Bilateral Glenohumeral Septic Arthritis Secondary to Retroperitoneal Abscess


Abstract

Glenohumeral septic arthritis is rare and usually a result of Staphylococcus aureus infection. Gram-negative septic arthritis is on the increase and is usually associated with intra-abdominal pathology. We present a case of bilateral E. coli glenohumeral septic arthritis associated with retroperitoneal abscess and discuss pitfalls in diagnosis and management.

Glenohumeral septic arthritis is a rare condition and accounts for 4% to 14% of all cases of septic arthritis. There are local and systemic factors that predispose to glenohumeral septic arthritis (Table 1). Staphylococcus aureus is the most common causative organism of infectious arthritis in adults, accounting for 50% of cases. Other organisms involved include streptococci, gram-negative bacilli, and Neisseria gonorrhoeae (in sexually active young adults). The occurrence of gram-negative septic arthritis appears to be on the increase, with Escherichia coli accounting for about one-third of gram-negative cases.

We discuss a case of bilateral glenohumeral E. coli septic arthritis secondary to a latent retroperitoneal diverticular abscess.

Case Report

An 86-year-old female with a long-standing history of generalized osteoarthritis presented with a 1-week history of bilateral shoulder pain and a sudden deterioration in shoulder movement, despite the use of various simple analgesics. The pain was not made worse by neck movements, was not associated with any neurological symptoms, and did not radiate. There was no history of recent injury, but she had sustained a conservatively treated traumatic fracture of her right humerus 5 years previously. She denied any fever and had been systemically well. Past medical history included autoimmune hepatitis, hypertension, right total knee replacement, and a percutaneously-drained diverticular abscess 3 years prior.

Physical examination showed the patient to be hemodynamically stable and apyrexial. Both shoulders were obviously swollen and the range of movement was severely limited by pain, both actively and passively. There were no overlying skin changes. Abdominal examination revealed a scar in the left iliac fossa from the previously drained diverticular abscess. There were no audible cardiac murmurs. The remainder of the physical examination was unremarkable.

Initial laboratory investigations were as follows: C-reactive protein, 288 mg/L; and white blood cell count, 10.7 $\times\ 10^9$/L. Shoulder radiographs revealed bilateral loss of joint space, proximal migration of the humeral head, and sourcil sign (erosion of the inferior acromial surface), consistent with rotator cuff tear arthropathy (Fig. 1). As the patient was apyrexial, blood cultures were not performed. Fifteen milliliters of straw-coloured fluid were aspirated under aseptic conditions from both shoulders. Initial gram-staining revealed numerous polymorphs but no organisms, bilaterally. Twenty-four hours following aspiration, E. coli sensitive to ciprofloxacin was noted to be growing from both aspirates. She, therefore, underwent prompt bilateral arthroscopic shoulder washout, 3 days following admission. Oral ciprofloxacin therapy was commenced. Postoperatively, she made a slow recovery and the C-reactive protein was monitored regularly but remained elevated at 100 mg/L, 19
days postoperatively.

Two weeks postoperatively, the scar in the left iliac fossa region broke down, resulting in the steady discharge of purulent fluid. CT scan of the abdomen and pelvis demonstrated a small intra-pelvic collection, probably secondary to diverticular disease of the sigmoid colon (Fig. 2). This was treated conservatively. No organisms, other than a light growth of coagulase negative *Staphylococcus*, were cultured (patient had been on ciprofloxacin for 2 weeks at this stage). However, previous samples of pus from the percutaneous diverticular abscess drainage had cultured *Coliform* species, 3 years previously. The C-reactive protein steadily decreased thereafter, 33 mg/L, 5 weeks postoperatively. Her range of movement in both shoulders remained limited due to her pre-existing rotator cuff arthropathy.

**Discussion**

Bilateral glenohumeral septic arthritis is rare. Only four cases have previously been reported; two neonates,6 one teenager,7 and one adult with rheumatoid arthritis.8 Septic arthritis most commonly results from hematogenous spread. However, direct spread from a surrounding infective process, such as osteomyelitis and traumatic and iatrogenic inoculation, are other recognized routes of infection.

*E. Coli* septic arthritis is extremely rare, usually monoarticular, and most commonly affects the hip. Knee, shoulder, and sacroiliac involvement have also been described.2 Retroperitoneal abscesses are a recognized cause of *E. Coli* septic arthritis, usually occurring by direct or fistulous spread to the hip or sacroiliac joints.9-11

Our case demonstrates hematogenous spread of *E. Coli* from a retroperitoneal abscess, resulting in bilateral glenohumeral septic arthritis. There are several learning points to learn from this unusual case (Table 2). The patient’s pre-existing bilateral cuff tear arthropathy and its associated inflammatory process was a predisposing factor to her septic arthritis.

A negative gram stain from an initial aspirate could have led to the assumption that the symptoms were due to an acute exacerbation of the arthropathy or a frozen shoulder. This highlights the importance of awaiting the results of a full culture and sensitivity before dismissing the diagnosis

**Table 1 Predisposing Factors to Glenohumeral Septic Arthritis**

<table>
<thead>
<tr>
<th>Local</th>
<th>Systemic</th>
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<tbody>
<tr>
<td>Osteoarthritis</td>
<td>Diabetes mellitus</td>
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<tr>
<td>Rheumatoid arthritis</td>
<td>Immunosuppression</td>
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<tr>
<td>Avascular necrosis</td>
<td>Malignancy</td>
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<td>Intraarticular injections</td>
<td>Intravenous drug use</td>
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<td>Direct trauma</td>
<td>Renal failure</td>
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<td>Radiotherapy</td>
<td>Liver cirrhosis</td>
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Figure 1 AP radiographs of shoulders, demonstrating loss of joint space (thick arrows) and sourcil sign (thin arrows).

Figure 2 Axial CT scan of pelvic collection (thin arrow) with fistula (thick arrow) through anterior abdominal wall.
Table 2  Summary of Learning Points

1. Pre-existing joint pathology predisposes to septic arthritis.
2. Negative gram staining does not rule out septic arthritis.
3. Failure of the inflammatory markers to normalize should raise the suspicion of concurrent sources of infection.
4. Abdominal screening should be considered in cases of *E. Coli* septic arthritis.

of septic arthritis altogether.

Failure of the inflammatory markers to normalize after joint washout should raise the suspicion of recurrence or the possibility of a concurrent source of infection. In cases of septic arthritis due to *E. Coli*, it is important to consider intra-abdominal or intra-pelvic sources of infection. An abdominal ultrasound may be a useful screening tool to rule out abdominal or urinary tract pathology in any patient with a confirmed *E. Coli* septic arthritis. An early ultrasound and drainage in this case may have prevented fistulation of the retroperitoneal abscess through the abdominal wall.

Disclosure Statement
None of the authors have a financial or proprietary interest in the subject matter or materials discussed, including, but not limited to, employment, consultancies, stock ownership, honoraria, and paid expert testimony.

References