

GOOD EVIDENCE OF BACTERIAL INFECTIONS

Periodontal Disease

- Infection and inflammation of the periodontium due to plaque bacteria and the host's response to the bacterial insult.
- Stage 1: gingivitis only
- Stage 2: early periodontitis with 25% loss of attachment
- Stage 3: moderate periodontitis with 25-50% loss of attachment
- Stage 4: advanced periodontitis with >50% loss of attachment
- Gingivitis is the inflammation of the gingival in response to plaque antigen; common in dogs and cats.
- Periodontitis is a more severe disease that involves inflammation of the periodontal ligament and alveolar bone leading to loss of attachment.



Gingivitis in Dog



Periodontitis Radiograph in Cat



Periodontitis in Cat



Periodontitis in Dog











Abscesses

- A collection of liquefied tissue, known as pus, encapsulated in the tissues underneath the skin.
- Pus results from the body's defence against foreign material (bacterial infection).
- Abscess can form if bacteria invades the skin.
- It first appears as a painful firm swelling under the skin that eventually becomes softer and less painful and may even form a point.
- Swab test of the infected area to determine the strain of bacteria present.
- Standard blood test to investigate if the infection has migrated to the bloodstream.




Cytology of Discharge and Cavity Fluid

Gram's staining

REAGENT	GRAM-POS.	GRAM-NEG.
NONE <small>(Heat-fixed Cells)</small>		
CRYSTAL VIOLET <small>(20 seconds)</small>		
GRAM'S IODINE <small>(1 minute)</small>		
ETHYL ALCOHOL <small>(10-20 seconds)</small>		
SAFRANIN <small>(20 seconds)</small>		

Colour changes

Under the light microscope



Morphologies


There are 3 basic morphologies

1. Sphere (coccus)
2. Straight rod (bacillus)
3. Spiral or curved rods

Variation of the basic forms; a) cocco-bacillary, b) filamentous, c) branching chains,

Arrangement: i) clusters or bunches, chains, branching rods, bamboo-stick rods, tetrads, sea-gull appearance

Staining morphologies; beaded staining, bamboo-stick, negative staining



- Bacterial culture – multiplication of microorganisms (bacteria) in a predetermined culture media under controlled laboratory conditions.
- Cultures can be used to determine the type, the quantity and antibiotic sensitivity and resistance of microorganisms.

CLINICAL BACTERIOLOGY

Refers to examination and /or processing of clinical specimen for the purpose of isolating and identifying microorganisms contained.

Types of specimen

1. Swabs – usually sterile cotton buds stuck to one end of a piece of wood or disposable plastic, that is rolled onto site or secretions to be tested for the presence or absence of microorganisms. Swabs are normally stuck in transport medium (Ames or Stuart) to preserve microorganisms.
2. Pieces of tissues (Post mortem samples)
3. Milk samples (suspected mastitis cases)
4. Urine samples
5. Blood samples
6. Pus
7. Skin lesions
8. Hair samples (mycology).

General guidelines

1. Specimen should be collected from living or newly dead animals.
2. The edge of the lesion should be sampled since microbial multiplication is most active at this site.
3. Collect specimen as aseptically as possible to prevent suspected pathogens from being overgrown by contaminants.
4. Best to collect samples before treatment.
5. If processing is delayed, store the specimen in the fridge at 4°C.
6. Samples containing suspected unstable bacteria require transport media, e.g. i) *Streptococcus* spp is prone to desiccation, ii) *Typhlorella equigenitalis* samples should be placed in Ames transport containing charcoal.

Transport media

- a) For anaerobes: i) oxygen-free swabs, ii) Modified Cary-Blair medium
- b) Routine specimen; i) Ames transport media with or without charcoal - non-nutritious, buffered with phosphate and provide a reduced environment, due to their formulation with sodium thioglycollate. Organisms in the sample material are protected from drying by moisture in the transport medium. The medium is designed to maintain the viability of organisms during transit to the laboratory. Charcoal prolongs survival of fastidious organisms.
ii) Stuart transport medium – a chemically defined, semisolid, non-nutrient medium which prevent microbial proliferation, but ensures survival of microorganisms present for a sufficiently long period of time. The medium provides an adequate degree of anaerobiosis which can be monitored by means of the redox indicator methylene blue. Calcium chloride along with sodium glycerophosphate act as good buffering agent and also maintains osmotic equilibrium in the medium.



Bacteriuria

Collection of Urine Samples

Sample Collection	Free Catch/ Voided Sample	Urethral Catheterization	Cystocentesis
Effect on the patient	Easiest method for the patient	Some discomfort for the patient	Some discomfort for the patient
Special note	In cats use a clean litter pan with plastic litter and remove the urine either with a syringe or pour into a container.	Common method in male dogs but difficult in females. Sedation of patient. In cats only done with lower urinary tract obstruction and heavy sedation.	Recommended way to obtain urine for laboratory testing. Always palpate and check size of the bladder before sampling.
Preparation	No sterile preparation	Sterile preparation performed on the prepuce and perineal and vaginal areas. Materials used should be sterile.	Sterile preparation of the area.
Method	Urine is collected midstream into a dry clean collection container	The catheter is inserted in the distal end of the urethra and directed to the bladder	Isolate the bladder and insert the needle and withdraw a urine sample
Sterility	Not sterile	Sterile	Most sterile

Dipstick

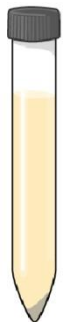
- Chemical analysis of urine
- Small strip of plastic with a series of individual test pads attached
- Each test measures a different chemical component of the urine
- The pads change colour to indicate the amount of that substance in the urine
- Nitrites may be produced by the bacteria present in some infections. The test often shows a false negative so it is considered inaccurate in pets.

Leukocyte esterase	120	Tr	+	++	+++			
Nitrite	60	Pos	Pos					
pH	6.0	5.0	5.5	6.0	6.5	7.0	7.5	8.0
Protein	60	Tr	+	++	+++	++		
Blood	60	Tr	+	++	+++	++		
Specific gravity	45	1.005	1.010	1.015	1.020	1.025	1.030	
Ketones	40	Tr	+	++	+++	++		
Glucose	30	Tr	+	++	+++	++		
Bilirubin	30	+	++	+++				



Sedimentation of urine

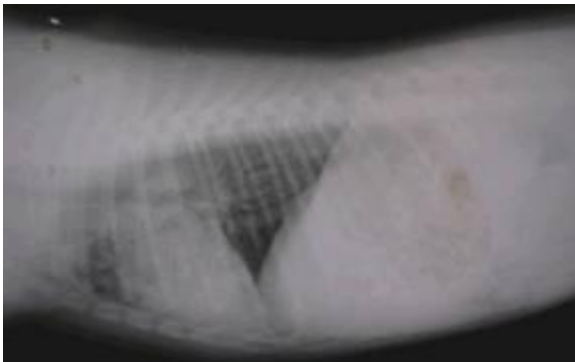
- Bacterial infection is a common cause of inflammation of the bladder and sometimes the kidneys.
- Small amounts of bacteria may be from contamination during the sample. Large amounts may indicate an infection.
- Culture and sensitivity is done to identify the type of bacteria.



Thoracic Radiographs (Pneumonia)



The dark branching of lines represent airways surrounded by lung tissue completely filled with pus and fluid. The branched lines are called air bronchograms and show lung areas that are completely unable to participate in oxygenation/gas exchange.



Notice how the same area of lung looks more mottled rather than solid white. The white areas are locations where the lungs are still full of pus and fluid, while the darker areas contain air.