European Veterinary Conference
Voorjaarsdagen

Amsterdam, Netherlands
24 - 26 April, 2008

Next meeting :

April 23-25, 2009 - Amsterdam, Netherlands

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Canine Polyarthritis
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Introduction
The diagnosis of immune-mediated polyarthritis can be challenging but is borne of a clinical suspicion of the disease, exclusion of other causes of polyarthritis, and response to therapy.

Inflammatory arthropathies
Polyarthritis is either infectious or immune-mediated in origin. Clinical signs, radiographic and laboratory abnormalities overlap among the diseases in each etiology. Identification of infectious agents can be difficult and is beyond the scope of this presentation. Exclusion of infectious polyarthritis to the best degree possible is advocated before treating for immune-mediated polyarthritis.

History and Clinical signs
Lameness is the most common clinical complaint, but the history and pattern of clinical signs in patients with polyarthritis may be surprisingly variable. Other common complaints include a reluctance to move, lethargy, and inappetance. Animals may have a stiff or stilted gait; some are reluctant to move their head and neck. Some exhibit an arched or hunched posture.

Physical examination abnormalities can include swelling and pain of involved joints, and pain on palpation or manipulation of the spinal column. Some have no detectable joint pain or joint effusion. Animals that are painful in the thoracolumbar spine may appear painful in the abdomen during abdominal palpation. Fever is extremely common and in the author’s practice, polyarthritis is a common cause of fever of unknown origin or antibiotic-unresponsive fever, particularly in younger animals. Patients should have careful examination of mucous membranes, retinas, and skin for petechial hemorrhages that could signal an underlying multisystemic disease. Auscultation of a new heart murmur may raise suspicion of polyarthritis secondary to endocarditis. Deep palpation of the large muscle groups should be performed to assess myopathies that may present with complaints that overlap with polyarthritis. In juvenile dogs, palpation of the diaphysis and metaphysis of the long bones to rule out panosteitis and hypertrophic osteodystrophy which may mimic the signs of arthropathy. A neurological examination is advised for patients with clinical signs of spinal column pain and fever as meningeal disease may have a clinical presentation that may be hard to distinguish from that of polyarthritis.

Differential diagnoses
Infectious polyarthritis represents the biggest group of differentials for immune-mediated polyarthritis (Table 1). Many immune-mediated diseases can have joint involvement (Table 2).

Diagnostic approach
The diagnosis of immune-mediated polyarthritis requires exclusion of infectious disease. Most patients are candidates for a complete blood count, biochemical profile, and urinalysis to assess for systemic disease. Radiographs of affected joints may suggest alternative causes of lameness (neoplasia, hypertrophic osteopathy) or joint pain and help differentiate non-erosive from erosive arthropathies. The most important diagnostic test is arthrocentesis and joint fluid analysis/examination.

Arthrocentesis is easily accomplished. One needs syringes, needles (22-gauge needles are the author’s preference), microscope slides, and tubes for submission of samples to specialized laboratories. Small clot tubes are suitable for culture and general analysis if performed quickly. EDTA tubes preserve cell morphology and may inhibit bacterial growth, but may be necessary for hemorrhagic aspirates. Sedation or brief anesthesia is given if needed; some patients tolerate the procedure without drugs. Multiple joints (at least 3 different joints representing at least 2 different joint types e.g. metacarpal and tibiotarsal) are aspirated even without obvious evidence of joint pain or effusion. Normal joint fluid is colorless or occasionally pale yellow, viscous, and should form a string if touched by a fingertip. An orange tint to the fluid (xanthochromia) suggests old hemorrhage.

<table>
<thead>
<tr>
<th>Table 1. Infectious causes of polyarthritis</th>
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<tbody>
<tr>
<td><strong>Bacterial</strong></td>
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<tr>
<td>Mycoplasma</td>
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<tr>
<td>Rickettsia (Rickettsia rickettsii, Ehrlichial sp.)</td>
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<tr>
<td>E. coli</td>
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<tr>
<td>Streptococcus</td>
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<tr>
<td>Pasteurella</td>
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<tr>
<td>Borrelia burgdorferi</td>
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<td>L-form</td>
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<tr>
<td>Bartonella?</td>
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<tr>
<td>Protozoal</td>
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<tr>
<td>Leishmania</td>
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<tr>
<td>Viral</td>
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<tr>
<td>Calicivirus (cats)</td>
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**Table 1. Infectious causes of polyarthritis**
The author considers the cytological examination the most important and informative aspect of joint fluid analysis. Thus, a drop of joint fluid for smear on a glass slide is the first allocation of joint fluid, and if all one has is a drop of fluid, it is used to make a smear for cytology. Normal joint fluid contains predominantly lymphocytes and macrophages; neutrophils are fewer than 10% of cells. Patients with polyarthritis have an increase in neutrophils, which are often the predominant cell type, in their joint fluid. Neutrophils in inflamed joints commonly have a “non-degenerate” appearance and neutrophil morphology is not reliable for distinguishing infectious from non-infectious etiologies. Grossly normal joint fluid may have abnormal cellular characteristics so any joint fluid obtained is examined cytologically.

Other tests that can be performed include a mucin clot test, total nucleated cell counts, total protein and microbial culture and sensitivity testing. Normal joint fluid should have a good mucin clot (results are commonly reported as good, fair, poor and very poor), and a small total cell count. Total protein concentrations should be less than 2.5 g/dl.

Negative results of microbial culture and sensitivity do not exclude infectious arthritis. Questionable reliability of joint fluid cultures makes empiric antibiotic treatment appropriate for some patients. Antibiotic selection can be guided by history, physical examination and laboratory data as these may point the clinician toward bacterial or rickettsial arthritis. Tetracyclines are excellent empirical choices given their broad antimicrobial spectrum. Response to therapy should be prompt (48-72 hours).

Non-erosive
- Idiopathic
  - Type I: uncomplicated
  - Type II: associated with infection remote from joints
  - Type III: enteropathic
  - Type IV: associated with tumors remote from joints
- Systemic lupus erythematosus
- Polyarthritis-meningitis syndrome
- Polyarthritis-myositis syndrome
- Polyarthritis of Akitas
- Shar-pei fever

Erosive
- Rheumatoid arthritis
- Polyarthritis of Greyhounds
- Periosteal proliferative polyarthritis

Miscellaneous
- Drug-associated
- Post-vaccinal
- lymphocytic plasmacytic synovitis

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<th>Table 2. Causes of immune-mediated polyarthritis</th>
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<tbody>
<tr>
<td>Non-erosive</td>
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<tr>
<td>Erosive</td>
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<td>Miscellaneous</td>
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Table 3. Immune suppressive therapy for immune-mediated polyarthritis

Immune-mediated arthritis
Though type I idiopathic arthritis is the most common form seen at the WSU-VTH, additional diagnostic testing is recommended for patients with idiopathic polyarthritis. Abdominal ultrasound or radiographs, and thoracic radiographs (three views) may reveal organomegaly, lymphadenomegaly or other lesions that suggest occult neoplasia or inflammation. Aspiration cytology or needle biopsy, with ultrasound guidance as needed, can be safely accomplished in most patients.

Treatment
Treatment of immune-mediated polyarthritis requires immunosuppressive therapy; administration of analgesics benefits some patients. Treatment of underlying disease is important, but immunosuppression if often needed to relieve the discomfort of joint inflammation. The goal of treatment is control of clinical signs with the least amount of drugs.

Important principles in the treatment of immune-mediated joint disease are 1) use proper dosages, and 2) do not taper too quickly. Clinical relapses are more likely to occur if prednisone is tapered too quickly. The author prefers to start azathioprine with prednisone. Cases refractory to treatment with prednisone and azathioprine are candidates for cyclosporine or cyclophosphamide. Treatment efficacy will be seen in resolution of clinical signs and decreased numbers of neutrophils in joint fluid.

Non-erosive
- Prednisone: 1-2 mg/kg PO q12h
- Azathioprine: 1-2 mg/kg PO q24h for 10-14 days, then q48h
- Cyclosporine: 3-5 mg/kg PO q12h
- Cyclophosphamide 50 mg/m² PO q24h for 4 days weekly; monitor neutrophil count
- Gold salts
  - Monitor for cytopenias, liver enzyme increases (ALT>AP), hyperbilirubinemia; not recommended in cats.