Case Report

Snapping Scapula Syndrome in the Setting of Elastofibroma Dorsi: A Case Report

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Abstract

A 54-year-old woman presented with a 15-year history of progressively worsening left snapping scapula syndrome (SSS) in the setting of ipsilateral elastofibroma dorsi. Her pain was refractory to multiple conservative measures. She was successfully treated with focal ultrasound-guided corticosteroid injection to the superomedial border of the scapula. There was demonstrable improvement in findings between pre- and post-procedural MRI examinations. Despite the underlying cause of SSS, trials of nonoperative treatment techniques are warranted before considering surgical options. Focal ultrasound-guided corticosteroid injection, in conjunction with physiotherapy, is one such example.

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Introduction

Snapping scapula syndrome (SSS), also known as scapulothoracic crepitus or bursitis, is an uncommon and underrecognized condition stemming from disruption of normal scapulothoracic articulation [1–3]. The scapulothoracic articulation is unique in that the scapula glides over muscle layers and interposed bursal tissues, instead of hyaline cartilage or synovium, to achieve smooth motion [3]. Etiologies are divided into 3 main categories: (1) bursitis, (2) muscular and neuromuscular abnormalities, and (3) bony or soft tissue abnormalities [1, 4–6].

Elastofibroma dorsi (ED), a benign, slow-growing soft tissue tumor of mesenchymal origins with benign characteristics, is an infrequent cause and predisposing risk factor for SSS [1, 3, 4, 7, 8]. Although the pathogenesis of ED is unclear, the literature suggests that repetitive microtrauma caused by friction between the scapula and the thoracic wall may cause reactive hyperproliferation of fibroelastic tissue, resulting in subscapular ED [9, 10]. Further histological studies have demonstrated the tumor to be hypocellular containing a mixture of benign fibroblasts, eosinophilic collagen, elastin fibers, and interspersed adipose tissue [11].

With a prevalence of 3% in the adult population, ED is seen 5 times more often in patients aged 65 years and older, and twice as often in female individuals [12]. The lesion is usually seen in the subscapular or infrascapular region at the level of the rhomboid major and latissimus dorsi muscle [1, 8]. Although the lesion is firmly adherent to the chest wall, the tumor can elevate the inferior scapula resulting in the scapula grating on the underlying rib cage during movement, subsequently causing inflammation and bursitis [1, 8].

SSS can produce significant chronic pain, disability, and limited function in affected patients [1, 3]. Patients affected with SSS usually present with a history of overhead activity-related pain, repetitive overuse of the shoulder, or trauma [7, 13]. Physical examination findings include audible, palpable, and/or painful crepitus of the scapulothoracic articulation during active shoulder movements [1, 7, 13]. Despite the etiology of SSS, nonoperative treatments are warranted first, prior to considering surgery [1, 13, 14].

We report the case of a 54-year-old woman with a 15-year history of symptomatic left SSS, likely related to ipsilateral ED. Treatment with focal ultrasound-guided corticosteroid injection to the superomedial border of the scapula resulted in symptomatic pain relief. The patient was informed that data concerning her case would be submitted for publication, and she provided consent.

Case Report

A 54-year-old right-hand dominant woman was referred to our hospital due to chronic pain in the region of the left scapula. Her relevant past medical history was significant for left subacromial bursitis treated with corticosteroid injection 8 years prior.

Upon her initial visit, she described a 15-year history of progressively worsening pain around the posterior region of her left shoulder associated with reaching movements, with severe pain radiating along the left lateral neck, over the superior portion of the shoulder, and muscle spasms. She experienced minimal temporary pain relief with conservative treatment techniques, such as physiotherapy, acupuncture, heat relaxation, and topical anti-inflammatory medications.

Her physical examination demonstrated pain predominantly around the region of the insertion of the left levator scapulae at the superomedial border of the scapula. Her cervical spine, thoracic spine, and left chest wall MRIs demonstrated (1) ill-defined crescent-shaped mass along the left posterolateral chest wall deep to the left serratus anterior muscle, in keeping with ED; and (2) focal soft tissue edema between the ribs and superomedial

Fig. 1. **A** Pre-procedure axial T1-weighted MR image near the inferior border of the left scapula showing a characteristic elastofibroma (solid white arrow and white circled area) presenting as a crescentic shaped lesion lying deep to the serratus anterior muscle with interspersed areas of fatty streaks and fibrous tissue, measuring approximately $7.6 \times 2.5 \times 6.5$ cm (AP $\times$ ML $\times$ CC). This results in posterolateral displacement of the left serratus anterior muscle. **B** Pre-procedure coronal T2-weighted fat suppressed MR image of the left shoulder region showing an area of high signal (solid white arrow and white circled area) near the superomedial tip of the left scapula. This is suggestive of focal soft tissue edema involving muscles inserting on the superomedial scapula, indicating bursitis. **C** Pre-procedure axial proton-density fat-suppressed MR image of the left shoulder region shows to better advantage high signal (white circled area) near the superomedial tip of the left scapula (white arrow), reflecting soft tissue edema. This is suggestive of marked bursal thickening and superomedial angle bursitis.

Fig. 2. **A** Intra-procedure, pre-injection: Ultrasound of the left periscapular region in a transverse orientation showing interspersed areas of hypo- and hyper-echogenicity (white circled area). This corresponds to the area of soft tissue edema in the left suprascapular region on prior MRI. No fluid demonstrated. **B** Intra-procedure injection: Ultrasound of the left periscapular region showing the insertion of the 22-gauge needle (white circled area), with a medial-to-lateral approach. The needle was subsequently advanced laterally to the area of concern (blue circled area). One cubic centimeter of 80 mg/mL Depo-Medrol (methylprednisolone) and 7 cm³ of 0.5% saline into the suprascapular muscles and intervening fascia were subsequently injected.

scapula, reflecting superomedial angle bursitis. The latter corresponded to the patient's area of symptomatology (Fig. 1A–C).

The patient was treated with ultrasound-guided periscapular corticosteroid injection, targeting the region of bursitis. Under ultrasound guidance and following local instillation, a 22-gauge needle was used to inject 1 cm³ of 80 mg/mL Depo-Medrol (methylprednisolone) and 7 cm³ of 0.5% saline into the suprascapular muscles and intervening fascia. No immediate complications were noted (Fig. 2A, B).

She was seen in our benign bone/soft tissue lesion clinic 6 weeks after her periscapular injection. She presented with full active range of motion of both shoulders with no pain or snapping sensation. Given the resolution of her symptoms, she was advised that surgery for the removal of ED was not recommended.

Fig. 3. **A** Post-procedure coronal T2-weighted fat suppressed MR image of the left shoulder region showing a much less hyperintense signal (white circled area) in the area of concern than the pre-procedure MR image (Fig. 1B). **B** Post-procedure axial proton density fat-suppressed MR image of the left shoulder region showing a less hyperintense signal (white circled area) in the left suprascapular region than the pre-procedure MR image (Fig. 1C), suggestive of significant improvement of the previously seen soft tissue edema and bursitis.

On physical examination 16 weeks post-procedure, she had mild pain at the insertion of the levator scapula and mild crepitus beneath the scapula with movement. She reported the pain was minimal compared to the severe debilitating pain she experienced prior to the injection. Treatment with prolotherapy versus platelet-rich plasma was discussed. However, the patient declined as she was content to continue conservative management techniques.

A post-procedure MRI of the left chest wall at 15 months demonstrated significant improvement of the soft tissue edema in between the scapula, second rib, and bursitis. No scapulothoracic bursal fluid distention was observed. The appearance of the ED was unchanged (Fig. 3A, B).

Discussion

The occurrence of SSS in the setting of ED is the result of a vicious cycle of inflammation, scarring, and impingement [1]. ED is a known risk factor for this occurrence, stemming from the lesion causing disruption of the scapulothoracic articulation [1, 8].

Diagnosis of SSS in the setting of ED may be challenging and includes a focused history, physical examination, and imaging. CT scans are useful for assessing bony incongruities between the scapula and chest wall [15]. An abnormality detected at the inferior tip of the scapula is characteristic for ED, allowing for confident diagnoses in typical patient presentations. However, due to the similarity in density and appearance of ED with muscle on CT, ED may often be missed.

Although not routinely required, MRI adds further diagnostic confidence due to its soft tissue contrast. ED manifests as a heterogeneous, well-defined structure with longitudinal areas of higher signal intensity and areas of low signal intensity, similar to muscle, with interspersed adipose strands [10]. A confident diagnosis can often be made based on these features. Advanced age of patients, typical chronic localization, female gender, or bilateral manifestation further supports a radiological and clinical diagnosis of ED, as in our patient [10]. In such patients with typical characteristic presentations, biopsy is not required. However, in unusual cases, follow-up or biopsy may ultimately be required to distinguish

from differential considerations of an atypical lipomatous tumor, sarcoma, and aggressive fibromatosis [10].

There is consensus in the literature regarding management strategies for SSS. Physiotherapy and rehabilitation are the mainstay in nonoperative management of SSS and aim to address scapulothoracic dyskinesia [16]. The optimal initial nonoperative approach combines scapular strengthening, postural re-education, and core strength endurance. Muscle endurance exercises that add physical bulk to the periscapular muscles and improves rotator cuff strength may improve the scapulothoracic articulation [17–19]. The literature demonstrates that exercise and rehabilitation results in significant clinical improvement posttreatment. One study compared segmental stretching exercises with global postural re-education and found that although both improved symptoms, postural re-education was superior when it came to pain and quality-of-life improvement [20]. Additionally, it was found that virtual reality exergaming resulted in better performance on clinical tests for dyskinesia than home exercises [21].

The next mainstay of treatment is scapulothoracic injections at the medial border of the scapula with either anti-inflammatory medications or localized corticosteroid [18]. The subsequent use of anti-inflammatory medications and localized corticosteroid injections has proven to be helpful, with 50%–80% of patients reporting relief of symptoms with nonoperative treatment [1, 22]. Mansız-Kaplan et al. [23] demonstrated that a 5% dextrose injection to the scapulothoracic bursa was effective for up to 3 months. It has been described that successful response to corticosteroid injections is a good predictor of successful future surgical outcomes, should the need arise, as in the case of our patient [1, 24]. A trial of nonoperative care is warranted for at least 6 months to 1 year, regardless of etiology before considering surgery [1, 16, 18, 19].

Operative options include partial scapulectomy, open or arthroscopic bursectomy, resection of the underlying causative mass, or a combination of procedures [1, 15, 17, 22–24]. The operative technique with the most consistently successful results is surgical resection of the superomedial angle of the affected scapula. Contraindications to the operation include severe winging, gross neurovascular invasion, and patients with severe radiation-related damage [15, 22, 23]. Overall, postoperative complete relief of pain and crepitus has been reported to be as high as 86% following resection [15, 17, 22–24]. Arthroscopic treatment is an alternative that decreases the morbidity of the open technique. The complications associated with open or arthroscopic bursectomy include postoperative hematoma, injury to surrounding neurovascular structures, and recurrence of bursitis [1, 15, 17, 22–24]. Regarding our case of the 54-year-old woman, focal ultrasound-guided corticosteroid injection to the superomedial border of the scapula, in conjunction with physiotherapy, resulted in adequate symptomatic pain relief. Should the need for surgery arise, such options could be considered.

Statement of Ethics

The subject has given their written informed consent to publish their case (including publication of images). This study is exempt from ethical committee approval. A case report with 3 or fewer patients does not meet the definition of research on the basis that the information in the case report has not been obtained through a systematic investigation and was not collected with a prior research intent. Furthermore, the information presented in a case report is not considered to be generalizable. Therefore, case studies that involve 3 or fewer patients do not require research ethics board review/approval. Written informed consent was obtained from participants for publication of the details of their medical case and any accompanying images.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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Author Contributions

Ibrahim M. Nadeem, BHSc, contributed to conceptualization; data curation; formal analysis; methodology; writing – original draft; and writing – review and editing. Muffaqam Shah, MBBS, contributed to conceptualization; data curation; formal analysis; methodology; writing – original draft; and writing – review and editing. Naveen Parasu, MD, involved in conceptualization; data curation; investigation; methodology; supervision; visualization; and Writing – review and editing. Moin Khan, MD, MSc, involved in conceptualization; data curation; formal analysis; methodology; supervision; and writing – review and editing. Sohaib Munir, MD, contributed to conceptualization; data curation; formal analysis; investigation; methodology; project administration; supervision; validation; visualization; writing – original draft; and writing – review and editing.

Data Availability Statement

All data generated or analyzed during this study are included in this article and/or its online suppl. material files; for all online suppl. material, see www.karger.com/doi/10.1159/000519069. Further inquiries can be directed to the corresponding author.

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