SURGICAL TECHNIQUES FOR SPAYING RABBITS AND RATS

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RABBITS

Indications

- Intact females have a high rate of uterine adenocarcinoma , as high as 80% by age 3 years and older
  - Very high incidence of systemic metastasis (mainly lung and liver)
- Intact females are impossible to keep together due to constant fighting
- High reproductive rate
  - Females can conceive within 24 hours post partum

Anatomy

- The vaginal body is very long and more flaccid than in other species.
- The vagina fills with urine during micturition.
- Two cervices (bicornute cervix or cervix duplex) are present as normal anatomy.
- The ovarian vessels are very well developed.
- The bladder receives a branch from the uterine artery.
- The uterine horns and the uterine blood vessels are often encased in large amounts of fat, especially in older females.
- The large intestine, especially the cecum, is in close proximity to the surgery site.

Preparation

- All forms of stress should be avoided prior to surgery
  - House rabbit in a quiet ward
  - Avoid barking dogs
  - Try not to house a ferret directly next to a rabbit
  - Avoid olfactory or direct visual contact between the rabbit patient and prey species
- In older intact rabbits, do perform radiographs and/or an ultrasound exam prior to surgery to check for subclinical uterine neoplasia or metastasis.
- Ideally a CBC and a chemistry panel should be run prior to anesthesia.
- Ensure that the doe is optimally hydrated:
  - Maintenance fluids are approximately 120 mL/kg/day

Procedure

- Generally very similar to a cat spay. Approach by ventral midline incision
- Make a 1- to 2-inch incision between umbilicus and pubis
  - Make incision closer to umbilicus as ovarian ligaments are not ‘stretchable’
- Cervices will be visible immediately in the incision
- Do NOT use spay hooks of any kind
- Avoid manipulation of GI tract at all costs.
- Follow uterine horn cranially to ovary
- Ovary is extremely small in relation to uterine horn, and yellow
  - Left ovary is close to kidney
- Identify ovarian artery and ligate immediately
  - Hemoclips will speed procedure up
- Bluntly dissect along uterine horn
  - Radiocauthery can be used on smaller uterine vessels
- Repeat procedure on other side
- In young animals transection of uterine horn can be made cranial to cervix
  - Will leave cervix behind and may provide an additional barrier against bacterial contamination from vagina
- In older animals remove cervices completely
- Transection is performed in vagina (ovario-vagino-hysterectomy)
  - Reduces the chance of a subclinical uterine cancer in remnant tissue
- Close incision in a three-layer fashion
  - Use an intradermal suture pattern

Follow-up

- Make sure animal is eating, urinating and defecating

Possible Complications

- Intestinal adhesions
  - Fibrin clots
- Ligation of a ureter
- Leakage of urine from vaginal stump
  - If cervix is completely removed
- Uterine cancer in the residual tissue
  - If cervices are not removed

RATS

Indications

- Intact females have a high incidence of mammary cancer (adenoma/adenocarcinoma)
  - As high as 66% by about 2 years of age (21 months)
  - Spayed rats have a significantly lower rate of mammary cancer.
  - If mammary cancer develops it usually has a low incidence of systemic metastasis (eg, lung and liver)
- High reproductive rate
  - Note: Intact female hamsters normally have a vaginal discharge
    - Often mistaken for pyometra

Anatomy

- The ovaries are located caudal to the kidneys in a large fat pad
- The uterine horn wraps around the ovary
- The ovarian vessels are not well developed
- The ovarian ligament is very long and the ovary is easily exteriorized

Preparations
- Evaluate patient thoroughly for subclinical forms of respiratory disease or heart disease in older animals (over 2 years old)
- Ideally a minimal screen (hematocrit, total solids, blood glucose and blood urea nitrogen) should be run prior to anesthesia
- Make sure animal is optimally hydrated
  - Maintenance is approximately 100 mL/kg/day

Procedure
Ventral Approach
- Very similar to cat spay
- Approach by ventral midline incision
- Make a 1-inch incision between umbilicus and pubis
- The cervix will be immediately visible in the incision
- Follow uterine horn cranially to ovary
- Identify vessels in mesovarium and ligate
  - Hemoclips will speed procedure up, otherwise use 5-0 Maxon or PDS
- Bluntly dissect along uterine horn
  - Radiocauthery can be used on smaller uterine vessels
- Repeat procedure on other side
- In all animals transection of uterine horn can be made cranial to cervix
- Will leave cervix behind and may provide an additional barrier against bacterial contamination from vagina
- Close in a two- or three-layer fashion
  - Use an intradermal suture pattern
  - Apply lidocaine to suture site to decrease frequency of self-mutilation

Dorsal Approach
- Developed in lab animal medicine where ovariectomy is a common procedure
- Ovaries and part of the uterine structures can be accessed dorsally
- A dorsal approach offers a number of advantages to the ventral approach
  - Less invasive
  - Less painful
  - Smaller incision
  - Less likely to see postsurgical incision complications due to self-mutilation or contamination with soiled bedding material
- Make a half-inch skin incision on midline, directly over the spinal column, between the last rib and pelvis.
- The skin incision can then be moved to the left or right side about 1 cm lateral to the spinal processes to access the body wall.
- Move the skin incision laterally to one side and bluntly dissect through the body wall.
- A large fat deposit is usually seen when dissecting through the body wall and the ovary sits within this fatty tissue.
- Exteriorize the ovary and the uterine horn and place a hemoclip around the uterine horn prior to excising it.
- The body wall can be closed with a 5-0 Maxon or PDS or can be left open.
- Repeat the procedure on opposite side.
- Close skin with an intradermal suture pattern.

Follow-up
- Make sure animal is eating, urinating, and defecating.
- Recheck suture site frequently.
- Keep separate from other cage mates, as they sometimes ‘groom’ suture out.

Common Complications
- Suture removal by animal
- Inadequate pain management often responsible for self-mutilation

REFERENCES
1. Capello V. Surgical techniques for neutering the female pet rabbit. Exotic DVM. 2005;(7.5):15.
2. Johnson-Delaney C. Ovariohysterectomy in a rat. Exotic DVM. 2002;(4.4):17.