[13] but the author prefers to perform vasectomy in cats through a small caudal abdominal incision. A 2 - 3 cm skin incision is made such that its caudal extent is about 1 cm cranial to the pubic brim. For vasectomy, it is critical that the urinary bladder is completely empty. Cystocentesis should be performed at surgery if preoperative bladder expression was inadequate. The bladder is retracted caudally, and both ductus deferens are visualized entering the bladder neck. These are bright white structures curving into the bladder neck, and are easily differentiated from the ureters. Both ductus deferens are double ligated with 4-0 absorbable suture material and divided in the middle. Alternately, they can simply by cauterized. Cautery with an inexpensive hand held battery powered instrument is acceptable (Argent™, McKesson, San Francisco, CA). Closure is routine.

Complications after vasectomy in cats are rare, and generally limited to incisional problems typical of any short-duration surgery. Time from performing vasectomy to azospermia in the cat is likely quite a bit longer than in dogs, with reported duration of ~ 49 days.[6]

Conclusion

Traditional surgical and laparoscopic vasectomy are safe, relatively simple procedures in dogs and cats for both clinical and research situations where the goal is guaranteed sterilization with preservation of reproductive hormones.

Conflict of interest

None to declare.

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