



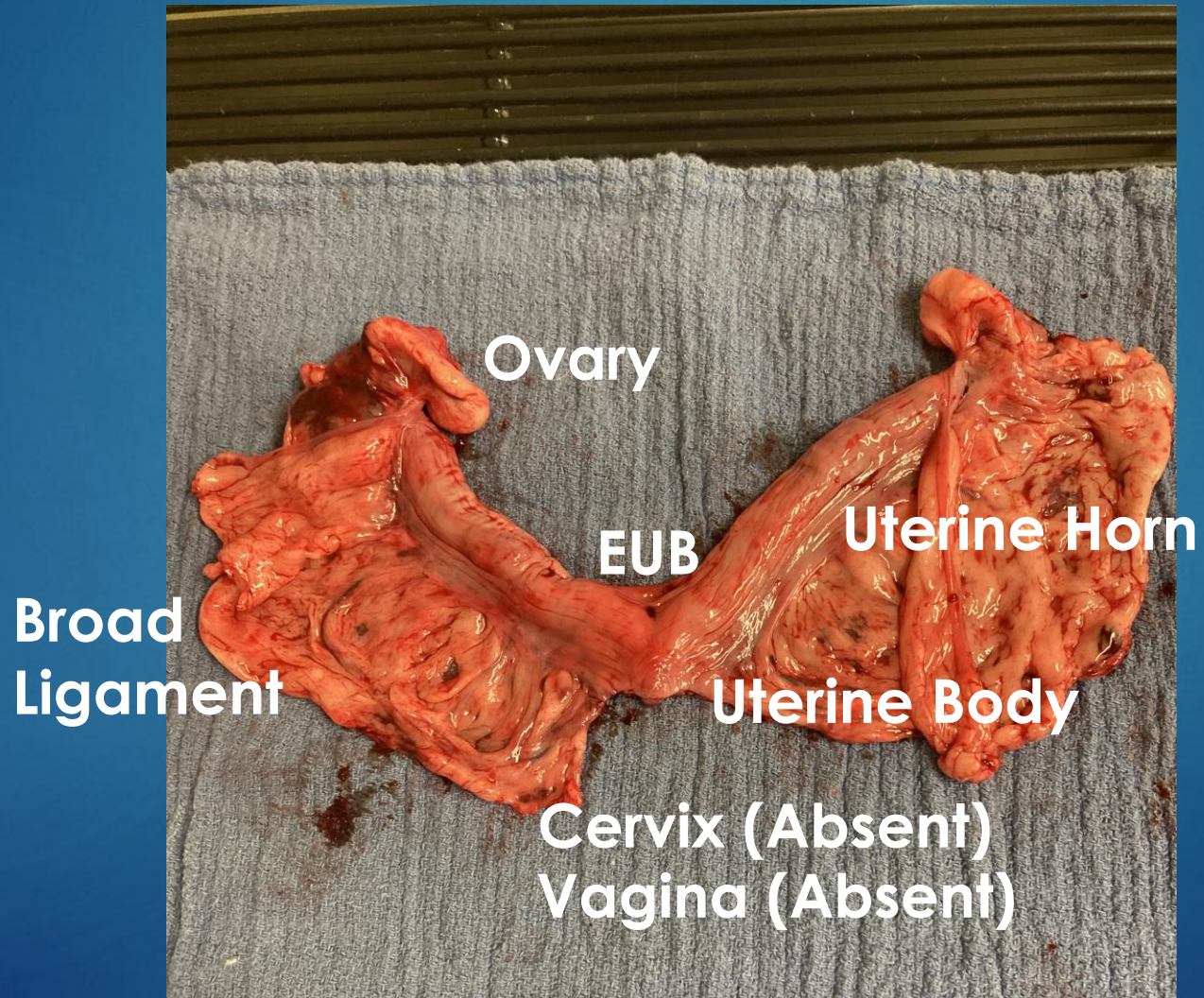
Metritis and Mastitis in the Canine

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Overview of Topic

- ▶ Review of Basic anatomy of associated structures
- ▶ Review of Basic Physiology associated with Parturition/Involution/Lactation
- ▶ Review Pathophysiology of Metritis
- ▶ Review Pathophysiology of Mastitis
- ▶ Review Treatment Options
- ▶ Concluding Overview

Basic Anatomy of Female Canine Tract



EUB
- External Uterine
Bifurcation

Basic Anatomy of Female Canine Tract



Infundibulum



Basic Anatomy of the Mammary System

- Four teats on each side (Bilateral)
- 5-6 Ducts per Teat
- Each duct comes from a canal (canaliculi) that drains from a Lobulo-Alveolar like structures that is rounded in nature and contains the secretory cells necessary to produce “milk”

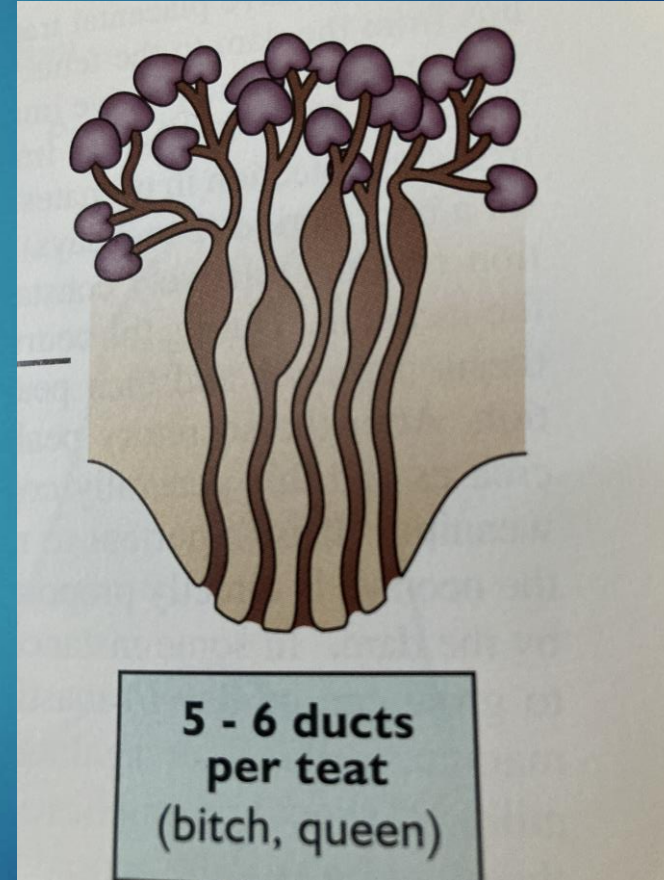


Diagram from Senger, *Pathways to Pregnancy and Parturition*

Basic Physiology of Parturition

- ▶ Purposes of this topic, we will pick up with Parturition at the point of delivery of the fetus
- ▶ The fetus' hypothalamo-pituitary-adrenal axis begins to “cortisol” as a result of reaching the end of its growth space within the mother's uterus
- ▶ This causes two major things in the dam
 - ▶ 1) Removal of the “progesterone block”
 - ▶ 2) Increasing the reproductive tract secretions, particularly in the cervix
- ▶ One of the most important hormones for this discussion is the sudden increase in Estrogen

Estrogen Increases Cause Drastic Changes

Cervix/Vagina

- Cervix and Vagina begin to produce mucus which lubricates the tract for expulsion of the fetus
- This "WASHES OUT" the cervix and vagina before birth

Myometrium Contractions

- Has a "Positive Feedback", coupled with the elevated levels of ProstaglandinF2alpha, cause the uterine muscles to contract in waves and forcefully
 - Failure to do so or a delay in fetal expulsion will create a scenario for "metritis"

Hematologic

- As estrogen levels increase just before birth, it causes a leukocytosis to occur.
- The body of the dam sends enormous amounts of white blood cells to the uterus while birth is occurring

Lochia

- ▶ “Lochia” is normal occurring, blood tinged fluid containing the remnants of fetal placenta and endometrial tissue that comes out after birth.
- ▶ Some owners will mistake this for “pathology” of the uterus and thus will bring the animal into the veterinarian’s office
- ▶ Normal lochia does not have an “odor” present
 - ▶ Owner’s can be asked if the discharge has a “smell” to it or also ask for the color of the discharge
 - ▶ Our general rule is if it smells and is green it needs to be seen!

Contamination during delivery

- ▶ Parturition or birth is usually not performed in a “sterile” environment
- ▶ This leads to the opportunity for bacterial contamination during the event
- ▶ Conditions that predispose the uterus are
 - ▶ Retained fetal membranes
 - ▶ Dystocia
 - ▶ Delay in lochial expulsion brought about by weak muscle contractions

Bacterial Contamination

- ▶ Regardless of the cause, bacterial contamination will
 - ▶ Prolong uterine involution
 - ▶ Prolong the puerperium or period after birth when the reproductive tract returns to its non-pregnant condition so the female can become pregnant again
 - ▶ Delay subsequent pregnancies
- ▶ Remember the increase in Estrogen prior to birth brings white blood cells to the uterus to help phagocytize contaminants. However, despite the reason, contamination can overwhelm the dam's ability to clean out these contaminants.

Metritis

- ▶ Metritis is defined as postpartum infection of the uterus
- ▶ *Escherichia coli* is the most common bacterium isolated from the infected uterus; streptococci, staphylococci, *Proteus* sp, and others are isolated less frequently.

Clinical signs of Metritis

- ▶ Purulent vulvar discharge. (IT SMELLS)
- ▶ Bitches with metritis are usually depressed, with signs of fever, usually >102.5 F, and are lethargic
- ▶ Inappetence is present due to fever and the dam may neglect their offspring.
- ▶ Pups may become restless and cry incessantly.
- ▶ Metritis should be considered in any postpartum animal with signs of systemic illness or an abnormal vaginal discharge.
- ▶ A large, flaccid uterus may be palpable.
- ▶ Radiographs should be taken to determine whether fetuses or placentas are retained. The hemogram may show leukocytosis with a left shift.

Initial Treatment of Metritis

Is dog critical?

- Treatment includes stabilization with IV fluids
- Supportive care
- Antibiotic therapy based on culture and sensitivity testing of the vulvar discharge (if this is available to you)
- Pain/malaise management with Non-Steroidal Anti-Inflammatory Agents

Breeding Desired Again

- Supportive care
- Antibiotic therapy based on culture and sensitivity testing of the vulvar discharge (if this is available to you)
- Pain/malaise management with Non-Steroidal Anti-Inflammatory Agents

No more breeding

- Treatment includes stabilization with IV fluids
- Spay the dog preferably after lactation is done, however, if the dog is sick, go ahead and do OHE
- Antibiotic therapy
- Non-Steroidal Anti-Inflammatory Agents

Anti-Microbial Treatment

*When cultures aren't an option

- ▶ Gram Negative Target

- ▶ E.Coli

- ▶ Enrofloxacin

- ▶ Amoxicillin with Clavulonic Acid

- ▶ Cephalexin?

- ▶ Gram Positive Target

- ▶ Streptococci

- ▶ Staphylococci


- ▶ Penicillin or Amoxicillin has good Gram Positive Spectrum and has good uterine penetration

Case Study: Elizabeth

- ▶ 4 year old, intact female Yorkshire Terrier
- ▶ Weight: 3.6 pounds
- ▶ Presented for lethargy. She had one, dead puppy 48 hours prior to presentation. Owner noted this morning a discharge that made her “gag” and now the dog is not moving and laterally recumbent.
- ▶ Temp was 96.8 F
- ▶ Physical Examination: Dog was laterally recumbent
- ▶ Severely dehydrated (tacky skin turgor, mucous membranes dry)
- ▶ Ddx: septic metritis/peritonitis from perforated uterus/generalized sepsis.
- ▶ Abdomen palpation: “Gas filled uterus”
- ▶ Bloodwork results to follow

Complete Blood Count/Serum Chemistry

IDEXX



ELIZABETH WILLOUGHBY-ARCHIE

PET OWNER: **WILLOUGHBY-ARCHIE**

SPECIES: **Canine**

BREED:

GENDER:

AGE: **5 Years**

PATIENT ID:

Deaton Veterinary Services

5015 ALABAMA HIGHWAY 9 N

Cedar Bluff, Alabama 35959

256-779-3291

ACCOUNT #:

ATTENDING VET:

LAB ID:


ORDER ID:

DATE OF RECEIPT: **11/23/20**

DATE OF RESULT: **11/23/20**

















IDEXX Services: ProCyt Dx Hematology Analyzer, Catalyst One Chemistry Analyzer

Hematology



11/23/20
















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TEST	RESULT	REFERENCE VALUE	
RBC	3.12	5.65 - 8.87 M/μL	L 
Hematocrit	17.1	37.3 - 61.7 %	L 
Hemoglobin	6.8	13.1 - 20.5 g/dL	L 
MCV	54.8	61.6 - 73.5 fL	L 
MCH	21.8	21.2 - 25.9 pg	
MCHC	39.8	32.0 - 37.9 g/dL	H 
RDW	15.1	13.6 - 21.7 %	
% Reticulocyte	0.4	%	
Reticulocytes	13.1	10.0 - 110.0 K/μL	
Reticulocyte Hemoglobin	21.2	22.3 - 29.6 pg	L 
WBC	* 4.68	5.05 - 16.76 K/μL	L 
% Neutrophils	* 9.5	%	
% Lymphocytes	* 14.1	%	
% Monocytes	* 75.6	%	
% Eosinophils	* 0.6	%	
% Basophils	* 0.2	%	
Neutrophils	* 0.44	2.95 - 11.64 K/μL	L 
Bands	* Suspected		
Lymphocytes	* 0.66	1.05 - 5.10 K/μL	L 
Monocytes	* 3.54	0.16 - 1.12 K/μL	H 
Eosinophils	* 0.03	0.06 - 1.23 K/μL	L 
Basophils	* 0.01	0.00 - 0.10 K/μL	
Nucleated RBC	* Suspected		
Platelets	* 167	148 - 484 K/μL	

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TEST	RESULT	REFERENCE VALUE	
Glucose	80	74 - 143 mg/dL	
Creatinine	0.6	0.5 - 1.8 mg/dL	
BUN	108	7 - 27 mg/dL	H 
BUN: Creatinine Ratio	175		
Phosphorus	9.1	2.5 - 6.8 mg/dL	H 
Calcium	7.2	7.9 - 12.0 mg/dL	L 
Total Protein	6.8	5.2 - 8.2 g/dL	
Albumin	2.4	2.3 - 4.0 g/dL	
Globulin	4.4	2.5 - 4.5 g/dL	
Albumin: Globulin Ratio	0.5		
ALT	41	10 - 125 U/L	
ALP	287	23 - 212 U/L	H 
GGT	0	0 - 11 U/L	
Bilirubin - Total	0.6	0.0 - 0.9 mg/dL	
Cholesterol	242	110 - 320 mg/dL	
Amylase	642	500 - 1,500 U/L	
Lipase	472	200 - 1,800 U/L	

Case Management

- ▶ Gave owner POOR prognosis and need for IMMEDIATE surgical intervention or offered euthanasia
- ▶ IV catheter placed and two shock doses of fluid and placed on a twice maintenance drip of lactated Ringer's Solution
- ▶ Taken to surgery for OvarioHysterectomy
- ▶ Given Enrofloxacin and Penicillin Post-Operatively
- ▶ Dog died about 8 hours post op
- ▶ Likely as a complication from Sepsis/Endocarditis? We will never know the exact reason

Mastitis

- ▶ Inflammation/Infection of the mammary system
- ▶ Can be isolated to one mammae or have uni or bilateral mammae involvement
- ▶ Can be seen pre-parturition as the mammary system is developing (galactostasis) but mostly seen during lactation phase.
- ▶ Usually an ascending infection

Lots of “prickly” teeth
nursing the dam



Signs and Treatment

- ▶ Clinical signs are obvious swelling of the affected mammae
- ▶ Fever, lethargy of the animal
- ▶ Usually the mammae is warm or hot to the touch
- ▶ Painful to the touch, will result in mother failing to allow the puppies to nurse
- ▶ Alternating warm and cold compresses, applied in 5 minute time frames three times daily
- ▶ Antimicrobial therapy consistent with what was discussed with metritis.
- ▶ Usually with gram negative infection the breast can become necrotic and eventually bust open and then needs to be treated supportively with topical therapy and lavage.

Example of Gram neg –Necrotizing and ruptured

-Alternating Compresses

- Thorough flushing with cool water with antiseptic such as Betadine or Chlorhexadine
- Honey and Sugar packing every 24 hours
- Systemic anti-inflammatory and pain medication
- Systemic antibiotics





