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Case Report

Pseudo-winging of scapula due to benign lesions of ventral surface of scapula – Two unusual causes

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ABSTRACT

Winging of the scapula due to benign lesion of ventral surface of scapula is one of the rare cause and difficult to diagnose in first place. We present two unusual cases of pseudo winging of scapula due to benign lesions of scapula. First case was of 23 year old male with solitary osteochondroma of ventral surface of scapula. Second was 38 year old female with hemangioma involving subscapular muscles. Both the patients presented to us with dull aching pain over right scapular and shoulder region of 6 months duration with gradually increasing pseudo-winging of scapula. On examination there was mild tenderness over superomedial border of scapula with scapular snapping⁵ or 'clunk' on hyper abduction of shoulder. Further radiographic evaluation of right scapular region revealed solitary osteochondroma of ventral surface of right scapula in first case whereas MRI revealed hemangioma of subscapular muscles in second case. Hemangioma was initially treated by weekly injecting sclerosing agent (Inj. Polidocanol) locally for 4 weeks. Both lesions were later treated by excision and subsequent follow up revealed disappearance of pain and winging of scapula.

Conclusion: Winging of the scapula due to solitary osteochondroma and subscapular hemangioma of the scapula may present with an initial diagnostic difficulty but appropriate knowledge of literature and diagnostic acumen can give excellent results.

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1. Introduction

Winging of scapula is generally considered to be due to serratus anterior palsy but this dynamic winging should be differentiated from static or pseudo-winging. The pseudo-winging of scapula is due to non neuromuscular causes like fixed deformities of scapula or ribs. This type of winging

characteristically present at rest and do not increases with forward flexion of arm.

Benign lesions like osteochondroma of ventral surface of scapula may cause pseudowinging of scapula. Although scapula is rarely involved, this is the most common tumor of the scapula^{1,2} with incidence of 4%. The scapular osteochondroma arising from ventral surface may present with pseudo-winging of scapula along with Snapping scapula syndrome,

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also known as scapulothoracic crepitus or bursitis. This was first described in 1867 by Boinet.¹ There are a few articles in the literature reporting pseudo-winging of scapula due to scapular osteochondroma.^{3,4} Due to its location on under surface of scapula and atypical presentation of pseudowinging, diagnosis of osteochondroma of scapula is often delayed until it grows into a large mass. Here we present two cases of pseudo-winging and snapping scapula syndrome. First case was of 23 year old male with solitary osteochondroma of ventral surface of scapula. Second was 38 year old female with hemangioma involving subscapular muscles. Both the patients presented to us with dull aching pain over right scapular and shoulder region of 6 months duration with gradually increasing pseudo-winging of scapula and Snapping scapula syndrome.

2. Case presentation

Two patients, a 23 year old male and 38 year old female presented to us with similar complains of dull aching pain over right scapular and shoulder region of 6 months duration. There was history of gradually increasing asymmetry of upper back for last 5–6 months. Patients used to have increase in pain during sleep while lying on back. On examination there was asymmetry of right upper back with pseudo-winging (Figs. 1 and 2) of scapula which was not increasing with forward flexion of arm against resistance (unlike true winging which increases on forward flexion of arm against resistance). There was palpable ‘clunk’ or scapulothoracic crepitus also called Snapping scapula syndrome⁵ on passive hyperabduction of right shoulder. However range of motion of right shoulder was found to be normal. No other bony prominences were detected elsewhere in the body.

Plain radiograph of male showed solitary osteochondroma (Fig. 3) arising from superomedial margin of right scapula whereas there was normal radiograph of female. Magnetic resonance imaging (MRI) of male showed solitary osteochondroma (Fig. 4 a, b, c) $3 \times 2 \times 1$ cm arising from the superomedial part of ventral surface of right scapula with insinuation in intermuscular planes and edema of adjacent muscles.

Fig. 1 – Case 1 Right scapular pseudo-winging.

Fig. 2 – Case 2 Right scapular pseudo-winging.

However there was no evidence of malignant transformation. MRI of female showed hemangioma (Fig. 5a, b) of subscapular muscles involving subscapularis, rhomboids and part of supraspinatus. Hemangioma was initially treated by weekly injecting sclerosing agent (Inj. Polidocanol) locally for 4 weeks. Polidocanol is a sclerosing agent which reduces vascularity of the lesion and helps in easier enbloc excision of hemangioma. Surgical excision of tumors were performed for increasing deformity and concern about malignant transformation (of osteochondroma).

2.1. Injection technique

Patient is positioned in prone position with arm extended and internally rotated (“Chicken-wing position”⁶). Needle is inserted through medial border of scapula and carefully

Fig. 3 – Case 1 Plain radiograph showing right scapular osteochondroma.

Fig. 4 – a, b, c: Case 1 MRI showing ventral scapular osteochondroma in coronal, sagittal & axial sections.

directed under scapula parallel to the chest wall. For lesions involving middle or lower third of scapula, needle can be safely inserted at 1 cm medial to medial border of scapula (dorsal scapular nerve is 2–3 cm medial to medial border of

scapula in upper half of scapula) at midpoint of scapular spine and inferior angle of scapula (Fig. 6). For lesions involving proximal third of scapula, entry should be avoided near supero-medial angle of scapula which is close to spinal

Fig. 5 – a, b: Case 2 MRI showing subscapular hemangioma in axial, and sagittal section.

Fig. 6 – Three nerves located posteriorly in superficial layer around scapula.

accessory nerve. In large lesions, like in our case, needle can be inserted safely parallel to the chest wall but in smaller lesions care must be taken while inserting needle to avoid pneumothorax,⁷ which is a potential complication. USG guided injections is another viable option for smaller and more concealed subscapular lesions.

3. Surgical procedure

The patients were positioned in the prone position. Positioning the arm in extension and internal rotation lifts the medial border of scapula and helps in placement of incision accurately. A skin incision was given along the medial border of the right scapula depending on the location of each lesions. Trapezius was divided in the line of the skin incision. Since osteochondroma (Fig. 7) was arising from the supero-medial part of scapula, care was taken to protect the spinal accessory nerve, which crosses the scapula just lateral to its supero-medial angle (Fig. 6). For hemangioma, the rhomboids were detached from its scapular attachment, leaving a small cuff to allow for repair. During detachment of rhomboids, care must be taken to protect dorsal scapular nerve which is 2–3 cm medial to medial border of scapula in the proximal half of scapula (Fig. 6). Muscles were retracted medially to expose the medial edge of the scapula. Scapula was lifted off the chest wall after subperiosteal dissection to expose the tumor. Osteochondroma was excised from the base. Hemangioma was dissected enbloc (Fig. 8) from surrounding subscapular muscles which were easily delineated from lesion by blunt dissection following preoperative sclerosing injection. The wound was closed in layers after carefully repairing rhomboids and trapezius.

Fig. 7 – Case 1 The osteochondroma was found under upper medial part of ventral surface of scapula.

Subsequent histological examination was consistent with the diagnosis of osteochondroma in first case and hemangioma in second. The cartilaginous cap of osteochondroma showed no evidence of malignant transformation.

The patients were given sling and range of motion exercise was started after 1 week in first case and after 3 weeks in second. Six weeks postoperative examination revealed disappearance of pseudo-winging and scapulothoracic crepitus (Fig. 9a, b and Fig. 10a, b). There was near complete painless range of motion of right shoulder with normal symmetry of upper back.

4. Discussion

Osteochondroma usually presents near the ends of long bones of lower extremity (50%), but rarely flat bones like scapula² may also be involved (4%). It most commonly arise from ventral surface of scapula. They commonly present as pain, crepitus and pseudo-winging of scapula. Since mass may not be palpable, there are a number of reports of ventral scapular lesions being mistaken for “winging” of the scapula.⁸ After

Fig. 8 – Case 2 Subscapular hemangioma dissected from subscapular area.

Fig. 9 – a, b: Case 1 Six weeks post-operatively with disappearance of deformity and complete ROM.

reviewing literature, we have not found even a single case of Hemangioma of subscapular muscles causing Pseudo-winging and snapping of scapula. Although, this patient also presented with similar complaints and clinical findings as of patient with osteochondroma.

Pseudo-winging of scapula should be differentiated (from true winging) as static winging which doesn't increase on forward flexion of arm against resistance (Table 1). This is unlike true winging of scapula which increases on forward flexion of arm against resistance. True winging is typically caused by neuromuscular disorders. Long thoracic nerve palsy⁹ leading to paralysis of the serratus anterior muscle is the most common cause.

Pseudo-winging on the other hand is not a common diagnosis. Surgeon should be aware of possible benign lesions of scapula and adjacent thoracic cage that can be

associated with pseudo-winging of scapula. Kyphoscoliotic deformity of the upper or mid-thoracic spine may also present with similar clinical findings. The most common tumor associated with pseudo-winging is osteochondroma¹¹ located on the ventral surface of scapula. Rinaldi¹² in 1966 reported 5 cases of scapular osteochondroma. Parsons¹³ in 1973 reported 3 cases of scapular exostosis. Fiddian and King¹⁴ reviewed 209 patients with winged scapula and found 23 different causes; of which only 1 case was due to scapular osteochondroma. Scott et al¹⁵ reported intermittent scapular winging in a teenage patient after an initial injury that was diagnosed as an osteochondroma about a year later. Therefore due to its rarity of presentation, in our case too it produced initially diagnostic dilemma. But appropriate review of literature and subsequent investigations, timely solved this problem.

Fig. 10 – a, b: Case 2 Six weeks post-operatively with disappearance of deformity and functional ROM.

Table 1 – Causes and differences between true winging and pseudo-winging of scapula.

True winging of scapula	Pseudo-winging of scapula
True or dynamic winging is defined as winging or increased medial prominence of scapula which further increases on forward flexion of arm against resistance.	Pseudo-winging or static winging on the other hand presents as increased medial prominence of scapula which do not increase on forward flexion of arm against resistance.
Causes-	Causes-
❖ Long thoracic nerve ⁹ palsy may be due <ul style="list-style-type: none"> > Direct penetrating injury > Iatrogenic injury due surgery around first rib. > Direct compression by overloaded Backpack (“Backpack injury”). > Athletic overactivity – mainly traction injuries. > Neuritis due to metabolic, radiation or viral diseases. > Involvement of Long thoracic nerve has also been reported in SLE.¹⁰ 	<ul style="list-style-type: none"> • Tumours arising from the ventral surface of scapula (most commonly osteochondroma) or dorsal surface of ribs • Malunited fractures of ribs or scapula • Kyphoscoliotic deformity involving dorsal spine
❖ Palsy of spinal accessory nerve leading paralysis of trapezius	

Diagnosis is usually made by clinical features and imaging. It is confirmed by histopathologic evaluation. Subscapular osteochondroma is not always visible on plain radiograph. CT scan or MRI is generally required to establish early diagnosis in these patients. MRI is valuable tool for assessing subscapular osteochondroma. It is a better investigation for identifying soft tissue lesions including bursal tissue. It simultaneously rules out malignant transformation of solitary osteochondroma, which although 1–2 %, is always a concern. Signs of malignant transformation are cartilaginous cap more than 2 cm, stippled calcification in cap, increase in size after skeletal maturity and sudden increase in pain. In our case although patient presented with increasing deformity and pain after skeletal maturity but symptoms were mainly due to mechanical cause. Further histological examination ruled out malignant changes.

Surgical excision of ventral scapular osteochondroma consists of excision of the mass and any reactive bursa. Treating subscapular hemangioma with weekly injection of sclerosing agent (Inj. Polidocanol) locally is extremely helpful as it reduces the vascularity of the lesion and subsequent en bloc excision becomes easier. The results were excellent in both the cases as excision significantly improved all of the patient's mechanical symptoms as well as deformity.

5. Conclusion

Winging of the scapula due to benign lesions of the scapula may present with an initial diagnostic difficulty but appropriate knowledge of literature and diagnostic acumen can solve this problem.

Increase in deformity and pain after skeletal maturation doesn't necessarily mean malignant transformation since the symptoms in these cases may be due to mechanical cause.

Conflicts of interest

No benefits in any form have been received or will be received from a commercial party related directly or indirectly to the subject of this article.

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