

ECVP/ESVP Summer School in Veterinary Pathology

Summer School 2014 – Mock Exam

CASE 9 Serosal lining (peritoneum) Nocardiosis

Histologic Description	Points
Style	1
Peritoneum, Serosa (could be pleura and is accepted)	1
Diffuse thickening (1) by granulation tissue (1) and inflammatory infiltrates (1) and ulceration of serosal lining (0,5)	3,5
Multifocal aggregates (0,5) of basophilic (0,5), filamentous (0,5) bacteria (0,5)	1,5
Diffuse inflammation composed by:	0
numerous lymphocytes (0,5) organized in nodular/follicular aggregates (0,5)	1
lesser numbers of plasma cells	1
macrophages	1
degenerated (karyolysis) neutrophils	0,5
non-degenerated neutrophils	0,5
Elevated numbers of neoformed capillaries (interpreted as angiogenesis)	1
Elevated numbers of reactive spindle cells 0,5 (fibroblasts/endothelioblasts 0,5) interpreted as granulation tissue (0,5)	1,5
Diffusely granulation tissue forms papillary structures	0,5
Serosal ulceration	0,5
Plump reactive mesothelial cells	0,5
Hemorrhages	0,5
Fibrin thrombi	0,5
Morphologic Diagnosis severe 0,5, diffuse 0,5, chronic 0,5, pyogranulomatous 0,5, peritonitis 0,5, with intralesional filamentous bacteria 0,5	3
Etiology nocardia sp., actinomyces sp., serratia sp. (1 for any of these) this was a Nocardiosis	1
	20

Serosal lining (peritoneum) Nocardiosis

HD: Infiltrating and expanding the subcutis and panniculus carnosus are multifocal to coalescing nodular aggregates of numerous viable and degenerate neutrophils, moderate numbers of macrophages, fewer lymphocytes, plasma cells, and eosinophils admixed with abundant eosinophilic cellular and karyorrhectic debris (necrosis) and eosinophilic beaded to fibrillar material (fibrin). Similar inflammatory cells are scattered throughout the subcutis, and collagen bundles are loosely separated by clear space with ectatic lymphatics (edema). Occasionally, most often at the periphery of necrotic areas, there are scattered clusters of tangled, faintly eosinophilic, filamentous bacteria that measure 1 um x 8-15 um. Myofibers of the panniculus carnosus are multifocally shrunken and fragmented (necrosis).

MD: Haired skin and subcutis: Panniculitis, nodular, pyogranulomatous, multifocal, moderate, with myofiber necrosis and filamentous bacteria, breed unspecified, canine.



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ED: peritoneal/serosal nocardiosis

E: *Nocardia asteroides*

General Discussion:

- *Nocardia sp.* is a gram-positive, non-motile, aerobic, filamentous rod that is ubiquitous in the soil and water
- Cutaneous nocardiosis is reported most frequently in dogs, cats, horses, and cattle; occurs more commonly in dogs than cats
- Three main species: *N. asteroides*, *N. brasiliensis*, *N. otitidiscaviarum*; *N. asteroides* is the most commonly isolated species in dogs and cats
- In mammals there are 6 basic forms: (1) cutaneous, subcutaneous, or lymphocutaneous; (2) pulmonary; (3) extrapulmonary; (4) systemic; (5) central nervous system; (6) actinomycetoma
- In dogs and cats, Nocardiosis may cause a pyogranulomatous pleuritis, characterized by accumulation of blood stained pus (“tomato soup”) in the thoracic cavity
- Gross lesions of actinomycosis and nocardiosis are usually indistinguishable; microscopically both are characterized by pyogranulomatous dermatitis and panniculitis

Pathogenesis:

- Cutaneous infection is usually secondary to bites, penetrating wounds caused by foreign bodies such as grass awns, quills, and wounds contaminated by licking
- Spreads via direct extension or hematogenous dissemination
- *Nocardia sp.* survive within phagocytic vacuoles of macrophages and neutrophils by inhibiting phagosome-lysosome fusion, neutralizing phagosome acidification, resisting oxidative burst, and altering lysosomal enzymes

Typical Clinical Findings:

- Skin infections with ulcerated nodules and abscesses with draining tracts that occur at wound sites especially on distal limbs and head; can extend into and involve underlying bone
- Pulmonary nocardiosis is characterized by subacute to chronic respiratory infection with mucopurulent oculonasal discharge, dyspnea, diarrhea, and hyperthermia.
- Systemic or disseminated nocardiosis involves lesions in two or more sites within the body; typically associated with pulmonary disease; most frequently involved extrathoracic organs include skin and subcutaneous tissue, kidney, liver, spleen, lymph node, CNS, bone, and joints



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Typical Gross Findings:

- Skin abscesses with draining fistulous tracts
- Lesions of internal organs are numerous, subserosal, discrete to coalescing, raised white nodules that are caseous to purulent on cut surface.
- Lymph nodes are often massively enlarged with a caseous to purulent core.
- Reddish-brown exudate may be present in pleural or peritoneal space.
- *Nocardia* sp. rarely forms granules, which are more suggestive of *Actinomyces*.

Typical Light Microscopic Findings:

- Pyogranulomatous dermatitis and panniculitis
- Bacteria tend to be distributed singly among the neutrophils or within macrophages
- Beaded, branching filaments individually or in tangled aggregates and shorter, coccobacillary forms, ranging from 10-30 um (length) x 0.5-1.0 um (width)
- +/- epidermal acanthosis and ulceration
- Dermis and subcutis contain central accumulations of neutrophils surrounded by a wall of epithelioid macrophages with variable numbers of multinucleated giant cells
- Necrosis may be prominent within the central abscess
- +/- fibrosis