An Overview of Osteomyelitis: Part II

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This is the second of a two part series of articles examining orthopedic infections. Part I examined the possible sources of contamination to bone as well as the pathophysiology involved in establishment of overt orthopedic infection. In Part II below, clinical osteomyelitis from the above concept until its clinical resolution will be discussed.

Clinical Osteomyelitis

Osteomyelitis as a clinical condition is in many ways similar to infection involving body tissues other than bone, i.e. an episode of overt infection has a significant chance of becoming a chronic situation unless it is properly addressed. Indeed, even with what is considered adequate treatment, a full one-fourth of acute cases develop into chronic ones.

Acute hematogenous osteomyelitis generally occurs in patients less than six months old.[1,3] A history of significant trauma is quite variable in these cases, but a sudden onset of lameness is typically noted by the owner. Fever, malaise and local pain at the infection site are often seen and a mild leukocytosis is common.[1,3]

Signs of inflammation, anorexia, lameness and production of purulent exudate are typically seen in cases of acute orthopedic infection from contamination via exogenous sources. The pus that is produced may be localized into an abscess or drained to the outside of the affected bone via a dehiscence. As with other wound infections, osteomyelitis via exogenous contamination usually will be seen in the first 2-3 weeks after the inciting event (e.e. initial trauma or, more likely, surgical repair of a fracture) and often within 4-5 days of same.[1,3]

A diagnosis of chronic osteomyelitis is made in long standing (up to years in duration) orthopedic infection whose acute infection stage may or may not have been appreciated. The cardinal signs of chronic osteomyelitis are lameness, pain and draining sinus tracts.[1,3]

Typical radiographic changes seen in cases of osteomyelitis reveal orthopedic lysis combined with periosteal new bone formation and evidence of sequestra without involucra. Such changes are often not seen for 14 days to a few weeks as bone is radiographically somewhat slow to respond to its contaminating insult.[1,3] Radiographic changes such as swelling of associated soft tissues may be noted earlier than the corresponding bony alterations. It is somewhat difficult to radiographically differentiate between orthopedic infection and the body's normal reaction to trauma and instability. Typically, though, the radiographic signs of instability of either a bone or associated orthopedic implant will be well outlined and limited by the extent of free motion allowed. Technetium bone scans are a new radiographic tool that may be helpful in finding small osteomyelitis lesions as well as locating foci of same within the first few days of appearance of clinical symptoms.

Nature of Bacterial Osteomyelitis

It is well known that the single most often isolated agent recovered from patients suffering from osteomyelitis is a B-lactamase resistant *Staphylococcus*[2] Sound choices of antibiotic treatment in such cases must be made with this fact in mind. The ideal antibiotic would have known efficacy against the above organism, be bactericidal, be available for parenteral use, have minimal side effects and be cost effective. Such medications are the B-lactamase resistant penicillins, first generation cephalosporins, clindamycin and quinolones.

Treatment of Osteomyelitis

Successful treatment of this condition relies on cognisance of the critical points made in Part I of this article regarding the pathogenesis of overt orthopedic infection: i.e. the problem of osteomyelitis is not so much a function of the initial infection of bone as it is a reflection of the fact that

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the infected bone often becomes surrounded and buried by a mass of dense fibrous connective tissue that is itself very poorly vascularized.[1,3] Due to this important fact, both medical and surgical therapy are often needed in its treatment.

Acute osteomyelitis cases may respond to antibiotics if they are instituted early in the progression of the disease and follow the principles of antibiotic therapy noted above. Deep bacterial (and fungal, if indicated) cultures should be obtained, and sensitivities performed. Surgical intervention is required in any case where purulent exudate is present or where no clinical improvement is noted within approximately 72 hours of initiation of antibiotic therapy.[1,3] At surgery, the bone and surrounding soft tissues should be completely debrided and the medullary canals decompressed to allow for further drainage. Additional bone biopsies and cultures should be taken at this time and any necessary fracture restabilization performed. The wound is treated as any other tissue would be in the face of significant infection, i.e. closure is delayed unless the approach site will heal without further interruption.[1,3] Appropriate antibiotics are administered for 30-60 days and regular radiographic and clinical evaluations are performed.

Many of the same principles used in cases of acute osteomyelitis surgery are also followed in situations of the chronic disease. However, in such long standing cases it is especially critical to systematically evaluate the patient as a whole and address conditions such as anemia and hypoproteinemia which may be a reflection of a lengthy debilitation.[1,3] Evaluation of the extent of the orthopedic and soft tissue lesions is such patients may be obtained via flat films and fistulagrams. Injection of methylene blue into draining tracts on day prior to surgery will also help outline diseased tissue as this dye is cleared by healthy cells while being retained by necrotic or otherwise poorly vascular tissue.[3]

Surgical treatment utilized in the chronic osteomyelitis patient involves complete debridement of necrotic and scarred bony and soft tissues.[1,3] Dead space and hematomas are eliminated and the fracture is evaluated for stability. All loose implants must be removed. If restabilization is necessary, a means other than intramedullary pins is preferred as such implants may spread infection throughout the bony canal.[1,3] Closure is often based on surgeon preference; techniques such as primary closure, closure over infusion and suction drains and delayed secondary closure are all employed. Antibiotics should be continued for at least 1-2 months and clinical and radiographic evaluation performed at regular intervals. All implants should be removed once the fracture has healed. At that time, culture and sensitivity tests should be repeated and antibiotic use is then dictated by results of same.[1]

If evidence of bony infection manifests itself at any point after successful treatment of osteomyelitis, then the entire treatment approach must begin anew.

References

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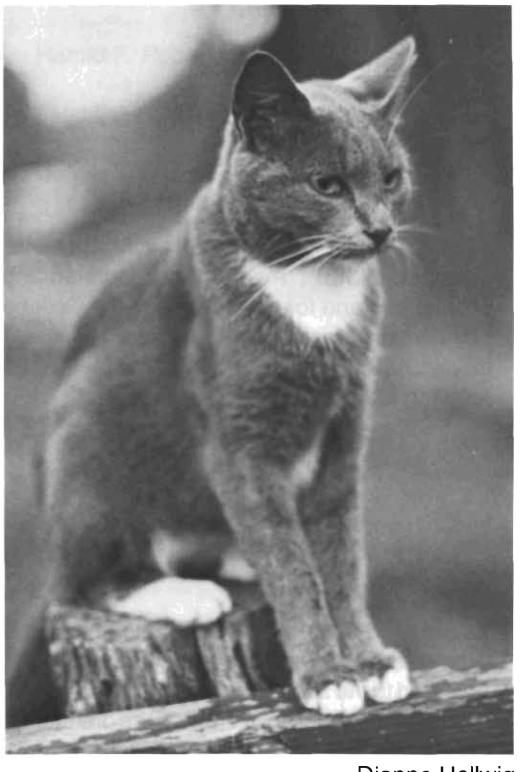

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