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Original Article

A case of septic arthritis of shoulder presenting as rotator cuff tear

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Abstract: Septic arthritis of the shoulder is uncommon in adults. It is a surgical emergency as joint destruction occurs rapidly and can lead to significant morbidity and mortality. Accurate diagnosis can be particularly challenging in elderly patients with underlying shoulder pain. Both MRI and arthroscopy are useful modalities in early detection of atypical causes of shoulder pain. A 75 years old female came to our outpatient department with complaint of pain and stiffness of her right shoulder. On examination, her shoulder abduction movement was severely restricted. Further evaluation with MRI revealed massive joint effusion and supraspinatus tear and normal white blood cell with erythrocyte sedimentation rate 43 mm/h and C-reaction protein 41 mg/l. The septic arthritis was diagnosed only during arthroscopic debridement of right glenohumeral joint was conducted. Septic arthritis of shoulder may not present with typical clinical features. Hence, although comprehensive clinical and radiological and laboratory examination are imperative, an aspirate examination or arthroscopy can have a crucial role to make the definite diagnosis on clinically inconspicuous cases.

Keywords: Septic arthritis, shoulder, rotator cuff tear, arthroscopy, staphylococcus aureus

Introduction

Acute septic arthritis is an uncommon musculoskeletal infectious disease. In the developed world, the hospital incidence of pyogenic arthritis is reasonable proxy for community incidence. The overall estimated incidence is about six cases per 100,000 population per year [1]. There has been a 43% increase in the reported incidence of septic arthritis, with rates rising from 5.5/100,000 in 1998 to 7.8/100,000 in 2013. The incidence is age dependent, with the highest incidence under 15 and over 55 years. The rate increases most rapidly in those >75 years of age (15/100,000 in 1998 and 31/100,000 in 2013). Staphylococcal species were most frequently reported, followed by Streptococcus Pneumococcus [2]. The most commonly involved joint is the hip in infants and the knee in older children. These two joints account for the majority of pyarthroses. However, any synovial joint can be involved, and more than one joint is involved in about 10% of patients. Males are affected slightly more often than females. A second peak of incidence appears in the elderly, with the shoulder not uncommonly infected.

We report a case of infectious arthritis of shoulder joint with a preliminary diagnosis of rotator cuff tear. The relevant literatures were reviewed accordingly.

A 73-year old woman visited the outpatient clinic with complaint of right shoulder pain worsening at night with imitated range of motion for more than 20 days. She was on medication for hypertension diagnosed 15 years ago. The patient had no history of other medical conditions such as tuberculosis, diabetes, and hepatitis or relevant family history. No recent injury or injection procedures around the joint was reported or documented. She was a house wife. For two weeks before seeking medical attention, a little edema had being developed in her right shoulder joint with pain radiating from the right shoulder joint to the upper arm although there was significant no pyrexia or skin flare. Upon presentation to the hospital, hervital

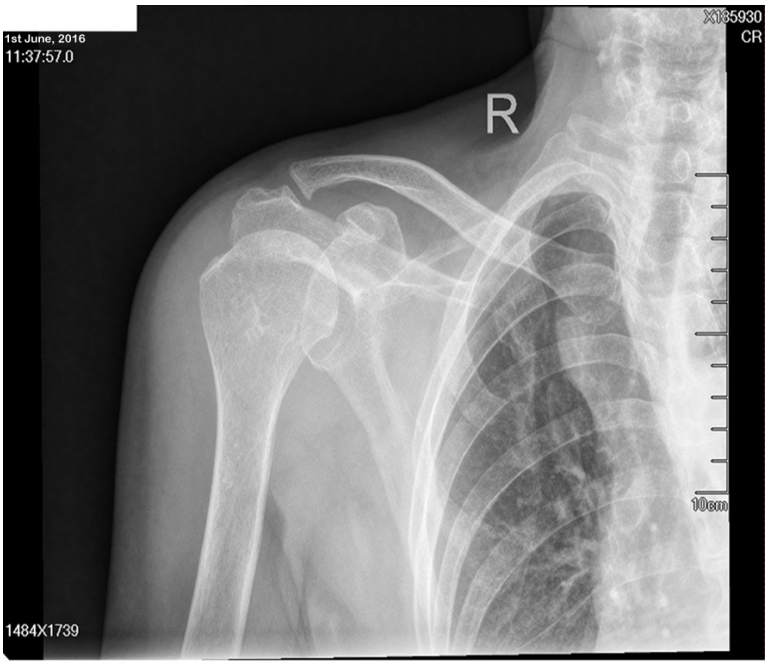

Figure 1. X-rays in anteroposterior of the right shoulder.

signs were within normal limits. However, a tender point and fluctuant joint was detected by palpation in the right shoulder joint during physical examination. The patient had a pain score of 7 out of 10 on the visual analogue scale. All the movements of the shoulder were grossly restricted due to the pain. Obtaining an accurate assessment of the manual muscle tone was impossible due to pain. The sensory function and deep tendon tests were normal. The empty-can test, lift-off test, and Hawkins-Kennedy tests could not be performed due to the pain. Routine blood test demonstrated white blood cell (WBC) count 9.22×10^9/L with normal differentiation, erythrocyte sedimentation rate 43 mm/h and C-reaction protein (CRP) 41 mg/L. the biochemical tests including ANA, RA factor, and the sputum culture test, acid-fast bacillus stain, nontuberculous mycobacterial test were negative. Radiography of the right shoulder showed an unremarkable shoulder joint (**Figure 1**). The magnetic resonance imaging of the right shoulder joint showed a large amount of effusion, diffuse synovial hypertrophyin the shoulder joint (**Figure 2**). The coronal oblique T2-weighted MR image showed a full-thickness tear of the supraspinatus muscle; the other muscles and ligaments were intact (**Figure 2**).

At day 2 of admission, arthroscopy was performed in order to make a definitive diagnosis and classify the extent and location of muscle damage. When we made the first posterolateral approach, 50 cc of yellowish fluid spilled from the skin access. Patient was received arthroscopic irrigation and debridement of the right shoulder joint. During surgery, partial-thickness rupture was found in the supraspinatus muscle. The cystoma appears purulent mucus. Cytology showed white blood cells were full of view with fewer red blood cells. Staphylococcus aureus was detected in the culture of collected joint fluid and the medicine sensitive experiment was done. After intravenous administration of vancomycin 2 g per day for 28 days, patient's symptoms improved. After continuous four weeks treatment, the VAS score decreased to2. A biochemical test and CBC performed one month after the admission showed that the red blood cell sedimentation rate and the C-reactive protein level had decreased to 33 mm/h and 40 mg/l, respectively. The discharge medication includes oral rifampicin 0.6 g per day for 4 weeks. On the post-operative day 56, the patient's symptoms including pain and limitation of motion subsided. The sequential blood tests for inflammatory markers were also normal. The right shoulder ultrasound revealed no fluid collection and the aspirate showed no growth of organisms (**Figures 3** and **4**). The patient is now on follow-up without shoulder pain or limitation of motion.

Discussion

Septic arthritis of the shoulder is an inflammatory process of infectious origin affecting the glenohumeral joint. Septic arthritis is often found in pediatric and immune-compromised patient [3] in which the sequelae of delay in diagnosis or inadequate treatment can be crippling. Hematogenic route is the most common cause in child. Other causes include contiguity,

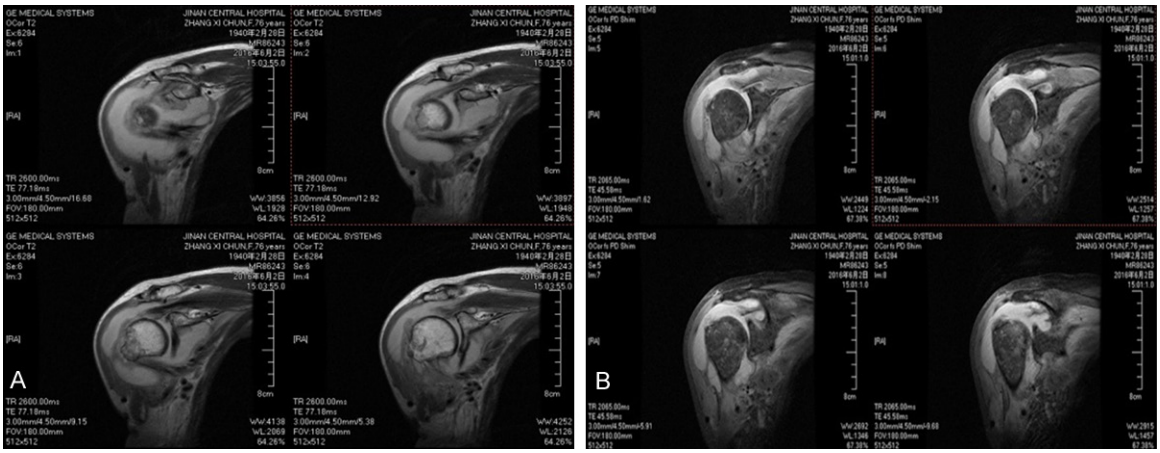

Figure 2. The coronal oblique T2 (A) and fat-suppressed T2 (B)-weighted MR image showed a full-thickness tear of the supraspinatus muscle.

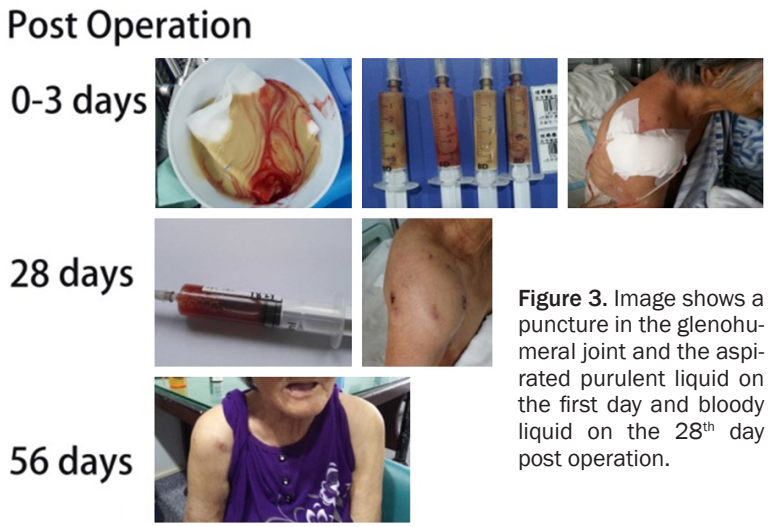

Figure 3. Image shows a puncture in the glenohumeral joint and the aspirated purulent liquid on the first day and bloody liquid on the 28th day post operation.

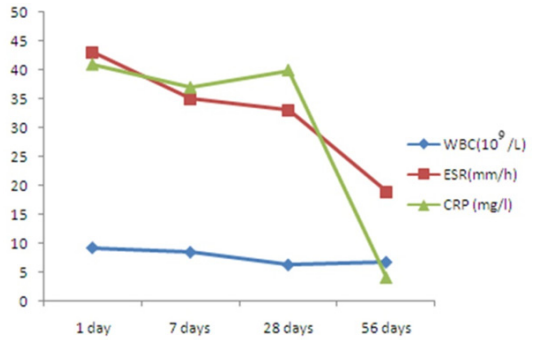

Figure 4. The variation trend of WBC, ESR and CRP on the 1st day (operation day), 7th, 25th and 56th day.

previous surgery, or intra-articular injection [4, 5]. It is relatively rare, representing 10-15% of all joint infections, and can lead to severe limited range of motion with potentially fatal implications. The most common pathogen is Staphylococcus aureus [6]. The inflammatory response is seen in the synovium and the destructive effects are observed on articular cartilage. Early diagnosis and intervention are required to avoid irreversible complications.

Bacterial septic arthritis can lead to joint destruction, and is associated with a high mortality. The mechanisms by which articular cartilage is destroyed in the presence of bacteria remain unclear. It has been reported that synovial concentrations of the proinflammatory markers TNFα, IL-1β, and IL-6 are elevated in the course of disease [7]. Articular infection and synovial inflammation are bacteria-specific and have direct influence on cartilage metabolism. Collagen type II cleavage products reliably mark the destruction, which is associated with upregulation of typical cartilage turnover cytokines such as bFGF, BMP-2, and BMP-7 [8].

The number, type and virulence of organisms and the local and general resistance of the patient determine the outcome. The response to invasive bacteria is the development of edema, hyperemia and acute inflammation in the synovium.

Adults often have a sub-acute presentation. Therefore a painful joint after arthroscopy or arthrography, must be suspected of being infected unless proven otherwise. One prospective study of 75 patients, over a period of 2 years, found underlying joint disease in 46 patients, and drug abuse in 11 patients. Fever was present in 64% and the white cell count was normal in 38%. A raised white cell count was a predictor of poor prognosis. CRP raised in 98%. Mortality was 11% [9]. Leg ulcers were a bad prognostic sign, occurring in 11% of all patients, but in 38% deceased patients.

Sen et al. [10] recommend that patients with an acute joint in the outpatient setting received routine lab work involving serum WBC, ESR, and CRP. Mathews and Coakley (2008) stated that though serum WBC, ESR, CRP, and temperature were all useful in the evaluation of an acute joint, they were not diagnostic [11]. Synovial white cell count is cited as being the only predictive laboratory value, with values ayText >[11]</Display Text >< record >< rec-nuty of 83% and 67%, respectively, and is considered not better than the "gold standard," which is clinical suspicion by an expert physician with experience in musculoskeletal disease [12, 13]. MRI with contrast has been reported with sensitivity (100%) and specificity (77%) for septic arthritis within 24 hours of onset [14-16].

Early diagnosis and treatment of pyogenic arthritis of the glenohumeral joint is essential to prevent irreversible changes to the bone or surrounding soft tissues, thereby avoiding compromising the results of other surgical procedures that may be necessary [17, 18]. Jeon et al. [17] in their retrospective study, demonstrated the safety and efficacy of arthroscopic treatment in 19 patients diagnosed with pyogenic arthritis of the glenohumeral joint. Patients who underwent surgery within two weeks of arthroscopic lavage had better outcomes than those who had symptoms for a longer time. Those authors also observed a high proportion of medical comorbidities, such as diabetes, previous infiltrations in the shoulder, and pre-existing rotator cuff injuries in their sample. However, in that study, the authors did not mention a direct association between the massive rotator cuff injury and pyogenic arthritis.

Treatment of septic arthritis of the shoulder includes appropriate antibiotic therapy and drainage. Repeat aspiration and irrigation, and debridement are reported modalities for septic arthritis of the shoulder [19]. However, some author also recommends dividing and exploring the biceps tendon sheath to ensure full debridement of infected tissue [20].

Antibiotics must be appropriate in type, dose and duration. The best guides to the choice of antibiotic are the knowledge of the natural history of the disease, the age of the patient, and the type of organism. The aims of treatment are to evacuate the bacterial products and debris associated with infection, sterilize the joint, relieve pain and prevent deformity. Surgical lavage is recommended for all patients to achieve the above aims.

Septic arthritis of the shoulder joint should be suspected in patients presenting with rotator cuff tear associated with subclinical and/or laboratory alterations. High index of suspicion and prompt diagnosis with arthroscopic washout and debridement using effective antibiotics yields good functional outcomes.

Disclosure of conflict of interest

None.

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