

Pseudotumor deltoideus: An underreported and misinterpreted cause of shoulder pain

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Abstract

Pseudotumor deltoideus refers to focal cortical irregularity and thickening at the deltoid insertion. It is benign in nature with a possible role as a tumor stimulator and possesses various anatomic variations. A well-defined area of cortical irregularity and radiological lucency at the deltoid insertion are uncommon radiological findings that pose a diagnostic dilemma. In this case report, we demonstrate a 45-year-old male with right shoulder pain along with radiological images indicative of the condition to make this previously less discussed entity more understandable. Cases of shoulder pain along with X-ray findings of cortical thickening in the proximal humerus should be investigated further with computed tomography (CT)/magnetic resonance imaging (MRI). Findings of an elongated lucency on CT and T2 hyperintensity in the cortex should help in the correct diagnosis of the condition. It should not be misdiagnosed as infective foci or a malignant entity and biopsy should be avoided.

Key words: Benign; cortical irregularity; deltoid; humerus; lucency, pseudotumor deltoideus; radiolucent; T1 isointense; T2 hyperintense

Introduction

The term Pseudotumor deltoideus was first coined in 2001 by Morgan *et al.* after they reported a study on five patients presenting with acute or subacute pain and observed similar findings at the deltoid insertion.^[1] They defined the various anatomic variations of benign character at the deltoid insertion [Figure 1A]. When a chronic avulsion injury of the deltoid tubercle and at the pectoralis major insertion in the proximal humerus has occurred, a cortical irregularity was observed in the deltoid insertion with specific radiological findings.^[2] Similar findings have been recorded in the latissimus dorsi insertion also in few case

reports, where patients presented with chronic pain and no trauma.^[3] The simultaneous presence of cortical irregularity and pain may mimic infection and lesions such as tumors, thus making these lesion potential areas of misdiagnosis which tend to be over investigated. The purpose of this article is to elucidate the lesser-known cause of shoulder pain. This report, to the best of our knowledge, constitutes one of the few reports on this rare and underreported entity in literature and the first case report from India on pseudotumor deltoideus.

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Case History

A 44-year-old male presented with complaints of intermittent moderate pain in the lateral part of his right shoulder and restricted range of motion with difficulty in lifting the arm which worsened with activity. There was no history of trauma, heavy weight lifting, or involvement in any sports. On examination, the movements of internal rotation and abduction of the shoulder caused moderate pain. Other supportive investigations including hemogram and serological test results were within normal limits.

On plain X-ray of the shoulder joint, we observed subtle changes showing a focal area of cortical thickening, and irregularity in the middle one-third of the humerus. [Figure 1B]

On investigating the lesion further with computed tomography (CT), an irregular hypodense lesion was seen in the intracortical location with the expansion of the overlying cortex [Figure 2]. On volume-rendered images, cortical irregularity and focal protuberance in this area were very evident [Figure 3].

On magnetic resonance imaging (MRI), eccentric cortical thickening and intracortical altered signal intensity, with expansion and irregularity, were observed. The lesion was isointense on T1 [Figure 4] and hyperintense on T2-weighted images with loss of normal cortical low signal in the lesion [Figure 5].

On the basis of these clinical and radiological findings, the diagnosis of pseudotumor deltoideus was drawn and further management on conservative lines was pursued. The patient was started on nonsteroidal anti-inflammatory drugs (NSAIDs) and anti-inflammatory analgesic medications, along with regular physiotherapy and hot fomentation and was called for follow up thereafter.

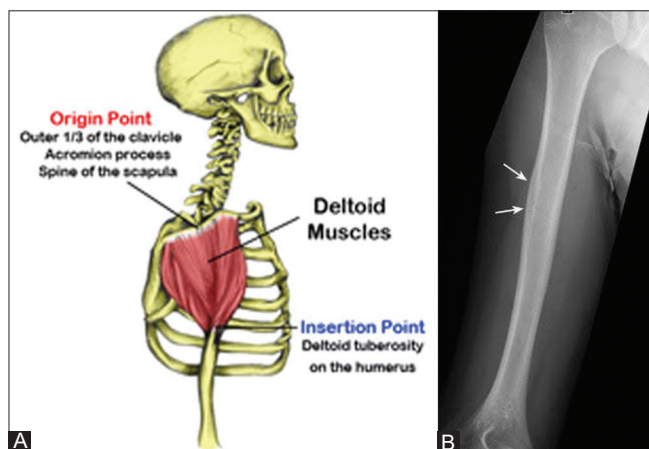


Figure 1 (A and B): (A) Normal insertion of deltoid muscle on the humerus. (B) AP radiograph of right humerus showing an ill defined area of cortical thickening and sclerosis at the deltoid insertion

At the 2-month follow-up examination, shoulder pain severity had considerably reduced and a full range of motion was restored. However, no change was observed in the MRI findings [Figures 6]. Further follow-up was advised in case of clinical deterioration.

Discussion

When a positive clinical history of shoulder pain is seen along with suspicious radiological findings like cortical thickening, irregularity, and lucency in the deltoid insertion area of the humerus, it can lead to unnecessary biopsy or radical treatment on the suspicion of a neoplastic lesion. Damron *et al.*^[2] observed a similarity between sarcoma symptoms and some sports-related injuries or pseudotumors and indicated that they could be a cause of potentially excessive treatment.

According to a study by Morgan *et al.*^[1] in five patients aged 25-76 years, two were determined to be asymptomatic and in three symptomatic patients, complaints included lateral shoulder and upper arm pain persisting for 10 weeks, 4 months, and 1 year. In their study, pseudotumor deltoideus was observed in the dominant arm of two patients. Our clinical findings were similar to those in the symptomatic cases described by Morgan *et al.* who reported shoulder pain as chronic or acute. However, here we noted subacute shoulder pain. In patients diagnosed with pseudotumor deltoideus by Morgan *et al.*^[1] cortical

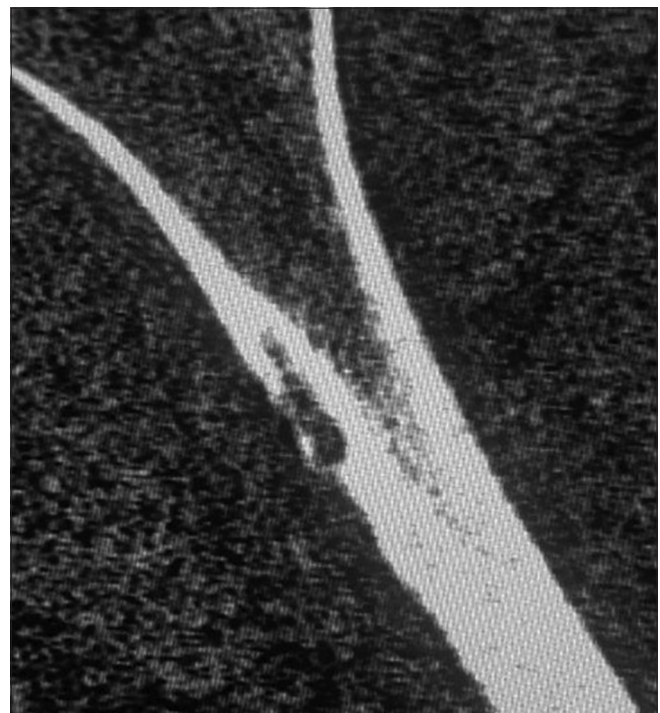


Figure 2: Humerus coronal CT showing well-defined cortical thickening, expansion, mild irregularity on the endosteal surface with irregular intracortical lucency at the deltoid muscle attachment area on the lateral side of the right humerus

thickening, irregularity, and intracortical lucency were observed on direct radiographs, generally in the deltoid insertion area.

A case report of a 61-year-old man by Adiguzel *et al.* showed similar findings of intracortical altered signal and irregularity at deltoid insertion and was diagnosed as pseudotumor^[4] Donnelly *et al.*^[5] reported the imaging findings of three adolescents aged 13–16 years with a history of sport or intense activity who were diagnosed

with chronic avulsion injury of the deltoid tubercle. Cortical thickening and irregularity were reported to have been observed in the deltoid insertion in the dominant arm.

According to Donnelly *et al.*^[5], high signal intensity was reported within the thickened cortex at the deltoid insertion



Figure 3: 3D Volume rendered image showing the cortical irregularity

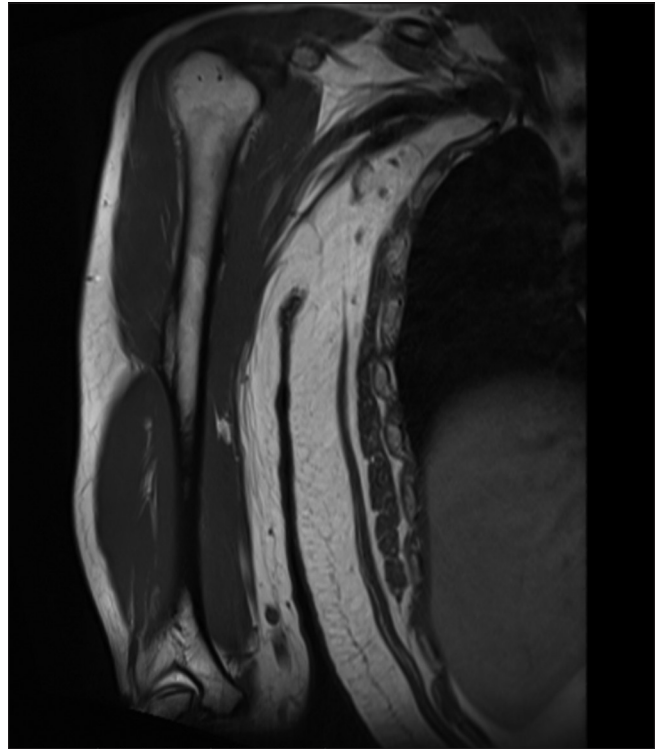


Figure 4: T1WI showing the isointense area of cortical thickening

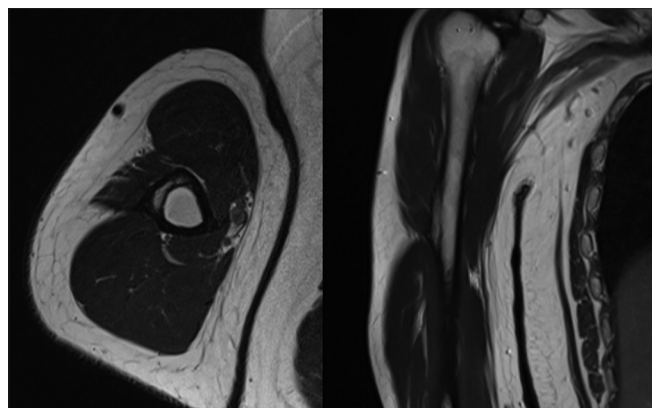


Figure 5: Axial and Coronal T2WI showing cortical irregularity with loss of normal hypointensity of the cortex

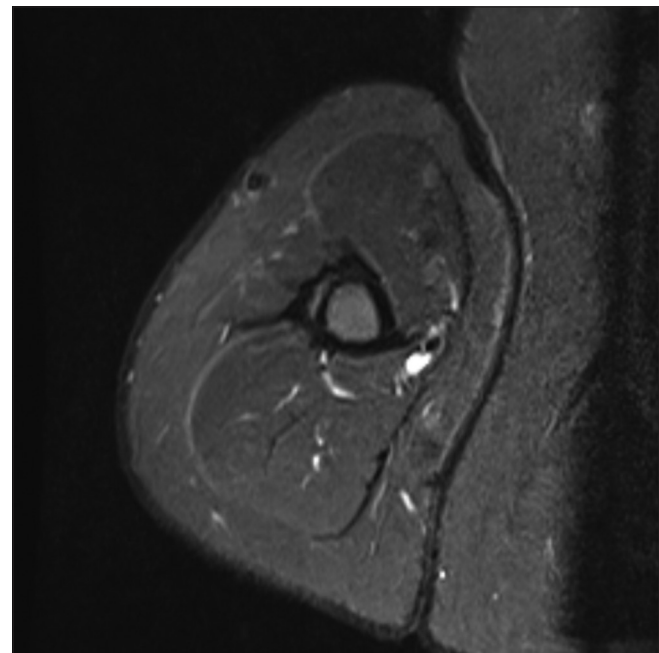


Figure 6: 2 months follow-up image shows no significant change in the MRI findings

site on T2-weighted images, and a signal increase was observed associated with or without edema in the soft tissue adjacent to the deltoid insertion.

In this case, cortical thickening and irregularity, and intracortical lucency were observed in the deltoid insertion. The findings on direct radiographs and CT were consistent with pseudotumor deltoideus and chronic avulsion injury of the deltoid. On MRI, no edema was observed in the soft tissue adjacent to the deltoid insertion. Pseudotumor deltoideus was diagnosed after considering patient age, symptoms, no history of injury from sports or other intense activity and imaging findings. The same was confirmed on 2 months follow-up scan after physiotherapy, NSAIDs, and conservative management leading to resolution of symptoms with unchanged radiological findings, proving it to be a benign self-limiting disease that does not require any undue biopsy.

The lesion bears a close similarity to various other conditions like avulsion injury fibrous, cortical defect, calcific tendinitis, which should be differentiated from the same. Avulsion injury at the insertion of the deltoid tendon shows a bony fragment at the donor site associated with soft tissue swelling in its acute stage and bony sclerosis can be seen in the chronic stage. Fibrous cortical defect presents as a well-defined intracortical lytic lesion at the metadiaphyseal region. It shows a thin rim of cortical thickening, however, it is not just limited to the region of the tendon insertion and no soft tissue component is evident.^[6] Calcific tendinitis is another differential, which should be considered. Here, tiny, focal calcific deposits occur in the soft tissue at the tendinous insertion site along with underlying cortical irregularity.^[7]

Conclusions

In young patients with subacute onset, severe lateral shoulder pain, where cortical thickening in the humerus deltoid insertion is accompanied by irregularity and

intracortical lucency on CT and T2 hyperintensity on MRI, a diagnosis of pseudotumor deltoideus should be considered. MRI is helpful in the differential diagnosis and unwanted biopsies should be avoided, which could potentially increase the cost of illness and reduce the patient discomfort.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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