Instructive Case

Monoarticular Knee Joint Inflammation in a Newborn

Marla G. Balao-Litam, MD*

We have a fullterm baby girl, presenting with joint inflammation one day after hospital discharge where she was treated with intravenous antibiotics for sepsis neonatorum with necrotizing enterocolitis. Patient had no central lines nor history of trauma to the affected area. Joint tenderness and limitation of movement were prominent physical findings. Differential diagnoses include malignancies, rheumatoid arthritis, reactive arthritis, osteomyelitis and septic arthritis. Leukemia was unlikely because of normal abdominal findings and a normal WBC and different count. Rheumatoid arthritis was not highly considered because of the large joint and monoarticular involvement, not to mention the very young age of the patient. Rheumatoid arthritis usually is multiarticular, involves the fingers and joints and rarely starts in the knee. Reactive arthritis usually occurs in patients with previous abdominal infection like shigella and salmonella but the arthritis improves in 7-10 days even without antibiotics.

Osteomyelitis cannot also be ruled out at this point due to the unique blood vessel anatomy of neonates at the level of the joints. Trans-epiphyseal or penetrating vessels persist up to 12 months of age. Hence below 1 year of life osteomyelitis and joint infection can co-exist. Inspite of the absence of fever, septic arthritis is the primary diagnosis. Due to the rapid and destructive course of this disease, even the shortest history of joint pain and inflammation and irritability and/or failure to feed in neonates or pain and fever in older children should make septic arthritis a primary consideration unless proven otherwise. Essential examination for diagnoses and monitoring of treatment include joint fluid aspiration, radiographs and ESR. Arthrocentesis was done on the right knee and 0.5 cc of purulent material was aspirated. Gram stain showed 20-40 pmn but no organisms. Knee fluid aspirate also showed a low sugar value at 0.45 mmol/L and high protein at 18 grams/L. All these point to a bacterial etiology of the arthritis despite the absence of fever. Unfortunately, there was no growth on culture. A positive result on diagnostic needle aspiration is important to distinguish infectious arthritis from other non-infectious causes. To avert any clotted specimen which may be labeled unfit for examination, a heparinized syringe may be used. The main purpose of x-ray is to rule out pre-existing lesions. The capsular articulations of the hips and shoulders are fixed and when these joints are involved, it would be even harder to tell where the joint infection ends and the osteomyelitis begins because the inflammatory process of osteomyelitis and septic arthritis can occupy both sides of the growth plate leading to ischemia, necrosis and permanent damage.

In neonates, the etiology remains to be *S. aureus*, *Group B streptococcus* and coliform bacteria.[5] Infection usually is blood borne although direct inoculation can also be a mode of infection. Predisposing factors are invasive procedures, ventilatory therapy, prematurity and respiratory distress syndrome.[1] The mainstay of therapy consists of administration of antimicrobials. Our patient was started initially on Oxacillin (200 mkd) and Ceftazidime (100 mkd) to cover for *S. aureus* and gram negative enteric bacteria which are the prevailing nosocomial isolates in our neonatal intensive care unit. Unfortunately the organism isolated from the patients blood was *Staph. epidermidis* sensitive to chloramphenicol, clindamycin and sulfatrimethoprim-sulfasoxazole. It was resistant to oxacillin. MIC was 32 mcg/ml (sensitivity value was ≤0.25 mcg/ml) while MIC of vancomycin was 1.5 mcg/ml (sensitivity value was ≤4 mcg/ml). Antibiotics were shifted to monotherapy with vancomycin. After 4-5 days of antimicrobial therapy, decrease in the joint swelling was noted and was documented on repeat x-ray. Intra-articular injections of antibiotics are unnecessary because most drugs penetrate the inflamed synovium . The erythrocyte sedimentation rate (ESR) was also decreased from baseline. ESR monitored weekly is a valuable indicator for response to therapy in septic arthritis and osteomyelitis. Parental antibiotics maybe shifted to oral after 1 week and stopped as soon as ESR values normalize.[1] Due to financial constraints Oral clindamycin (30mkd) was started after 5 days of intravenous vancomycin. Repeat CBC was still within normal limit for age. Patient was discharged on day 5 of oral clindamycin with plans to continue antibiotics for at least 2 more weeks and on close follow-up. Ideally, the serum bactericidal level of 1:8 should be maintained.[1] The usual course of therapy is 2 weeks for *H. influenzae, streptococci* or gram negative cocci and 3 weeks for *staphyloccoci* or gram negative bacilli.[2]

Other therapeutic modalities include repeated knee joint aspirations which may be done to relieve pressure and monitor response to treatment, as was done in this patient. But in infants, th hip joint is a surgical emergency[1] and for some authors the shoulder joint also.[5] Surgical drainage is necessary when response to therapy is poor or needle aspiration is unsuccesful because of thick exudate or loculation. Another aspect of therapy is joint rehabilitation. While some degree of rest is prudent and a position of optimal function is maintained, complete immobilization is unnecessary.[1] Passive exercises should be started as soon as pain abates.

Discharge physical examination centered on the absence of tenderness on extension of the right knee although some limitation of motion remained at about 60 degrees. Mortality from septic arthritis is now rare. Morbidity due to growth plate damage may be considerable at 30%.

References:

1. Rang , W., Infections and Tumors. Wenger and Rang, The Art and Practice of Children's Orthopaedics, 1993, pp.588-601.
2. Newton,PO; Ballock, RT ; and Bradley, JS; Oral Antibiotic Therapy of Bacterial Arthritis. Pediatr Infect Dis J. 1999;18:1102-1103.
3. Halder, D., Neonatal Septic Arthritis, southeast Asian J Trop Med Public Health 1996 Sep;27(3):600-5.
4. Nelson Textbook of Pediatrics, 14th edition, Septic Arthritis. p697.
5. Feigin and Cherry, Textbook of Pediatric Infectious Diseases, 3rd ed., pp.740-745.
6. Dickie, AS., Current Concepts in the Management of Infections in Bones and Joints, Drugs 32: 458-475 (1986).
7. Syriogiannopoulous GA. Nelson JD. Duration of antimicrobial therapy for acute suppurative osteoarticular infections. Lancet. 1988; 1:37-40.
8. Bernardo PB, Acute Septic Antibiotics in Infants & Children, acute Med Philipp 1989 Oct-Dec : 25 (4) : 143-146.
9. Nelson J., Antibiotic Concentrations in septic joint effusions. N.Engl. J. Med. 284: 349. 1971a.
10. Ogden JA and Lister G., The pathology of neonatal osteomyelitis, Pediatrics 55: 474. 1975.