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CASE REPORT



# Ultrasound-guided aspiration of a large subacromial subdeltoid bursitis

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**Abstract**

Today, ultrasonography (US) is used for diagnosis in many areas of medicine (such as abdomen, cardiac, urological, gynecological, cerebrovascular and pediatric examinations). In the field of physical medicine and rehabilitation, it is the most important development in the diagnosis of muscle, joint, nerve, ligament and tendon lesions in recent years. At the same time, various injections (local anesthetic, corticosteroid, platelet-rich plasma and botulinum toxin, etc.), fluid aspiration and biopsy procedures (soft tissue, muscle, joint cavities, nerve sheath) are practiced with US.

In this medical case report, the importance of US in the diagnosis of subacromial subdeltoid bursitis and aspiration of this fluid will be discussed.

**Keywords:** Subacromial subdeltoid bursitis; ultrasound; shoulder

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## Introduction

Ultrasound (US) is a rapid, cost-effective, repeatable, practical imaging method that can be easily utilized by clinicians for musculoskeletal system visualization. Its ability to allow dynamic examination gives it an edge over other diagnostic modalities [1]. This non-invasive technique, devoid of radiation, does not require patient immobility, and enables patients to view the examined structure on the US screen, making it well-accepted. Competent interpretation necessitates practitioner training and experience [2, 3].

Ultrasound is not only a diagnostic tool but also a therapeutic modality, capable of concurrently displaying target structures and the needle during interventional procedures. Furthermore, during interventional procedures, visualization of the adjacent arteries, veins, tendons and nerves in the target area leads to a safer procedure. Under US guidance, various injections (local anesthetics, corticosteroids, platelet-rich plasma, botulinum toxin, etc.), fluid aspirations, and biopsies (soft tissue, muscle, joint spaces, nerve sheaths) are easily performed [4]. This case report discusses the significance of using US in the diagnosis and aspiration of subacromial subdeltoid (SASD) bursitis.

## Case Report

A 75-year-old female presented to outpatient clinic with a three-month history of left shoulder pain and restricted movement, worsening with overhead activities and recently disturbing her sleep. She had no history of trauma. Previously, she was advised to use non-steroidal anti-inflammatory drugs (NSAIDs) for two months by another physician, but experienced no relief. Her medical history included twenty years of hypertension, coronary heart disease, chronic obstructive pulmonary disease, and multiple medication use. Musculoskeletal examination revealed significant tenderness upon palpation, especially in the anterior and lateral aspects of the shoulder. Joint range of motion included: active left shoulder abduction 40°, flexion 60°, extension 40°, internal and external rotation 30°. Yergason, Speed, Neer, and Hawkins tests were positive. Her daily activities were severely affected, with a visual analog scale (VAS) pain score of 9. Laboratory results (including hemogram, erythrocyte sedimentation rate, C-reactive protein, and rheumatoid factor) were normal. Anteroposterior shoulder radiography was unremarkable. Subsequent US examination with a 7-12 MHz linear probe revealed a 4.5x2.3 cm SASD bursitis above the biceps tendon (**Image 1A**). Considering

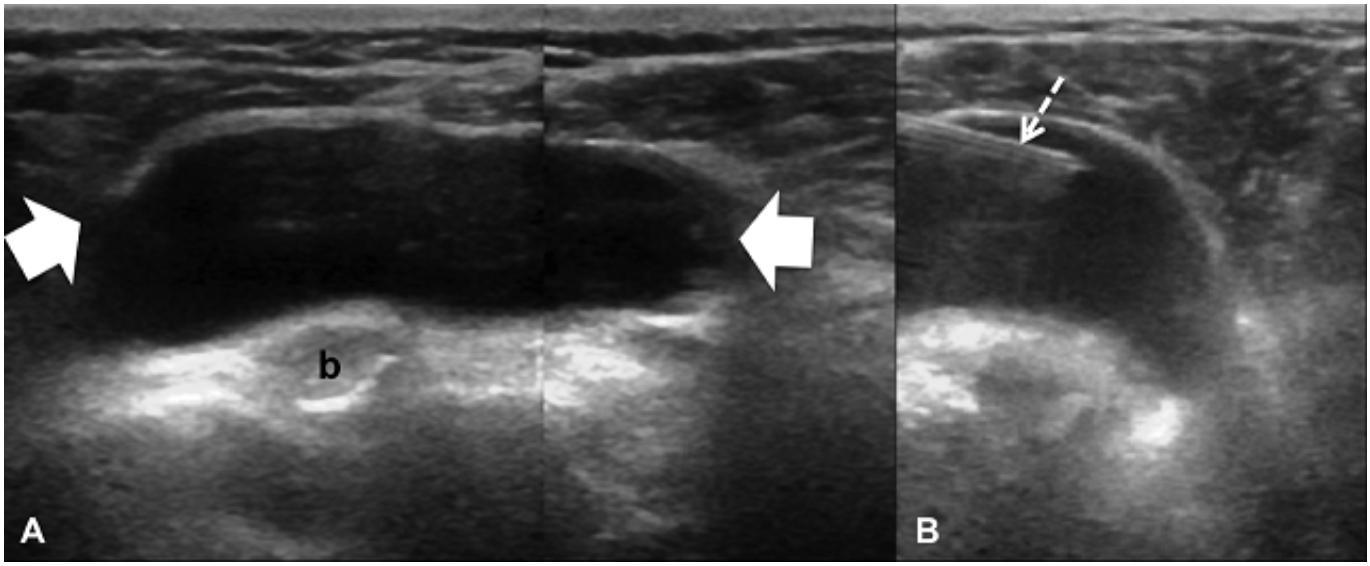


**Image 1 A-B:** *Ultrasonographic image of subacromial subdeltoid bursitis. Image A shows a 4.5x2.3 cm subacromial subdeltoid bursae(white arrows) situated above the biceps tendon (b) in an anteroposterior axial (split-screen image) ultrasonographic examination of the shoulder. Image B displays the needle (dashed arrow) during in-plane direct aspiration of the subacromial subdeltoid bursae fluid. Note: In image A, two images are merged and the fragmented part is marked with an asterisk.*

the ineffectiveness of previous NSAID treatment and severe pain, informed consent was obtained for US-guided fluid aspiration and intrabursal injection of 40 mg methylprednisolone acetate into the SASD bursae (**Image 1B**).

At the follow-up on day three, her pain was reduced to VAS pain score 1, with no restriction in shoulder movements. US examination showed complete regression of the SASD bursitis.

**Discussion**

Shoulder pain is a common musculoskeletal problem in the general population, with point prevalence and lifetime estimates as high as 26 and 67%, respectively. There are various causes of shoulder pain. The most common cause is soft tissue lesions involving structures such as bursa and tendons.These lesions are often associated with rotator cuff injuries and subacromial impingement syndrome [5-7].

Several bursae surround the shoulder joint, each located in different areas. The most important of these is the SASD bursae, situated between the rotator cuff tendons and the underside of the acromion. This bursae is a potential space and normally has a volume of 5-10 mL if there is no pathological condition like edema or adhesion. The SASD bursae facilitates movement by increasing lubrication between the rotator cuff, acromion, and acromioclavicular joint during shoulder movements. Normally, the SASD bursae has no relationship with the glenohumeral joint. Fluid accumulation in the bursae can occur due to reactive bursal inflammation associated with glenohumeral joint diseases such as rotator cuff tears, impingement, infection, arthritis, direct trauma, and calcific deposit disease. This leads to an abnormal relationship with the joint. After obtaining a detailed medical history to identify the etiological factors causing this abnormal relationship, specific tests for diseases should be performed along with a physical examination [7-9]. Various imaging methods are used to demonstrate fluid accumulation in the SASD bursae. Direct radiography is primarily used to assess bone structures, joints, degenerative changes, and the presence of calcification. US should be preferred first in evaluating fluid accumulation in the bursae [9, 10]. The reason for the preference of US in the first place is that it does not contain ionizing radiation, is portable, easily accessible and noninvasive. It can also be examined dynamically, can be easily repeated if necessary, and provides information about tissue blood supply with Doppler activity. It also guides interventional procedures like aspiration/biopsy. The most significant disadvantage is its dependence on the practitioner and its inability to provide information about the bone marrow due to strong back shadowing originating from the cortical bone [4, 10]. The diagnosis of SASD bursitis with US is made by the presence of hypoechoic fluid or effusion and a bursae thickness of >2mm. Thickening in the subacromial bursae is defined as the distance between the deep part of the deltoid muscle and the superficial part of the supraspinatus tendon being >2mm [11]. Since bursae thickening can be normal in certain life conditions and bursal thickness can vary with movement, it is recommended to compare with the asymptomatic side [12]. The incidence of SASD bursitis in patients with shoulder pain was found to be 40% in a study using US [13]. Magnetic resonance imaging (MRI) is often preferred in patients presenting with shoulder pain. While MRI has many advantages (high resolution, ability to image in various sequences, absence of radiation, non-invasiveness), its disadvantages should also be considered. These include the cost of MRI, the need for the patient to remain still during imaging, the presence of metallic and MRI-incompatible objects, claustrophobia, and operator-dependent interpretation. Evaluation can be suboptimal with MRI as it does not adequately signal some structures and tissues such as lung tissue, calcification, and cortical bone [14]. Magnetic resonance arthrogram is more valuable than MRI for detecting shoulder joint pathologies [8].

In the treatment of SASD bursitis, activity restriction, cold application, NSAIDs, exercise, and electrotherapy should be prioritized. Depending on the patient's condition and disease status, manual therapy, acupuncture, and subacromial steroid injections can be added to the treatment. If symptoms persist for more than three months despite these treatments, it is advised to seek a surgical evaluation [6]. In our case, considering both the previous two-month usage failure and the patient's age, comorbidities, and multiple drug use, oral NSAID usage might be risky and could exacerbate comorbidity. Therefore, aspiration of fluid in the SASD

bursa and local steroid injection are planned under US guidance. Studies have shown that patients receiving US-guided injections into the SASD bursae have better functional outcomes [15, 16]. It is a well-accepted fact in the literature that the success rate of interventional procedures performed under US guidance is higher compared to those done blindly [17-20]. Simultaneous imaging during US-guided interventional procedures ensures direct access to the target, increasing the success of the procedure. Additionally, it involves less risk of tissue damage as neighboring structures (vessels, nerves, tendons, ligaments, etc.) are easily visualized [17, 18].

In conclusion, solving the puzzle of treatment, as in our patient, when there is a specific goal for interventional procedures, in addition to diagnosing shoulder joint pathologies, is facilitated by US. Currently, there is no other diagnostic tool that provides simultaneous imaging capabilities during interventional procedures in daily clinical practice for physicians dealing with musculoskeletal system diseases. The safety and comfort it provides are beneficial for both the patient and the practitioner. In elderly patients like in this case, where polypharmacy is already increasing comorbidity, and the use of NSAIDs can further compound this, local treatments should be prioritized. Using systemic drugs with many side effects in such a patient is risky when safe aspiration can be performed under US guidance.

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