Three cases of septic arthritis following a recent arthroscopic procedure

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SUMMARY

We report three cases of septic arthritis in patients who presented with a painful, swollen and suppurative knee joint following a recent arthroscopic procedure, 8–15 days prior to attendance. In all three cases, patients presented with pain and swelling of the affected knee joint with discharge from the port sites. All were sent for washout of the affected joint and received intravenous antibiotic cover. Any patient presenting within 1 month of a recent arthroscopic procedure with pain and swelling of that joint should be presumed to have septic arthritis until proven otherwise. They must have urgent treatment in the form of joint washout and intravenous antibiotics, and receive 6 weeks oral antibiotics on discharge.

BACKGROUND

The invasion of any joint by a microorganism must be treated as a surgical emergency. In the majority of cases only a single joint is affected. Any hot, swollen and painful joint should be considered septic until proven otherwise. Common organisms implicated in septic arthritis include *Staphylococcus aureus*, *Haemophilus influenzae* and *Neisseria gonorrhoea*. These organisms invade the joint through several different mechanisms, including direct inoculation, local extension from nearby osteomyelitis or via haematogenous spread.

Local factors such as arthritis, joint trauma and gout can increase the risk of pyogenic arthritis in the same joint. Septic arthritis can also occur following operative procedures including joint arthroplasty and arthroscopy, due to extensive dissection, increased operative time and use of bone cement for securing prosthesis, all of which are known to be significant factors in the development of post-operative septic arthritis.¹

Any patient presenting with an increasingly painful knee within a month of an arthroscopy must be presumed to have septic arthritis until proven otherwise. They must have urgent treatment in the form of joint washout and intravenous antibiotics and this should occur in spite of aspirate results in this high-risk patient group.

CASE PRESENTATION

Case 1

A 35-year-old Nigerian man presented with a 1-day history of a painful, swollen left knee following an arthroscopic medial meniscectomy 15 days back. He had felt generally unwell for the past 24 h, otherwise he was relatively fit and well with the only thing of significance in his medical history being a healed gastric ulcer. On examination, the gentleman was unable to bear weight. His left knee

was warm to touch with a large effusion confirmed by the presence of a patellar tap. His knee was maximally tender posteriorly, with a range of movement of only 10–70°. In addition, fluid was seen streaming from the port sites.

Case 2

A 39-year-old man attended the orthopaedic outpatient department following an arthroscopic debridement of his right knee 8 days back. He had considerable orthopaedic medical history including an anterior cruciate ligament (ACL) rupture and resulting arthritis. He reported considerable bleeding from the arthroscopy wounds with a 48 h history of increasing knee pain and inability to bear weight. In addition, he complained of feeling generally unwell with fever and pronounced sweating. On examination, his right knee was swollen and had a range of movement restricted by pain to 10–50°. Frank pus was leaking from the wound sites.

Case 3

A 58-year-old lady attended the emergency department with a 6-day history of pain in her left knee and difficulty to bear weight. She had undergone a left knee arthroscopy in Brazil 2 weeks prior to her attendance. She reported that the stitches had been removed 4 days ago and that there had been constant leaking from the port sites since but she had remained systemically well. Her medical history was unremarkable. She had undergone an uncomplicated right knee arthroscopy for osteoarthritis 6 years back and reported a significant difference in her postoperative pain and range of motion. On examination, she was unable to bear weight, there was a small effusion present and flexion was restricted to 40° due to stiffness. Turbid fluid was coming from the medial knee wound.

INVESTIGATIONS

Case 1

Radiological images of the knee joint showed evidence of an effusion, but no bony injury. The knee was aspirated and 10 mls blood stained but otherwise transparent yellowish fluid was sent to microbiology. Bloods showed that his white blood cell count (WCC) was within the normal range, C reactive protein (CRP) was 57 and erythrocyte sedimentation rate (ESR) was 72. The Gram stain identified white and red cells, but no organisms or crystals. Culture was positive for *S aureus*.

Case 2

Radiological images were unremarkable. Aspiration of the knee joint was attempted but no sample was

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obtainable, therefore fluid coming from one of the arthroscopic portals was sent for urgent Gram stain and culture. The WCC was 11.3, CRP was elevated at 203 but the ESR was 17. White and red cells were seen on the Gram stain but it was negative for organisms and crystals. Culture was positive for *S aureus*.

Case 3

Radiology was unremarkable. The joint was aspirated and 12 mls of turbid fluid was sent for Gram stain and culture. The WCC was normal, CRP was mildly elevated at 33 and the ESR was 40. Red and white cells were seen on Gram stain but there were no organisms or crystals. Culture was positive for *Serratia marcescens*.

TREATMENT

Case 1

This gentleman went on to have a left knee washout the same evening and intravenous flucloxacillin was prescribed. Initial washout was quite purulent and a second washout was performed 2 days later. His temperature and CRP improved and he was discharged with a 6-week course of oral flucloxacillin.

Case 2

Two separate arthroscopic washouts of his knee joint along with an arthrotomy and lavage with excision of osteophyte were performed. Intravenous vancomycin was started after the first operation. Antibiotics were stepped-down to oral flucloxacillin and fucidic acid which were continued for 6 weeks following discharge.

Case 3

The patient underwent an emergent arthroscopic washout. *S marcescens* had grown within the knee and it was found to be sensitive to ciprofloxacin. The patient was treated with intravenous antibiotics and when clinically settled she was discharged with a further 6 weeks course of oral antibiotics.

OUTCOME AND FOLLOW-UP

Case 1

At 6-week follow-up, clinically septic arthritis of his left knee had improved, swelling had settled and range of movement was virtually normal. CRP was 16. No further follow-up was arranged for this gentleman as he returned to Nigeria and follow-up was arranged locally.

Case 2

This gentleman was reviewed in clinic 8 weeks following discharge. His CRP was 44 which was a considerable improvement from the CRP of 203 on initial presentation. He had good range of movement of his knee joint. He was advised to continue a further 2 weeks of antibiotics and underwent repeat CRP at next clinic appointment, which proved normal.

Case 3

Her condition improved. She returned to Brazil for follow-up.

DISCUSSION

Diagnosing septic arthritis is dependent on clinical evaluation, synovial fluid analysis and culture of aspirate. Prompt identification and treatment is important in order to eradicate infection and prevent complications of protracted synovitis, cartilage damage and joint destruction.

The majority of cases are caused by haematogenous spread, direct inoculation or local extension. Arthroscopy contributes to

direct inoculation by conveying organisms through instruments, into the joint space, where they cause an acute inflammatory response of the synovial membrane/fluid. One recent study in Germany estimated that the rate of infection following arthroscopy was 0.13%, based on evaluation in 66 centres between 2001 and 2008.² Various factors were shown to increase risk of infection, such as inadequate sterilisation of equipment, duration of surgery and extent of arthroscopic intervention.³

Patient-related factors also play a part in contracting septic arthritis following arthroscopy, most notably those with a history of osteo/rheumatoid arthritis and gout.

There is no evidence that perioperative antibiotic prophylaxis plays a role in preventing post arthroscopy septic arthritis. Several studies have even shown this to be detrimental to recovery due to increased risk of contracting *Clostridium difficile* associated diarrhoea and allergic reaction.⁴ Antibiotics are usually given at induction of anaesthesia, however the main emphasis for prevention is proper sterilisation of equipment and to minimise operative times without compromising patient safety.

Post operatively, antibiotic therapy is indicated, typically a third-generation cephalosporin, due to increasing resistance to penicillin and the preponderance for *S aureus* as the causative organism. In the third case, *S marcescens* was isolated from the aspirate. As far as we are aware, few cases of postoperative *Serratia* joint infection have been reported in the UK. *S marcescens* is a Gram-negative enterobacterium, intrinsically resistant to cephalosporins. This emphasises the importance of microbiological analysis as a guideline for resistance-adapted antibiotic treatment.

Laboratory investigations such as WCC are also of limited diagnostic value. A study by Mehta *et al*⁵ identified 40% of those with an acute septic arthritis had a leucocyte count <10 000/ml. That said, low WCC cannot rule out joint infection. This is supported by the three cases presented here. In the same study, CRP was shown to be increased in >95%.⁵

In these cases, any patient presenting within 1 month of arthroscopic procedure should be presumed to have a septic joint. Washout is the definitive treatment. For arthroscopic washout to be effective, it is continued until outflow fluid is clear, usually requiring 3–6 litres and may have to be repeated. Antibiotic cover should be continued for 6 weeks postoperatively with follow-up CRP levels conducted to ensure absence of infection. In addition, physiotherapy and early mobilisation, as much as pain will allow, should encourage early return of normal function.

Learning points

- ▶ All cases of septic arthritis that present within 1 month of arthroscopic procedure should be referred for urgent surgical washout.
- ▶ Aspirate of joint fluid should be sent for urgent Gram stain and culture, so that appropriate antibiotic therapy can be started in addition to washout.
- ▶ Oral antimicrobial therapy should be continued for at least 6 weeks following washout.

Competing interests None.

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