

Approaches to sterilization in the dog

There are numerous methods of sterilizing pets and new methods are being introduced regularly. There are pros and cons to each procedure and they should be considered prior to deciding which approach is best for your pet. Each of these will be discussed in this handout. See the handout on 'What is the correct age to spay or neuter my pet' for discussion about this other now controversial topic.

The methods currently available for the bitch are:

- 1) Traditional open ovariohysterectomy
- 2) Laparoscopic assisted ovariohysterectomy
- 3) Open ovariectomy
- 4) Laparoscopic ovariectomy
- 5) Tubal ligation
- 6) Ovary sparing spays
- 7) Chemical contraception

The methods currently available for the stud dog are:

- 1) Castration
- 2) Vasectomy
- 3) Chemical castration

Female procedures:

Traditional open ovariohysterectomy

This has been the standard method of sterilization in the bitch in the United States for over a hundred years. It is taught to every veterinary student as the main method of contraception and in fact may be the only procedure they are taught in veterinary school. It involves a small incision into the abdominal cavity and then tying off or ligating, the blood supply to the uterus and ovaries and removal of both ovaries and all, or most of the uterus. In peripubertal patients, or those spayed in shelters, more of the uterus may be left behind in order to speed up the time of surgery to minimize complications of anesthesia in young or small patients and allow more surgical procedures to be performed daily. In high volume spay clinics, the number of procedures done daily is critical to their success. This technique is typically performed on bitches that have had multiple heat cycle or have been pregnant because there may be disease in the uterus and leaving it behind may result in complications later in life (infections of the uterus or uterine stump, tumors of the uterus).

The risks of this surgery include bleeding from the major blood vessels supplying the uterus and ovaries, abdominal infection, leaving a piece of an ovary behind due to poor visualization because of the small incision, accidental entrapment of part of the urinary tract in the sutures placed around the reproductive tract, anesthetic complications, and excessive cooling, called hypothermia, especially in very young or small patients. The benefits of the surgery, when performed properly, are that it removes all of the reproductive tract, thus stopping heat cycles and preventing pregnancy, as well as reducing the risk of mammary cancer, especially when performed prior to the second heat cycle (see handout on benefits and risks of gonadal steroids).

Laparoscopic ovariohysterectomy

This procedure is the same as the open technique but is done with an endoscope thus providing better visualization and magnification of the blood vessels which reduces the risk of bleeding and death both in surgery and post-operatively. This is particularly important in bitches that are older, those that have had

many heat cycles, those that have been pregnant or in bitches that are overweight because the tissue is more fragile and there is greater risk of bleeding during or after surgery. The incisions are smaller and therefore postoperative pain is less and recovery time is shorter. This technique is typically performed on bitches that have had multiple heat cycle or have been pregnant because there may be disease in the uterus and leaving it behind may result in complications later in life (infections of the uterus or uterine stump, tumors of the uterus).

The risks of this surgery are less than the traditional approach but include infection, anesthetic complications, hypothermia or rarely, inadvertent trauma to other abdominal organs. Laparoscopic surgery is more expensive than the open approach because of the additional equipment and training required but is often felt to be much safer due to improved visualization and magnification of the blood vessels.

Open ovariectomy

This surgery is performed with either a single incision in the middle of the abdomen or 2 smaller incision in either flank. The approach is the surgeon's preference. In this procedure the uterus is left behind and only the ovaries are removed. This is typically recommended for young patients (peripubertal or between 1 and 3 heat cycles).

The benefits of the procedure include shorter surgery time compared to standard ovariohysterectomy and smaller incisions so less pain and shorter recovery times. Risks include hemorrhage from the blood vessels of the ovaries or uterus, seroma formation (fluid accumulation resulting from excess bleeding) at the incision sites especially with flank incisions, the possibility of leaving a piece of ovary in the patient which may result in return to heat, mammary cancer, or uterine infection. Uterine infection may also occur if there is uterine disease at the time of surgery or tumors of the uterus later in life.

Laparoscopic ovariectomy

This procedure is the same as the open technique but is done with an endoscope thus providing better visualization and magnification of the blood vessels which reduces the risk of bleeding and death. The incisions are smaller and therefore postoperative pain is less and recovery time is shorter. It is similarly recommended for young patients (peripubertal or between 1-3 heat cycles). Large and giant breeds may benefit the most from the procedure because of the difficulty of exteriorizing the ovaries with the open approach.

The risks of the procedure include infection, anesthetic complications, hypothermia and rarely, inadvertent injury to other abdominal organs. Since the uterus is left behind, if there is disease already present it may cause problems later on and uterine tumors may still develop. Laparoscopic surgery is more expensive than the open approach because of the additional equipment and training required but is often felt to be much safer due to improved visualization and magnification of the blood vessels.

Tubal ligation

This procedure simply involves suturing or placing metal clips over the fallopian tubes or oviducts. This prevents sperm from getting to the eggs during the fertile period. The bitch cycles normally, bleeds during the heat cycle, attracts males, desires to stray or wander during the heat period, is at increased risk for mammary, ovarian and uterine cancer and may develop ovarian cysts later in life which could cause prolonged heat cycles and estrogen toxicity.

Surgery can be done with either an open or a laparoscopic approach but is more commonly done with an open approach as it can be difficult to ensure the oviducts are fully occluded with a laparoscopic approach.

Risks include infection, anesthetic complications, hypothermia, hemorrhage or pregnancy if the clips or sutures are not placed correctly or they slip.

Ovary sparing spays

This procedure may also be done with an open or laparoscopic technique. In this procedure either one or both ovaries are left in the bitch and the uterus is completely removed to the level of the cervix. It requires a larger incision when done with an open technique so that the entire uterus and cervix can be accessed.

There are numerous risks with this procedure. If the entire uterus and cervix are not removed then there is risk for uterine disease or infection later in life. Since the bitch has a history of uterine removal (hysterectomy) the uterus as a cause of disease is much lower on the veterinarian's diagnostic list sometimes delaying diagnosis and thus delaying early and effective treatment.

There is an increased risk of mammary and ovarian cancer or ovarian cyst resulting in prolonged heat cycle and possible estrogen toxicity. Removal of the affected ovary may be more difficult if there is scar tissue (adhesions) that forms around the ovary. The approach to removing the ovary once it has been detached from the rest of the uterus is more difficult making surgery to remove an ovary with pathology more technically difficult.

The bitch cycles normally, attracts males, desires to stray or wander during the heat period, and if she is bred accidentally, because the vaginal wall may not be as strong as the cervix, vaginal perforation may occur resulting in a life threatening abdominal infection or herniation of abdominal contents through the rupture site.

The major reason for performing this technique is to allow continued exposure to the gonadal steroids. While there may be benefits to this for some time period, eventually, the risk of mammary or ovarian cancer will start to exceed the benefit of the gonadal steroids.

Chemical contraception

Mibolerone, an androgen, and megestrol acetate, a progestogen, have been used for many years to suppress estrus. Both medications have potential side effects. Mibolerone may cause male behaviors (mounting/marking), excessive tearing, a musky odor, greasy seborrhea or dander, vaginitis, enlarged clitoris, and elevation in liver enzymes while taking the medication. It can be given for up to 3 consecutive years followed by a cycle break. Megestrol acetate may cause uterine pathology including pyometra. There are other medications used overseas to suppress estrus but they are not currently available in the US. These types of medications are most commonly used to suppress estrus for a period of time in a bitch that is intended to be bred later or in bitches that have serious health issues that make anesthesia too risky.

Male procedures:

Castration

Castration involves removal of the testicles and all of the tubular tract attached to the testicles. It has been the traditional method of male sterilization in the United States for over a hundred years and is likely the only method taught to veterinary students. Typically, the scrotum is left intact but in older males with pendulous scrotums owners may request scrotal ablation to remove the sac which may be unsightly in a short-coated dog. It removes the hormone testosterone and thus negates any negative effects of this hormone on the prostate as the dog ages. The risks of this surgery include infection, bleeding into the scrotum, and anesthetic complications. It should be noted that prostate cancer is more common in neutered male dogs than in intact dogs, but this type of cancer is quite rare overall.

Vasectomy

This surgery involves removing a section of the vas deferens, the tubular structure that carries sperm from the testicle to urinary tract during ejaculation. It is technically a more difficult surgery than castration. The dog still maintains all male behaviors including marking, aggression, interest in females in heat, and the desire to wander or roam. The dog is also at risk for development of prostatic disease which occurs in most male dogs (90%) by the age of 7 years and for testicular cancer.

Complications include infection, anesthetic complications, re-anastomosis of the vasectomy site and return to fertility, and pain at the vasectomy sites due to granuloma formation.

Chemical castration

There is a chemical called Zeuterin® which can be injected into the testicles that destroys the cells that produce sperm. It is moderately uncomfortable for up to a week after injection and there is a moderate risk of infection. A low level of testosterone remains providing minimal gonadal hormone exposure and some male behaviors. Disease of the prostate may still occur.

Some of the same medications that can be used to suppress estrus in bitches can also be used for dogs however, these medications are not currently available in the US.

This paper describes all possible options for spaying and neutering your pets. Not all these procedures will be offered at every veterinary clinic; so you may need to investigate where you can get the procedure done if you are interested in a specific procedure and your veterinarian doesn't offer it.