A case of mistaken identity: pseudogout in a prosthetic knee

Introduction

This article presents a case of pseudogout affecting a prosthetic joint several years after a primary total knee arthroplasty. This case highlights the need to consider pseudogout in the differential diagnosis of patients presenting with knee pain and swelling after total knee arthroplasty. As this case demonstrates, accurate diagnosis of pseudogout can save the patient from unnecessary surgical interventions.

Discussion

Pseudogout is a term coined by McCarty et al (1962). It describes a disease similar to gout but which is characterized by the deposition of calcium pyrophosphate dihydrate crystals within joints. Pseudogout of native knee joints is common. McCarty et al (1996) examined knee menisci from 215 cadavers and found calcium pyrophosphate dihydrate crystals present in 3.3% of the cadavers. However, only a few cases of pseudogout after total knee arthroplasty have been reported (Holt et al, 2005; Hirose and Wright, 2007; Sonsale and Philipson, 2007; Harato and Yoshida, 2012).

This article has presented a case of pseudogout occurring after total knee arthroplasty, highlighting the difficulty in distinguishing between pseudogout and septic arthritis. In both these conditions the affected joints are characterized by pain, swelling, erythema and heat. Owing to activation of the systemic inflammatory response both pseudogout and septic arthritis can present with pyrexia and raised inflammatory markers. Synovial fluid analysis of joints affected by both these conditions shows a raised white cell count with a differential neutrophil count in excess of 90% (Dougados, 1996). The diagnosis of pseudogout is supported by the demonstration of calcium pyrophosphate dihydrate crystals in the synovial fluid (Zhang et al, 2011a). On polarizing light microscopy calcium pyrophosphate dihydrate crystals appear as weakly positive birefringent needle-shaped, rhomboid or parallelepipedic shaped crystals (Pascual et al, 2011).

Unlike septic arthritis, pseudogout is a self-limiting condition and only symptomatic treatment is required. The treatment options for pseudogout include ice packs, temporary rest, non-steroidal anti-inflammatory drugs, colchicine and intra-articular injection of steroids (Zhang et al, 2011b). Unlike the report by Holt et al (2005), in the current case the diagnosis of pseudogout was made before surgical intervention, so the patient was treated conservatively. By day 4 there was complete resolution of symptoms and there was no need for antibiotics or revision surgery.

Pseudogout of prosthetic knee joints is uncommon. Nevertheless, it should be considered in the differential diagnosis of acutely inflamed prosthetic knee joints. It is important to accurately diagnose pseudogout of prosthetic knee joints, as it can be successfully treated with non-operative measures alone. The key to diagnosing pseudogout is demonstrating the presence of calcium pyrophosphate dihydrate crystals in the synovial fluid using polarizing light microscopy. Joint aspiration is indicated in all patients presenting with knee pain and swelling after total knee arthroplasty. The authors recommend that the joint aspirate is routinely sent for crystal analysis as well as Gram stain, microscopy, culture and biochemical analysis. Accurate diagnosis of pseudogout can save the patient from inappropriate treatments, such as unnecessary antibiotics and multiple needless surgical interventions. BJHM

Dr Anand P Swayamprakasam *is CT1 in Trauma and Orthopaedics,* **Mr Syed Taqvi** *is Specialist Registrar in Trauma and Orthopaedics and* **Mr Saqif Hossain** *is Consultant in Trauma and Orthopaedics, Royal Oldham Hospital, Oldham OL1 2JH*

Correspondence to: Dr AP Swayamprakasam (aps49@doctors.org.uk)

Dougados M (1996) Synovial fluid cell analysis. *Baillieres Clinical Rheumatol* **10**(3): 519–34

Harato K, Yoshida H (2012) Pseudogout in the early postoperative period after total knee arthroplasty. *J Arthroplasty* Apr 20 (Epub ahead of print)

Hirose CB, Wright RW (2007) Calcium pyrophosphate dihydrate deposition disease (pseudogout) after total knee arthroplasty. *J Arthroplasty* **22**(2): 273–6

Holt G, Vass C, Kumar CS (2005) Acute crystal arthritis mimicking infection after total knee arthroplasty. *BMJ* **331**(7528): 1322–3

McCarty DJ, Jogan JM, Gatter RA, Grossman M (1996) Studies on pathological calcifications in human cartilage: prevalence and types of crystal

Case Report

A 90-year-old woman presented with a 24-hour history of left knee pain. Four years previously she had undergone left total knee arthroplasty for osteoarthritis. On examination the left knee was swollen, tender and warm to touch. The range of motion was limited to 5–20° of flexion. She had a low-grade pyrexia of 37.7°C. Blood analysis revealed a normal white cell count (7.1 x 10^9 cells/litre) but elevated C-reactive protein level of 32.0 mg/litre. Radiographs of the knee were unremarkable.

A provisional diagnosis of prosthetic joint infection was made and the patient was started on intravenous benzylpenicillin and flucloxacillin. Subsequently, joint aspiration was performed and 10 ml of turbid fluid was aspirated and sent for microbiology and biochemical analysis. No organisms were seen on Gram staining. However, intracellular calcium pyrophosphate dihydrate crystals were seen with a white cell count of 1.1 x 10^{11} cells/litre. Despite the joint aspirate finding the diagnosis of prosthetic joint infection was not revised as the patient had received a single dose of both antibiotics before aspiration and had no previous history of crystal arthropathy.

Intravenous antibiotics were continued and the patient was transferred to the authors' centre on day 4 for revision surgery. By this stage the patient had made a full recovery. She was pain free and had full range of knee motion. The diagnosis of prosthetic joint infection was revised to pseudogout and revision surgery was not performed. The antibiotics were discontinued and the patient was discharged. To date the patient has not been troubled by that knee.

deposition in menisci of two hundred fifteen cadavers. *J Bone Joint Surg Am* **48**(2): 309–25
McCarty DJ, Kohn NN, Faires JS (1962) Significance of calcium pyrophosphate crystals in synovial fluid of arthritis patients: "pseudogout syndrome". *Ann Intern Med* **56**(1): 711–37
Pascual E, Sivera F, Andrés M (2011) Synovial fluid analysis for crystals. *Curr Opin Rheumatol* **23**(2): 161–9
Sonsale PD, Philipson MR (2007) Pseudogout after total knee arthroplasty. *J Arthroplasty* **22**(2): 271–2
Zhang W, Doherty M, Bardin T et al (2011a) European League Against Rheumatism recommendations for calcium pyrophosphate deposition. Part I: terminology and diagnosis. *Ann Rheum Dis* **70**(4): 563–70
Zhang W, Doherty M, Pascual E et al (2011b) EULAR recommendations for calcium pyrophosphate deposition. Part II: management. *Ann Rheum Dis* **70**(4): 571–5

LEARNING POINTS

- Pseudogout should be excluded in all patients presenting with knee pain and swelling after total knee arthroplasty by polarizing light microscopy of the synovial fluid aspirate.
- Pseudogout of prosthetic joints can be successfully treated with conservative measures alone.

An unusual cause of bowel obstruction: caecal volvulus

A 70-year-old woman who had previously undergone anterior resection for rectal cancer presented with a 4-day history of abdominal distension and absolute constipation. On examination, the abdomen was diffusely tender with no signs of peritonism or sepsis.

Abdominal radiography showed a markedly distended air-filled viscus extending to the left upper quadrant, suggesting a diagnosis of caecal volvulus (*Figure 1*). This was distinguished radiologically from a distended stomach by identifying colonic haustrations (*Figure 1*, arrows).

Contrast-enhanced computed tomography demonstrated closed loop obstruction with massively distended caecum and collapsed distal colon. Twisting of the mesenteric vessels producing the 'whirl sign' was highly suggestive of intestinal volvulus (*Figure 2*).

Mr Sofronis Loizides *is Specialist Trainee in General Surgery,* **Dr Anastasia Hadjivassiliou** *is Foundation Year 2 Doctor,* **Mr Mohammed M Uzzaman** *is Specialist Trainee in General Surgery,* **Mr Subash P Vasudevan** *is Specialist Registrar in General Surgery and* **Mr Daren Francis** *is Consultant Laparoscopic and Colorectal Surgeon in the Department of Surgery, Chase Farm Hospital, Middlesex*

Correspondence to: Mr S Loizides, Specialist Registrar in General Surgery, Department of Surgery, Worthing Hospital, West Sussex BN11 2DH (sofronis.loizides@gmail.com)

Figure 1. Upright abdominal radiograph demonstrating a dilated caecum with its long axis extending to the left upper quadrant. The arrows point to colonic haustrations.

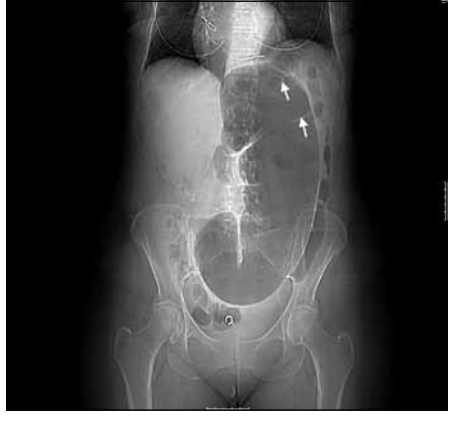
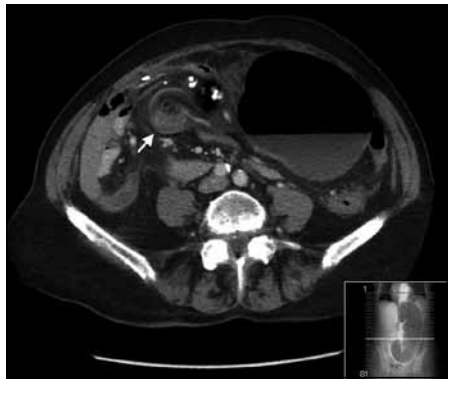


Figure 2. Axial contrast-enhanced computed tomography demonstrating distension of the caecum. Arrow points to 'whirl sign'.



The patient underwent a laparotomy, which confirmed the radiological findings (*Figure 3*). A right hemicolectomy with end-to-end anastomosis was performed, followed by an uneventful recovery.

Caecal volvulus can arise from incomplete embryological fixation of the right colon to retroperitoneal structures or as a result of adhesions acting as pivot points for rotation (Habre et al, 2008).

Diagnosis is based on clinical features of bowel obstruction and classical radiographic findings. Computed tomography can confirm the diagnosis, but should not delay treatment especially when features of peritonism are present. BJHM

Habre J, Sautot-Vial N, Marcotte C, Benchimol D (2008) Caecal Volvulus. *Am J Surg* **196**: e48–9

Figure 3. Intraoperative finding of distended U-shaped caecum with torted mesentry at its base.