

REPRODUCTIVE SYSTEM 1

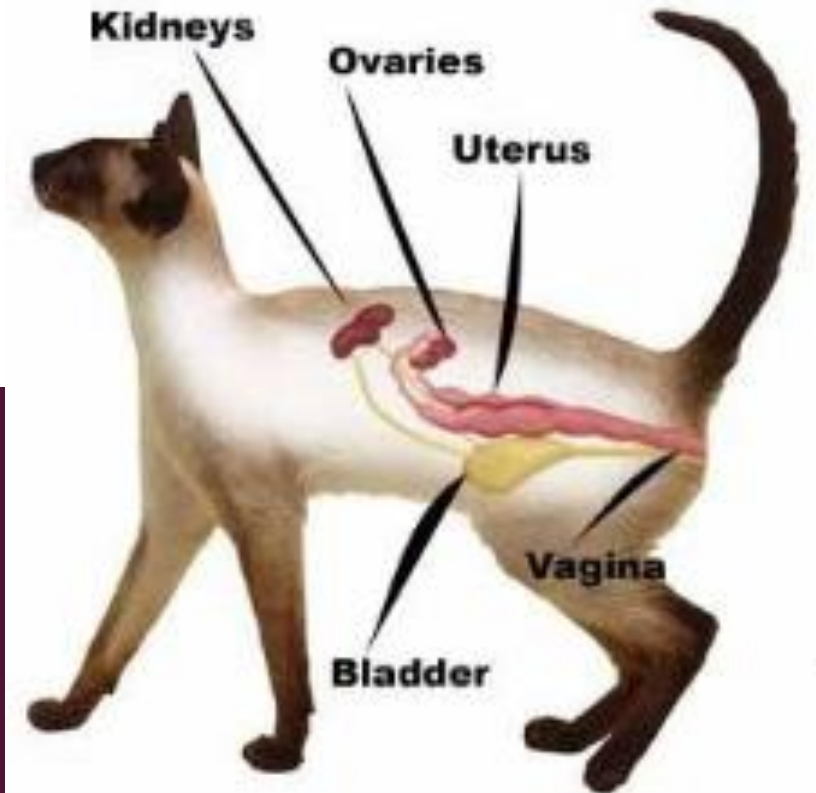
Female Genital System Surgery

REF:

1- Small Animal Surgery, 3rd Edition By FOSUM

CHAPTER 26 Surgery of the Reproductive and Genital Systems PP 702-775

2- Douglas Slatter_text book of_small Animal Surgery volume 2 chapter 98



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Surgical Anatomy

ANATOMY Female Reproductive Tract

- The female reproductive tract includes **the ovaries, oviduct, uterus, vagina, vulva**, in addition to **mammary glands**.
- The ovaries are located within a thin-walled peritoneal sac; the ovarian bursa is located just caudal to the pole of each kidney. The uterine tube or oviduct courses through the wall of the ovarian bursa.
- The right ovary **lies further cranially** than the left.
- The right ovary lies dorsal to the descending duodenum, and the left ovary lies dorsal to the descending colon and lateral to the spleen

Surgical Anatomy

NOTES :

- 1) Each ovary is attached by *the proper ligament* to the uterine horn and **via the *suspensory ligament*** to the transversal fascia medial to the last one or two ribs.
- 2) The ovarian pedicle (mesovarium) includes:
 - the suspensory ligament
 - the **arteriovenous complex** (ovarian artery and vein),
 - and variable amounts of fat and connective tissue.

The importance of the blood supply that influences life-threatening during reproductive system surgery is due to the:

مطلوب فقط بالعملي

➤ The blood supply of the ovaries

- **Ovarian arteries** originate from *the aorta*.
- **The left ovarian vein** drains into the *left renal vein*;
- **The right vein** drains into *the caudal vena cava*.

➤ The blood supply of the uterine

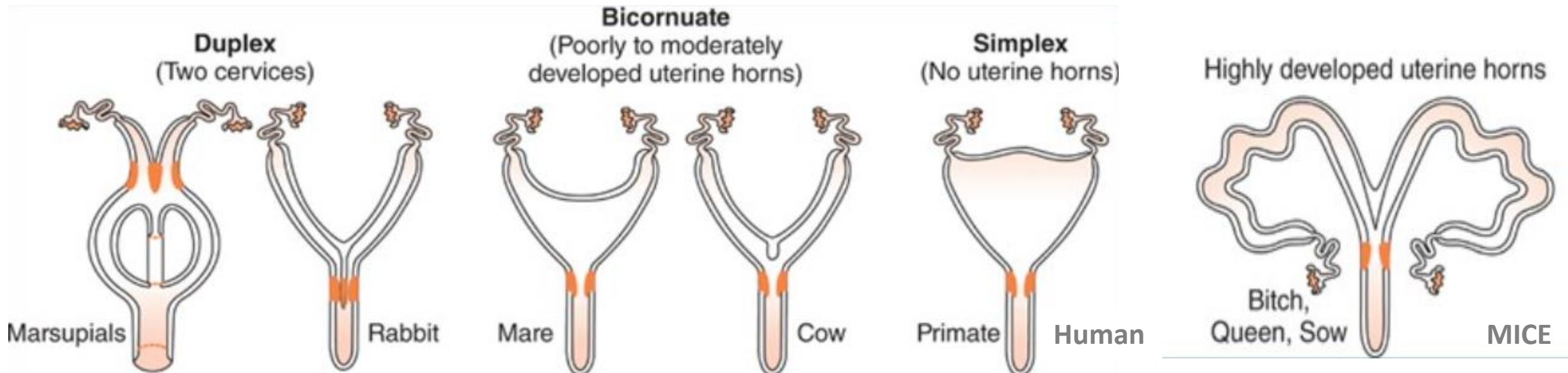
- The **uterine artery** is a branch of the *vaginal artery* and enters the mesometrium at the level of the cervix close to the body of the uterus.
- **Uterine veins** follow the course of arteries. It drains into the *internal iliac vein*

Surgical Anatomy

Types of Uteri :

- **Dublex**
- **Bicornuate**
- **Simplex**
- **Highly developed uterine**

Note: species that normally produce a single offspring (monotocous species) have short horns while species that normally produce a single offspring (polytocous species) have much longer uterine horns



Surgical Anatomy

The vagina

- The vagina in the ***Bicornuate long uterus*** is long and connects with the vaginal vestibule at the urethral entrance. The clitoris is broad, flat, vascular, infiltrated with fat, and lies on the floor of the vestibule near the vulva. The clitoral fossa is a depression on the floor of the vestibule that is sometimes mistaken for the urethral orifice.

Diagnosis of reproductive tract disease

Diagnosis of reproductive tract disease is based on:

- History.
- Clinical signs.
- Physical examination.
- **Diagnostic imaging** (e.g., radiographs, ultrasound, computed tomography [CT], magnetic resonance imaging [MRI], and bone scan).
- Endoscopy.
- Cytology.
- Microbiology
- hormonal assay
- hematology
- serum biochemistry profile
- urinalysis
- and/or other laboratory results.

History and clinical signs

History and clinical signs of animals needing reproductive surgery depend on condition and disease.

- Most animals brought in for elective reproductive surgery (i.e., ovariohysterectomy) **are healthy.**
- Asymptomatic animals with neoplasia may have **a mass found incidentally** by the owner.
- Those with genital tract infections may be **severely ill and have a fever, toxemia, incontinence, and/or obstruction.**

■ **Cytology.**

- The vaginal mucosa undergoes cyclical variation depending on the stage of the estrus cycle and this is of primary value in the canine. By examining the cytology from the vaginal vault, the approximate stage of estrus can be predicted.
 1. During **anestrus** (period of inactivity), the vagina contains large numbers of non-cornified, round to oval epithelial cells with large uniform nuclei. A few neutrophils may be present.
 2. During **proestrus**, large cornifying epithelial cells with shrunken or absent nuclei are present. Neutrophils are rare. Erythrocytes and bacteria may be present.
 3. During **estrus**, large cornified epithelial cells predominate. Many cells will not have nuclei. Erythrocytes are reduced.
 4. During **diestrus**, the smaller non-cornified epithelial cells reappear and neutrophils are dominant. Erythrocytes are rare.

Females genitalia physical examination

Physical examination should include inspection and palpation of the:
abdomen, vulva, and mammary glands.

- ***The abdomen,*** Abdominal palpation may reveal an:
 - a) enlarged uterus,
 - b) mass,
 - c) visceral displacement,
 - d) and/or pain.

Females genitalia physical examination

Very important this and next slides

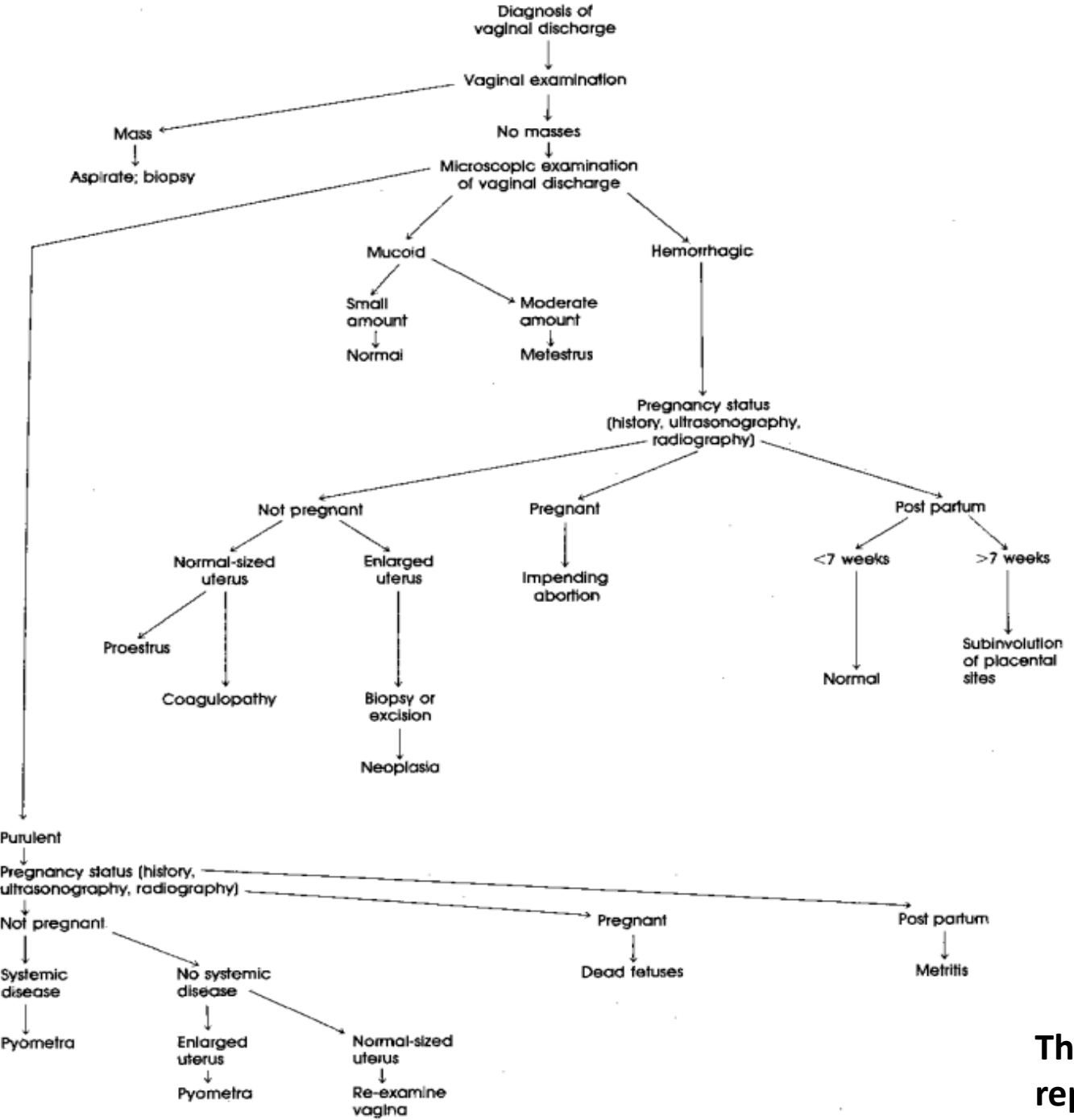
➤ Vulva

- a) Normally, the vulva is swollen to two or three times its normal size during estrus and proestrus. **Attention should be taken** when vaginal discharge or enlargement is evidently more than usual.
- b) The vestibule and vagina should be visualized and digitally palpated. If the vagina is too small to allow vaginal examination, then a rectal examination may allow the clinician to palpate abnormalities otherwise inaccessible during physical examination.



Very important

Very important to read and understand



This summarized all clinical signs of the reproductive surgical condition in small animals

Females genitalia physical examination

- ***Mammary glands:*** mammary glands should be inspected for **symmetry, texture, size, mobility, discharge, and the presence of masses.**

Disease and disorders of the Ovaries and uterus

➤ *Disease of Ovaries*

- **Congenital anomalies of the ovaries**
- **Acquired ovarian disease**
 1. Ovarian cyst : follicular cyst , lutein cyst
 2. Ovarian tumor

➤ *Disease of Uterus*

- **Congenital anomalies of the uterus. (e.g. unicorn uterus)**
- **Acquired uterine disease**
 1. Hydrometra and Mucometra
 2. Pyometra
 3. Metritis
 4. Uterine prolapse
 5. Uterine torsion
 6. Uterine rupture
 7. Uterine neoplasia
 8. Neoplasia
 9. Localized or diffuse cystic endometrial hyperplasia
 10. Dystocia

one horn or entire uterus , happens during prolonged labor or within 48 hours

Metritis

Metritis

- Acute metritis occurs most commonly in immediate postpartum period
- Usually associated with dystocia, obstetrical manipulation, or retained placenta or fetuses.
- after normal whelping
- Follow contaminated artificial insemination.
- it is a secondary infection due to hormonal changes in a female's reproductive tract.

Clinical signs

- The clinical signs appear within few days of parturition include:
 - a) A mal-odorous
 - b) Mucopurulent vaginal discharge
 - c) Signs of systemic illness like fever anorexia and vomiting
 - d) Enlarged uterus may be palpable
 - e) Mastitis may also occur.
 - f) Localized or diffuse cystic endometrial hyperplasia.

Metritis

Diagnosis

- a) clinical signs
- b) Complete blood picture : neutrophilia anemia , increase total protein
- c) Vaginal cytology : vaginal cytological evaluation revealed degenerative neutrophils and bacteria

Treatment :

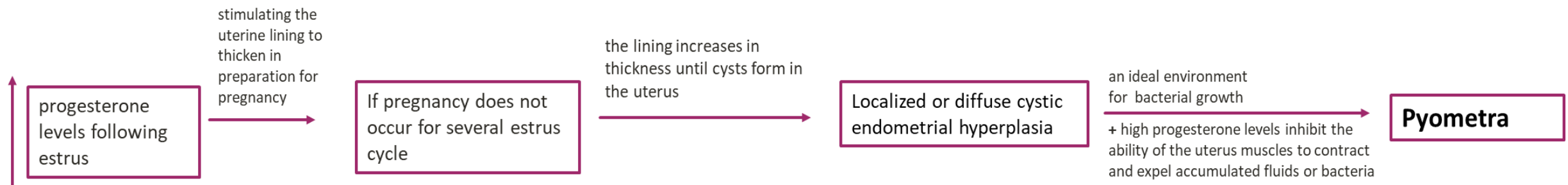
- a) In not-too-sick animals medical treatment can be attempted specially for breeding animal
- b) ovariectomy is the usual treatment
- c) Puppies or kitten should be weaned and hand-feed

PYOMETRA

Very important

Causes and pathogenesis:

- term pyometra described the pus filled uterus
- it is a secondary infection due to hormonal changes in a female's reproductive tract.
- Pathogenesis: Following estrus progesterone levels remain elevated for several weeks, stimulating the uterine lining to thicken in preparation for pregnancy. If pregnancy does not occur for several estrus cycles, the lining increases in thickness until cysts form in the uterus. This condition is called cystic endometrial hyperplasia. The thickened cystic lining secretes fluids, creating an ideal environment where bacteria can grow. Additionally, high progesterone levels inhibit the ability of the muscles in the wall of the uterus to contract and expel accumulated fluids or bacteria.



PYOMETRA

Case history

- the animal that did not submit to mating
- Some medications that are given to the animal as a contraceptive (e.g. Norgestimate citrate orally (Norgestimate is a progesterone used as a contraceptive and to treat acne

Clinical signs

- Lethargy, depression and weakness
- Anorexia
- Increased thirst
- Fever
- Pus draining from the vulva

Uterine prolapse

- Infrequent in dogs and cats
- Primiparous queen and queens and bitches that have had several normal litters without complications may develop uterine prolapse.
- One horn or entire uterus can prolapse during prolonged labour or up to 48 hours after parturition when the cervix is completely dilated
- Possible mechanism include excessive relaxation and stretching of pelvic musculature uterine atony due to metritis , severe tenesmus and post partum contraction intensified by oxytocin released during lactation
- Some times the foetus expelled from the one horn then prolapse and the other horn is still gravid

The clinical signs

- Animal with uterine prolapse has **one or two tubular masses** protruding from the valva
- The uterine may be hemorrhagic, ulcerated, and encrusted with litter hair feces or placental membrane's and tenesmus may continue

Uterine Torsion

Uterine Torsion

Is an uncommon condition in dogs and cats

One or both uterine horns can twist along the axis or round the opposite horn.

Causes:

Suggested causes of uterine torsion include jumping or running late in pregnancy

Clinical signs: *the signs is often acute*

- An abdominal pain
- Cough or strain (the back arch)
- Radiographic examination disclose a large air – of fluid fill tubular structure

Treatment: the treatment of choice is ovariohysterectomy. However, preoperative supportive therapy is necessary because of the massive sequestration of fluid within the uterus

Uterine Rupture

Causes:

- This condition happens during parturition or after severe trauma after accidents,
- The fetus is sometimes expelled into the peritoneal cavity and may die immediately or remain alive until parturition if the blood supply remains contact.
- The uterine rupture due to pyometra treatment during OVH surgery

Clinical signs:

- Abdominal palpation may reveal an extrauterine mass
- Exploratory surgery revealed one or more fetuses within the peritoneal cavity. Adhesions around the fetus . In some instances, the fetus/es can easily be removed by dissection of the adhesion from their attachments. If removal of the fetus/es and fetal membranes is impossible the prognosis is poor.

Treatment:

- a small laceration can be sutured however the treatment of choice is ovariohysterectomy.
- A uterus enlarged from pyometra may rupture during surgery, extensive peritoneal contamination needs copious lavage and careful suctioning during laparotomy minimized contamination an peritonitis contamination and peritonitis

Uterine neoplasia

Causes:

several unknown causes and predisposing factors

Clinical signs:

- Most uterine asymptomatic, the tumor may be found accidentally during OVH or by expletory laparotomy
- Abdominal enlargement or a palpable abdominal mass.
- The mass obstructs the lumen a hydrometra and mucometra may develop.
- Mass on the uterine body may cause dysuria and vaginal discharge.

Treatment: ovariectomy

(FYI) For Your Information

ANTIBIOTICS Perioperative antibiotics are not necessary for elective OHE or castration when use a highly aseptic technique however . Antibiotic choice should be based on culture and susceptibility or on expected pathogens in patients with pyometra, metritis, or bacterial prostatitis. Until culture results are available, antibiotics used to treat pyometra should be efficacious against *Escherichia coli* because this is the most common pathogen. Aminoglycosides are nephrotoxic and should be avoided when possible because of the renal dysfunction seen in pyometra. Choice of prophylactic antibiotics for surgery involving tumors or trauma depends on the patient's condition and surgeon's preference

Preoperative considerations

Antibiotics for Treatment of Reproductive Disorders

Cefazolin (Ancef, Kefzol)

22 mg/kg IV, IM, tid

Cefoxitin (Mefoxin)

30 mg/kg IV, tid

Amoxicillin plus Clavulanate
(Clavamax)

Dogs: 12.5–25 mg/kg PO, bid

Cats: 62.5 mg/cat PO, bid

Ampicillin

22 mg/kg IV, IM, or SC, tid to qid

Erythromycin

10–20 mg/kg PO, bid to tid

Clindamycin (Antirobe)

11–22 mg/kg PO, bid to tid

Doxycycline (Vibramycin)

5 mg/kg PO, bid

Enrofloxacin (Baytril)

7–20 mg/kg PO or IV, qd (given dilute and slowly over 30 minutes if given IV)

Carbenicillin (Geocillin)

*

22–33 mg/kg PO, tid for UTI

22–33 mg/kg IV, tid to qid for systemic infections

IV, Intravenous; IM, intramuscular; tid, three times a day; qid, four times a day; PO, oral;

bid, twice a day; SC, subcutaneous; qd, once a day; UTI, urinary tract infection.

* The only indication for oral carbenicillin is urinary tract infection. If the infection involves soft tissue parenchyma, a different antibiotic should be used

(FYI) For Your Information

Conclusion

- Ovariohysterectomy is the treatment of choice for most uterine diseases including pyometra, uterine torsion, localized or diffuse cystic endometrial hyperplasia, uterine rupture, and uterine neoplasia. Ovariohysterectomy is a routine procedure that is recommended as one means of population control in cats and dogs

Indications for the reproductive system surgery

Very important

why the animal subjected to surgery for the reproductive system

Reproductive surgery includes a variety of surgical techniques that be performed to achieve several purposes:

1. Most animals brought reproductive surgery is elective to alter the animal's ability to reproduce
2. Aid parturition and relieve dystocia
3. Treat or prevent disease of the reproductive organs (e.g., pyometra, metritis, tumors, cysts)
4. Help control certain diseases to help stabilize systemic diseases (e.g., diabetes and epilepsy, some dermatological diseases).
5. Prevent or treat tumors influenced by reproductive hormones (e.g., mammary tumors, and perianal adenomas)
6. Prevent or alter behavioral abnormalities.
7. Reconstruct traumatized, diseased, or malformed tissue.

The most common reproductive system surgeries .

Very important

- ***ovariohysterectomy (OHE)***, surgical removal of the ovaries and uterus.
- ***Hysterotomy*** is a surgical incision into the uterus (*e.g., cesarean section*).
- ***Episiotomy*** is incision of the vulvar orifice to expose the vulva and vagina,
- ***Episioplasty*** is the reconstruction of the vulva.
- ***Mastectomy*** is the excision of one or more mammary glands or mammary tissue.



THANK YOU