Synchronous subacromial and subdeltoid bursal abscess and pyomyositis of rotator cuff muscles caused by Viridans Streptococcus

Sheng-Min Lan*,+ Cheng-Li Lin*, Chien-Kuo Wang†, Sheng-Pin Lo‡, I-Ming Jou* & Wei-Ren Su*
*Department of Orthopedics, National Cheng Kung University Hospital, Tainan, Taiwan
†Department of Radiology, National Cheng Kung University Hospital, Tainan, Taiwan
‡Department of Orthopedics, Chi-Yi Christian Hospital, Chiayi, Taiwan

ABSTRACT

The most common causal organism in septic bursitis and pyomyositis is Staphylococcus aureus. Primary subacromial and subdeltoid abscess caused by viridans Streptococcus infection has never been reported and, to our knowledge, nor has diffuse pyomyositis of the rotator cuff associated with subacromial abscess. We describe the clinical presentation, radiological investigations and strategies for the management of a 56-year-old female who presented with purulent subacromial/subdeltoid bursitis and abscess formation in the rotator cuff muscles as a result of viridans Streptococcus infection. Because of its deep anatomic location, primary subacromial/subdeltoid septic bursitis and pyomyositis of rotator cuff muscles are rarely reported. The immunocompromise caused by diabetes mellitus presented a risk factor for the unusual infection observed in this patient. Magnetic resonance imaging aided the diagnosis. Treatment consisted of surgical debridement and drainage, with antibiotic administration, which resolved the infection without sequelae.

INTRODUCTION

Because of its deep anatomic location, primary subacromial/subdeltoid septic bursitis is uncommon compared to superficial bursae in which penetrating trauma predisposes to the development of infection [1–3]. Pyomyositis is pyogenic infection of skeletal muscle, usually involving the large muscle groups and very rarely the rotator cuff muscle [4,5]. The most common causal organism in septic bursitis and pyomyositis is Staphylococcus aureus [6]. There are no reported cases in the literature of septic bursitis in association with pyomyositis of the rotator cuff muscle. To our knowledge, this is the first reported case with abscess formation of the subacromial/subdeltoid bursa and rotator cuff muscles caused by viridans Streptococcus.

CASE REPORT

The 56-year-old female patient was a pharmacist. Her past medical history was important only for non-insulin-dependent diabetes mellitus (DM) under oral hypoglycaemic agent control for 8 years. One month before admission, she sustained a right shoulder sprain after lifting a heavy weight. Her right shoulder pain did not subside after conservative treatment, and swelling developed. She denied systemic symptoms such as fever, anorexia, body weight loss or cold sweating. Physical examination revealed severe swelling and diffuse tenderness of the right shoulder with a limited active and passive range of motion in all directions: less than 60° in forward flexion and abduction. Only minimal internal or external rotation was allowed, although there was no rash or erythema in the right shoulder. The distal circulation and neurological examinations were normal. Ultrasonographic examination showed a subacromial and subdeltoid space filled with a heterogeneous hypoechoic substance. Turbid fluid was drawn through needle aspiration under ultrasonographic guidance. She was then admitted. Her laboratory tests revealed borderline leucocytosis (9.4 k/μL) with a significant left shift (myelocyte was identified), thrombocytosis (506 k/μL), an erythrocyte sedimentation rate (ESR) of 118 mm/hour, and C-reactive protein (CRP) of 323 mg/L. A test for the HIV was negative. Radiography revealed obvious soft tissue swelling and mild spur formation in the acromioclavicular joint. Because of the rarity of such an infection and the presentation of diffused local heat and swelling of the whole shoulder girdle, a gadolinium-enhanced magnetic resonance imaging (MRI) scan was arranged before surgery. We found a large amount of multi-loculated fluid collected at the subacromial and subdeltoid bursae, with peripheral enhancement (Fig. 1) and abscess formation in the rotator cuff muscles (Fig. 2). The
Synchronous septic bursitis and pyomyositis

Fig. 1 (a) Coronal section of T2-weighted magnetic resonance image showing the subacromial fluid collected (white arrows) and the large loculated subdeltoid fluid collected (asterisk). (b) Contrasted coronal section showed peripheral enhancement (arrowheads) adjacent to the subdeltoid abscess (asterisk).

Fig. 2 Sagittal section of contrast-enhanced magnetic resonance image showing the fluid collected (asterisk) in the rotator cuff muscles with peripheral enhancement, which were compatible with pyomyositis.

The patient was started on antibiotic treatment with oxacillin (1 g every 6 hour), and then changed to cefotaxime (1 g every 6 hour for 4 weeks), based on the drug sensitivity test after the culture grew viridans Streptococcus. No fever occurred and she showed rapid clinical improvement. Her shoulder pain decreased and the range of motion increased progressively. CRP dropped dramatically to 33 at 1 week after operation and then slowly to a normal level. Her ESR was 135 mm/hour initially and dropped to 77 mm/hour after 5 weeks. Transthoracic echocardiography, performed on suspicion of infective endocarditis, confirmed no vegetation and no valvular insufficiency. The two drainage tubes were retained for 1 and 4 weeks, respectively, because of the amount of persistent discharge. The parenteral antibiotic therapy continued for 6 weeks in total.

The patient was discharged in good condition on oral levofloxacin 6 weeks postoperatively, after discontinuation of intravenous antibiotic therapy. The MRI taken 4 months after the surgical drainage revealed both an absence of pus in the subacromial space and reconstitution of almost normal rotator muscles. In the outpatient department, CRP was at a normal level, and the range of motion of the right shoulder had recovered fully at the 3-month follow-up. At the 7-month follow-up, there was no recurrence and the full range of motion of the shoulder remained.

DISCUSSION

Deep bursal infections such as subacromial and subdeltoid septic bursitis occur much more rarely than superficial ones [7]. Infections of the superficial bursae are mostly caused by transcutaneous inoculation, whereas the deeper infections are caused by haematogenous spread or injection contamination [1,3,7]. Many reported patients with subacromial and subdeltoid septic bursitis are immunocompromised, although this condition was also reported in healthy patients and even children [1,3,8]. Staphylococcus aureus is the most common pathogen and is found in approximately 80% of cases [1,3,6]. Other pathogens have
also been reported. Pookarnjanamorakot and Sirikulchyanontanata reported an 80-year-old female with primary tuberculosis of the subacromial bursitis [9]. Khazzam et al. described an immunocompetent patient with Candida infection of the subacromial bursae after repeated subacromial injections [10]. Our patient had a medical history of DM. It appears that the patient was immunocompromised, leading to the development of subacromial abscess and concomitant pyomyositis of the rotator cuff muscles. The patient had no history of local injection. It was very hard to determine whether the subacromial/subdeltoid septic bursitis or the pyomyositis occurred first. It was also possible that both occurred synchronously by haematogenous spread.

Pyomyositis is an acute bacterial infection manifesting as abscess formation in the skeletal muscles, usually the large muscle groups, and commonly those of the thigh; pyomyositis is usually caused by S. aureus [4,5]. The primary pyomyositis of viridans Streptococcus involving the rotator cuff muscles, as in the present case, is quite rare. Schalinski and Tsokos reviewed eight autopsy cases of fatal pyomyositis [11]. The shoulder girdle was affected in one case, although there was no description of rotator cuff involvement and Streptococcus pneumoniae was cultured from the abscess. Joseph et al. reported a patient with pyomyositis of the infraspinatus muscle caused by Clostridium septicum after a dental extraction [12]. Grewal et al. described a 54-year-old male patient who had an infected dental implant with recurrent infection of the rotator cuff after open repair [2]. Streptococcus viridans was isolated from the surgical lesion. Viridans Streptococcus consisting of multiple species of alpha-haemophilic Streptococci is not only part of the normal flora of the mouth, but also an important agent of bacterial endocarditis [13]. Our patient had no vegetation on transthoracic echocardiography but had undergone a dental procedure 1 month before her shoulder pain. Although there was an association between viridans Streptococcus and the dental procedure, it had little relevance to our patient chronologically. We favoured infection by the haematogenous route in our patient, although the primary focus was unclear.

Subacromial septic bursitis is not always associated with glenohumeral septic arthritis. The subacromial bursae overlie the lateral aspect of the glenohumeral joint and the rotator cuff tendons. Communication between these bursae and the glenohumeral joint occurs when there is a partial or complete tear of the rotator cuff. Costantino et al. reported a 52-year-old female who had a history of DM with concomitant septic glenohumeral arthritis and subacromial bursitis of her shoulder [14]. Unlike glenohumeral septic arthritis, subacromial septic bursitis has not been reported to be associated with pyomyositis of the rotator cuff muscles, as it was in this case; the two can be so clinically similar that the diagnosis cannot be excluded without a high index of suspicion with a thorough physical examination and supportive investigations.

The present case illustrates the importance of imaging in the timely diagnosis of concomitant subacromial septic bursitis and rotator cuff pyomyositis. Standard radiographs only demonstrated soft tissue swelling of the shoulder joint, although ultrasound could demonstrate a localized fluid collection superior to the humeral head consistent with an enlarged subacromial bursa [14,15], and MRI could clearly delineate the extent of the shoulder infection and the contiguous involvement of adjacent structures, which helped to determine the optimal surgical treatment.

Conclusions

The potential for an underlying spread of infection to unusual sites has been reported in the setting of DM and can very easily be overlooked. A high index of suspicion is required in such cases because any delay in diagnosis can have serious consequences. We found that septic bursitis may occur in association with pyomyositis of the rotator cuff muscle. To the best of our knowledge, this has not been previously reported in the literature.

CONSENT

Written informed consent was obtained from the patient for the publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

References