CASE REPORT

Olecranon bursitis as initial presentation of gout in asymptomatic normouricemic patients

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Gout;
MRI features

Abstract  Background: Acute bursitis is a less frequent presentation of gout, especially in normouricemic subjects compared to the typical pattern of acute gouty arthritis.

Aim of the work: The aim of the current case reports is to describe the clinical and the magnetic resonance imaging features of acute gouty olecranon bursitis as initial presentation of acute gouty attack.

Case report: In this report we describe the clinical and MRI features of three cases presenting with acute gouty olecranon bursitis, in spite of normal serum uric acid and stable renal function. For all cases diagnostic aspiration was carried out to exclude septic bursitis as initial first step of management. The bursal fluid was also examined under Polarized microscopy and monosodium urate crystals were identified in the aspirated fluid with typical negative birefringence typical for urate crystals. The literature on MRI features of olecranon bursitis as atypical presentation of gout is reviewed.

Conclusion: Olecranon gouty bursitis can be the initial presentation of acute gouty attack and should be considered in the differential diagnosis in acute presentation after exclusion of sepsis. The importance of bursal fluid analysis in such atypical presentation to look for monosodium urate crystals and excluding bacterial infection is quite important clinical task in such atypical presentation.

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1. Introduction

Gouty arthritis is an inflammatory condition associated with debilitating clinical symptoms, functional impairments, and a substantial impact on quality of life. This condition is initially triggered by the deposition of monosodium urate (MSU) crystals into the joint space. This causes an inflammatory cascade...
resulting in the secretion of several proinflammatory cytokines and neutrophil recruitment into the joint [1].

Gout is considered the most common cause of arthritis in the elderly, due to an increase in risk factors such as renal diseases, metabolic syndrome, and rich purine diets. Specifically, the components of metabolic syndrome are the most common medical conditions associated with tophaceous gout [2]. A treat to target approach has the potential to improve patient outcomes in the management of gouty arthritis [3].

Gouty bursitis as initial presentation of gouty arthritis is a rare presentation of gout especially among cases with normal serum uric acid. The current report will shed light on that topic and review the literature regarding the MRI features of the causes of acute olecranon bursitis.

2. Cases presentation

In this report we present three male patients with initial presentation of acute onset of inflamed olecranon bursitis. The study was approved by the local ethics committee and all patients gave informed written consent.

The three cases share a similar clinical presentation of acute olecranon bursitis without prior history of trauma to the affected elbow joint and without previous arthritis in foot or other joints. The onset was acute with painful cystic swelling on the tip of the elbow joint, with overlying redness, hotness and tenderness but without restriction of the elbow range of motion. Anatomically the swelling is located just over the extensor aspect of the extreme proximal end of the ulna and contained sizable amount of fluid and clinically considered as acutely inflamed olecranon bursitis for further differential diagnosis (Fig. 1a).

For all cases immediate diagnostic aspiration (Fig. 1b) was carried out to exclude septic bursitis. The aspirated fluid was clear yellow in the first case (Fig. 1b), while it was yellow turbid and yellow cloudy in the other two cases respectively.

All the aspirated bursal fluids were sent for immediate white cell count (WBCs), red blood cells (RBCs) count analysis, and for immediate Gram staining for bacteria and showed negative results for bacterial growth. The bursal fluid was also examined under Polarized microscopy that identified monosodium urate (MSU) crystals in the aspirated fluid with a negative birefringence.

Laboratory findings showed elevated inflammatory markers like ESR 1st hour and CRP levels. While serum uric acid (SUA) and serum creatinine levels were all normal during the attack and all patients were not using thiazide or other diuretics. Detailed demographic and clinical characteristics and laboratory findings are summarized in Table 1.

Magnetic resonance imaging (MRI) studies were performed for all cases after their initial presentation to exclude underlying pathology. MRI studies showed evidence of acutely inflamed olecranon bursitis in all cases with distended bursal fluid (Figs. 2a and b and 3a and c) with thickened walls and enhancement in post contrast images. None showed septation or poorly defined margins or joint effusion. The underlying elbow joints were normal in all cases and no joint effusion or signal alteration in surrounding bones or muscles was noticed on MRI scans (Figs. 2c and d and 3b and d).

All cases started on empirical antibiotics after the diagnostic aspiration procedure which stopped shortly after the aspirates proved to be negative for bacterial growth and all patients started on colchicine instead and brief course of non-steroidal anti-inflammatory drug (NSAIDs). All patients improved on the previous regimen with no fluid reaccumulation reported after that.

3. Discussion

The etiology of gouty arthritis episodes among normouricemic patients is still unclear. It was suggested that the fluctuation in synovial urate level, as well as pH, ion strength, albumin, and globulin values relative to serum levels, could be involved in crystal formation. Given that acid–base and ionic–protein gradient may lead to instability of subsaturated urate solution, thereby predisposing to MSU crystals deposition within synovial membrane and inducing inflammation [4].

Olecranon bursitis (also informally known as “student’s elbow”, “Baker’s elbow”, “swellbow”, or “water on the elbow”) is a condition characterized by pain, redness and swelling around the olecranon, caused by inflammation of the elbow’s bursa. A bursa is a slippery, sac-like tissue that normally allows smooth movement around bony prominences, such as the point behind the elbow. When a bursa becomes inflamed, the sac fills with fluid. This can cause pain and a noticeable swelling behind the elbow. Olecranon bursitis is a clinical diagnosis, and MRI is rarely performed in this context. However in certain cases of suspected infection MRI can play an important diagnostic role in order to exclude advanced infection, abscess formation or underlying osteomyelitis.

To our knowledge this is the first report describing the MRI features of gouty olecranon bursitis and underlying joints in

![Figure 1](image-url)  (a) Showing the inflamed olecranon bursa, (b) showing the diagnostic aspiration procedure with clear yellow aspirates in the first case.
fresh cases. All patients showed normal SUA and creatinine levels and none had a history of podagra or arthritis elsewhere. None of them were recently using thiazide diuretics which are known to be associated with a significantly increased risk for recurrent gouty arthritis [5]. In our cases we observed surrounding soft tissue edema, bursal fluid distension, and rim wall enhancement on post contrast MR images but without marginal lobulation, or septation, or poorly defined margins, or underlying joint effusion, characteristic of olecranon septic bursitis when compared with other causes. In an important study Floemer et al. [6] performed contrast enhanced MRI of 35 patients with olecranon bursitis (septic, n = 14; nonseptic, n = 21) and none of their patients were diagnosed as gouty bursitis. In their report the authors observed that marked lobulation, marked complexity, marked soft-tissue edema, and thickening of the triceps tendon were more frequent MRI criteria and more severe among patients with olecranon septic bursitis when compared with other causes. In an important study Floemer et al. [6] performed contrast enhanced MRI of 35 patients with olecranon bursitis (septic, n = 14; nonseptic, n = 21) and none of their patients were diagnosed as gouty bursitis. In their report the authors observed that marked lobulation, marked complexity, marked soft-tissue edema, and thickening of the triceps tendon were more frequent MRI criteria and more severe among patients with olecranon septic bursitis and may indicate potential infection. In addition although marked bursa wall enhancement and marked soft-tissue enhancement were more frequent in the septic cases, still marked rim enhancement can be seen in most noninfected bursitis cases, and half of these noninfected bursae had marked soft-tissue enhancement as well [6]. Given that septic and nonseptic olecranon bursitis present with a considerable overlap of MRI findings: bursa septation, definition of bursa margins, amount of elbow effusion, and presence of triceps edema were nearly equally distributed. Potential indications for MRI evaluation of patients with olecranon bursitis are the exclusion of concomitant osteomyelitis or abscess formation. Important to note is that diagnostic bursal aspiration still remains the gold standard to differentiate septic and aseptic olecranon bursitis and to rule crystal deposition diseases like in our cases [6].

### Table 1

Demographic and laboratory findings of the three cases and bursal fluid analysis findings.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Case 1</th>
<th>Case 2</th>
<th>Case 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>55</td>
<td>74</td>
<td>60</td>
</tr>
<tr>
<td>Sex</td>
<td>Male</td>
<td>Male</td>
<td>Male</td>
</tr>
<tr>
<td>Weight</td>
<td>60</td>
<td>80</td>
<td>100</td>
</tr>
<tr>
<td>BMI</td>
<td>23.4 (normal weight)</td>
<td>26.1 (obese)</td>
<td>32.7 (obese)</td>
</tr>
<tr>
<td>Alcohol intake</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>DM</td>
<td>Negative</td>
<td>Positive</td>
<td>Positive</td>
</tr>
<tr>
<td>HTN</td>
<td>Negative</td>
<td>Positive</td>
<td>Positive</td>
</tr>
<tr>
<td>IHD</td>
<td>Negative</td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>CRP (mg/dl)</td>
<td>3.2</td>
<td>11.7</td>
<td>2.1</td>
</tr>
<tr>
<td>ESR1st hour (mm/h)</td>
<td>50</td>
<td>83</td>
<td>46</td>
</tr>
<tr>
<td>HB (g/dl)</td>
<td>10.7</td>
<td>12.8</td>
<td>13.1</td>
</tr>
<tr>
<td>WBCs (×10^3/mm^3)</td>
<td>5.4</td>
<td>6</td>
<td>9.3</td>
</tr>
<tr>
<td>Platelets (×10^3/mm^3)</td>
<td>270</td>
<td>350</td>
<td>334</td>
</tr>
<tr>
<td>Serum creatinine (mg/dl)</td>
<td>0.4</td>
<td>0.6</td>
<td>0.5</td>
</tr>
<tr>
<td>Serum uric acid (mg/dl)</td>
<td>6.6</td>
<td>4.1</td>
<td>5.2</td>
</tr>
</tbody>
</table>

**Bursal fluid analysis**

- **Color**
  - Turbid yellow
  - Cloudy
  - Turbid

- **Viscosity**
  - Absent
  - Absent
  - Absent

- **White cell count (cells/mm^3)**
  - 1030
  - 30,000
  - 15,000

- **PMN (%)**
  - 87%
  - 45%
  - 60%

- **RBC (cells/mm^3)**
  - 25
  - 100
  - 46

- **MSU crystals**
  - Positive
  - Positive
  - Positive

- **Culture and sensitivity**
  - Negative
  - Negative
  - Negative

BMI, body mass index; DM, diabetes mellitus; HTN, hypertension; IHD, ischemic heart diseases; ESR, erythrocyte sedimentation rate; CRP, C-reactive protein; Hb, hemoglobin; WBCs, white blood cells; PMN, polymorphonuclear leukocytes; MSU, monosodium urate crystals.

**Figure 2**

Case 1: (a) axial T2 FSE weighted MR image showing distended olecranon bursa with thickened walls, (b) Sagittal T2 FAT SAT showing the same features with subcutaneous edema, (c) axial, (d) Sagittal T1 FAT SAT post contrast showing enhancing margins with fluid distension and peribursal subcutaneous inflammation.
A further report describes gouty inflammation of the pes anserine bursa that was identified as a previously unrecognized manifestation of acute gout [10]. The coexistence of acute gout and septic olecranon bursitis at the elbow is also presented in an asymptomatic normouricemic case, the hypothesis is that monosodium urate crystals, present in the bursa could secondarily have been triggered by the infection [11].

Rarely gouty and septic arthritis can coexist, and still the mechanisms responsible for such coexistence remain to be elucidated [12]. Prompt aspiration and analysis of the synovial fluid are imperative, regardless of the absence of fever or leukocytosis. Culture of the aspirated synovial fluid is warranted in gouty attack, even when it has a low white cell count or the Gram stain reveals no organisms [13].

In conclusion, Acute gouty olecranon bursitis as atypical presentation in normouricemic subjects should be taken into consideration as one of the presentations of gouty attacks, although not frequently reported. Diagnostic aspiration is mandatory to exclude associated infection or other causes of synovitis [14], for appropriate management decisions.

Conflict of interest

All the authors responsible for this work declare no conflict of interest.

References