A Practical Approach to Polyarthropathies

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Polyarthropathies are a diagnostic challenge in practice. Once it has been determined that an animal is suffering from inflammatory joint disease, it is necessary to determine whether the disease is caused by infectious agents or is a result of an idiopathic immune mediated disease. Often the underlying cause of immune mediated arthritis remains undetermined. If an infection is present it isn't necessary for the causative organism to be present in the joint itself. However, antigen antibody immune complex formation can occur with deposition in the joint. This then induces inflammation. When dealing with a case of polyarthritis, every effort to eliminate infectious disease as the underlying etiology should be made since the treatment of inflammatory arthropathies involves the use of immunosuppressive drugs. This could be disastrous if an infectious disease was present.

Diagnostic workup

A good history is a valuable source of important information. The possibility of tick contact (vector for disease) as well as the recent administration of vaccinations the use of medications has to be determined. Vaccination and drug administration have been associated with the development of inflammatory arthropathies, though infrequently. Heartworm status also needs to be determined, since this is a systemic infestation that results in a strong immune mediated response in some animals.

As with all diseases, a good physical examination is vital. Palpation and manipulation of all joints should be performed to determine which are affected. Polyarthropathies tend to more commonly involve the small joints such as the carpal and tarsal joints. When palpating the joints, special attention should be paid for the presence of swelling, warmth or pitting edema. In addition, every attempt should be made to localize potential sources of chronic infection or inflammation (i.e. prostate, uterus, abscesses). The heart and lungs need to be carefully ausculted. Chronic lung infections or endocarditis are a potential source of infection or antigen antibody complexes. The spinal column should be carefully palpated for the presence of pain that might be suggestive of discospondylitis. It recently has also been demonstrated that many dogs with polyarthropathies have concurrent meningitis which could also contribute to spinal pain. An ocular exam is also to be recommended, granuloma formation can be seen with fungal disease (especially blastomycosis) or uveitis can be a part of a generalized immune-mediated process.

Laboratory diagnosis

Since systemic disease can be the underlying stimulus for the development of a non-erosive polyarthropathy, a CBC, chemistry screen and urinalysis are indicated. Toxic changes in the neutrophils might be indicative of infection. Anemias or thrombocytopenias might be associated with the presence of immune mediated disease. A chemistry screen might reveal potential dysfunction in other organs. Since many polyarthropathies are immune mediated, the presence of proteinuria with a benign sediment could be significant and be indicative of the presence of concurrent glomerulonephritis. If proteinuria is present, this can be quantified with a urine protein to urine creatinine ratio. In addition, urinary tract infection might be found. In certain cases blood or urine culture may also be indicated.

The most important diagnostic test is arthrocentesis. Arthrocentesis allows the taking of a sample for both cytological and microbiological evaluation. Joints that are easy to tap include the carpus and tarsus, elbow and stifle. Synovial fluid analysis should be consistent with inflammatory joint disease before initiating therapy. This means that nucleated cell count should be elevated, generally with greater than 5,000 nucleated cells per milliliter. Usually there is also a shift from a strictly mononuclear population to a more neutrophilic cell population. Other signs of inflammatory joint disease include decreased viscosity and increased turbidity. Wright stain or with Gram stain can be used to identify infectious organisms. If indicated, aerobic, anaerobic and *Mycoplasma* culture should be obtained. Occasionally, synovial membrane biopsies can be taken if the diagnosis is uncertain, though this is rarely necessary. Synovial membrane can be a good sample for culture and sensitivity examination as well as histopathologic examination, it does however involve an arthrotomy.

Radiography can also be of value, though usually quite limited. Generally, early changes with most joint diseases will be nonspecific if present. Chronic and long-term cases of bacterial arthritis may eventually cause changes consistent with erosive arthritis. These signs consist of destruction of articular cartilage and subchondral bone with an irregular joint space, bone erosions, periosteal new bone, osteosclerosis and osteophyte production.

Serologic testing may be indicated if appropriate physical examination or historical information are present. These include titers for rickettsial and fungal organisms. Heartworm status of the dog should also be established since heartworm infection can lead to chronic immune stimulation. In cats, testing for feline leukemia virus and FIV is of great interest.

Specific etiologies

Rickettsial arthritis

Polyarthritis has often been associated with the presence of rickettsial organisms. Presentation of these dogs generally is that of a febrile and lame dog. The neutrophilic strains of *Ehrlichia* that are most commonly associated with polyarthris though *Ehrlichia canis* can also cause this. *Ehrlichia ewingii* and *Anaplasma phagocytophilum* represent granulocytic strains. It would be wrong to assume that we know all the ehrlichial organisms that can cause joint disease, more and more are being discovered with advanced genetic testing techniques. The drug of choice for rickettsial organisms is a tetracycline antibiotic, whereby I prefer doxycycline at 5 mg/kg BID for 10 to 14 days. A cure seems less likely based upon current research, however clinical improvement is seen. Whenever using doxycycline be sure to follow the pill with food or water, esophageal strictures have developed in animals that have been given doxycyline.

Bacterial l-forms

These organisms represent cell wall deficient bacteria. Antibiotic therapy and host immune response can cause this change. Repeated passages in special culture medium may allow reversion to the original form. They have been implicated in cats as pathogens, are however rare. Abscesses, fever, anorexia and inflammatory joint disease can occur. These organisms also respond to therapy with tetracyclines.

Mycoplasmal arthritis

Mycoplasma spp. have been implicated as the cause of joint disease in many species. They can be part of the normal flora as well. In both cats and dogs it has been suspected that they can cause joint disease. Our understanding of this is limited. The organisms should be responsive to tetracyclines.

Fungal arthritis

Polyarthritis associated with fungal disease is almost always immune mediated phenonema. Rarely the organisms can gain entrance to the joint in the process of hematogenous dissemination. Osteomyelitis is commonly present with certain systemic fungal infections and the joint can be invaded by direct extension from these lesions. Radiography is especially valuable in this case as the lesions present would be highly aggressive. Cryptococcus, Blastomyces and Coccidioides have been reported to have joint involvement.

Viral arthritis

Calicivirus, both infection and vaccination, has been associated with polyarthropathies in cats. This can be seen after vaccination as well, usually within in a few days after infection or vaccination. Disease is self-limiting.

Lyme disease

Borrelia burgdorferi has been associated with joint manifestations in humans. Experimentally infected dogs have shown signs of a neutrophilic inflammatory polyarthropathy. Signs of infection decreased in severity the older the dogs at age of initial infection. Antibody titer levels are of little use since they merely reflect exposure. The C6 antigen test is indicative of natural exposure. In endemic areas a large percentage of animals will be positive. Previous “diagnostic” criteria employed have been a positive test, suggestive signs of Lyme disease and response to antibiotic (often tetracycline or chloramphenicol) therapy. However many other organisms (rickettsial, mycoplasma, L-forms) already identified would have a similar course. As a result though Borrelia may cause disease the diagnosis is at best one of suspicion.

Take home message

A thorough physical exam is vital. As much as possible a complete database should be gathered to try to find the underlying etiology. The main causes of joint disease will be responsive to tetracyclines so that trial therapy with this type of antibiotic should be a part of the “work up” of joint disease. The other main differential is true idiopathic immune-mediated disease. The thoroughness of the work-up done will be the factor that minimizes the chances of immune suppression having negative consequences because of an underlying infectious disease.

References

Available upon request