

A Case Report Of Salmonella Infection Of A Total Knee Replacement Following Gastrointestinal Sepsis

S Boulis, A Wee, M Bowditch

Citation

S Boulis, A Wee, M Bowditch. *A Case Report Of Salmonella Infection Of A Total Knee Replacement Following Gastrointestinal Sepsis*. The Internet Journal of Orthopedic Surgery. 2005 Volume 3 Number 2.

Abstract

Salmonella infection of a joint prosthesis is extremely rare. We present a case of delayed diagnosis of Salmonella enteritidis infection of a knee replacement. The infection spread to the joint during a previous episode of sepsis through haematogenous route in the absence of immunosuppression.

Early recognition of haematogenous spread and early aggressive treatment are crucial to prevent development of significant loosening and joint destruction. The patient underwent a two-stage revision arthroplasty. No signs of re-infection have appeared 18 months after surgery.

INTRODUCTION

Periprosthetic infection is a devastating complication in joint replacement surgery and develops in 0.5% - 2% of cases (1). Salmonella infection of a joint prosthesis has rarely been reported in the English literature (1,2,3,4,5,6).

We present a case of delayed diagnosis of Salmonella infection of a knee replacement leading to prosthetic loosening and joint destruction and requiring a 2-stage revision surgery.

CASE REPORT

A 66-year-old lady with an original diagnosis of medial compartment osteoarthritis of the knee had numerous previous procedures including tibial osteotomies and a unicompartmental knee replacement in 1988. The latter failed after 3 years and in 1991 she underwent a cemented knee replacement.

In April 2002 the patient was admitted as an emergency with acute upper abdominal pain, sepsis and profuse diarrhoea. Her inflammatory markers were WCC of 46, ESR of 60 and CRP of 120. Her blood and stool cultures, abdominal ultrasound and CT scans were negative. She underwent an emergency laparotomy that did not reveal a clear source of sepsis. The episode resolved post-operatively with delayed treatment with intravenous followed by oral ciprofloxacin.

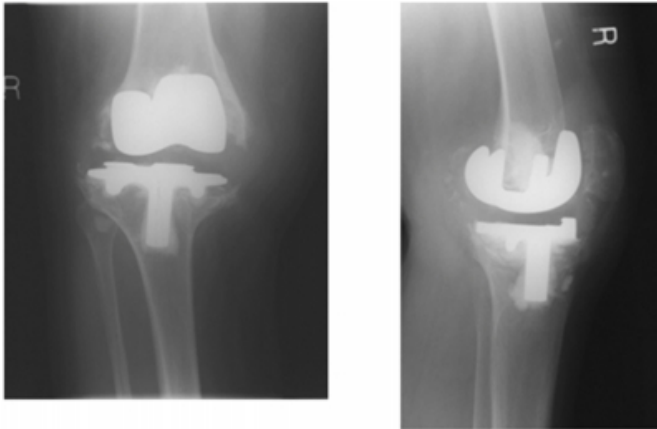
In May 2002, following recovery from the abdominal sepsis, her knee started to swell and became hot especially towards the end of the day. The possibility of haematogenous spread during the previous abdominal sepsis to the knee resulting in a significant deep infection was not recognised. She was referred to our clinic in September 2004.

She presented to our clinic with severe knee pain which made her wheelchair bound. On examination, she had a sinus over the antero-medial aspect of the knee. There was a marked varus deformity of the knee.

The radiographs shown in Figure 1 reveal a loose implant with bone loss on the medial side of the femur and tibia resulting in severe mal-alignment. Previous radiographs of the knee in 2001 did not show evidence of loosening.

Figure 1

Figure 1: Anterior-posterior and lateral radiographs of the right knee showing the original knee replacement in situ with lateral subluxation



The inflammatory markers were raised ESR at 30 and CRP at 60. The isotope bone scan revealed increased activity. In light of these findings, she underwent a two-stage revision knee replacement. The first stage in November 2004 involved excision of the prosthesis, thorough soft tissue debridement, and insertion of articulating cement spacer. Microbiological culture of the implant and specimens were positive for *Salmonella enteritidis* sensitive to ciprofloxacin. She was treated with oral ciprofloxacin (500mg twice daily) for two months. The wound healed and her inflammatory markers settled to normal. She underwent the second stage of the revision in January 2005; implantation of a rotating hinge total knee replacement (Figure 2) was carried out. The rotating hinge knee prosthesis was used due to the bone loss on the medial side of the femur and tibia. She made an excellent recovery and at follow-up of 12 and 15 months was pain free and mobilising well with no signs of infection.

Figure 2

Figure 2: Anterior-posterior and lateral radiographs of the right knee showing the rotating hinge knee replacement.



DISCUSSION

Salmonella lives in the intestinal tract of humans and other animals. It is usually transmitted to humans by ingestion of foods contaminated with animal faeces. There are three species of *Salmonella*; *S. enteritidis*, *S. typhi*, and *S. cholerae-suis*. In areas where salmonellosis is endemic *S. enteritidis* remains uncommon as a species causing joint infection (7).

Salmonellosis may present as one of several syndromes including gastroenteritis, enteric fever or septicaemia. Most patients infected with *Salmonella* develop fever, diarrhoea and abdominal cramps. Determining that *Salmonella* is the cause of the illness depends on laboratory tests to identify it in the stools of the infected patient. The tests are sometimes not performed unless the laboratory is instructed specifically to look for the organism. Nduati RW et al. had reported that every effort should be made to obtain two bacteriological specimens for culture to improve bacteriological diagnosis of the disease (8).

A prosthetic joint is at risk of bacterial infection during a period of bacteraemia through haematogenous spread of infection. This was not recognised at the time of presentation with knee problems. The cost of the delayed diagnosis from lack of early recognition and early aggressive treatment was

significant loosening and joint destruction.

Although no organisms were cultured in this case in 2002, clinical improvement occurred with ciprofloxacin. *Salmonella* was cultured at the revision and was sensitive to this antibiotic. Thus, it is probable that the spread of infection in this patient occurred through the bloodstream during the bacteraemia of 2002.

Previous case reports had described *Salmonella* infection of a joint replacement in presence of immunosuppression (3,5). This case illustrates that periprosthetic late infection can occur in a *Salmonella* bacteraemia in the absence of immunosuppression in a previously healthy individual. Previous case reports had described control of infection with antibiotics therapy only (3). However, the infection can be very significant leading to prosthetic loosening and the need for two-stage revision replacement. Early recognition of haematogenous spread is crucial to prevent development of loosening and joint destruction. The treatment for this

infection must be early and aggressive.

References

1. Kyle V, Chard M, Ramsey S, Cawston TE and Hazleman BE: *Salmonella enteritidis* causing joint sepsis. Clin Rheumatol 9:411-3, 1990.
2. John R, Mathai D, Daniel AJ and Lalitha MK: Bilateral septic arthritis due to *Salmonella enteritidis*. Diagn Microbiol Infect Dis 17:167-9, 1993.
3. Madan S, Abbas D, Jowett RL and Mounce K: *Salmonella enteritidis* infection in total knee replacement. Rheumatol 40:112-3, 2001.
4. Poss R, Thomas S, Thornhill MD, et al: Factors influencing the incidence and outcome of infection following total joint arthroplasty. Clin Orthop 182:117-126, 1984.
5. Chang Gung: Two-staged revision total hip arthroplasty due to *Salmonella* infection: a case report. Med. J. 24(3):202-7, 2001.
6. Day LJ, Qayyum QJ and Kaffman CA: *Salmonella* prosthetic joint septic arthritis. Clin Microbiol Infect 8(7):427-30, 2002.
7. Cohen JI, Bartlett JA and Corey GR: Extra-intestinal manifestations of *Salmonella* infection. Medicine 66:349-88, 1987.
8. Nduati RW and Wamola IA: Bacteriology of acute septic arthritis. J Trop Paediatr. 37(4):172-5, 1991.

Author Information

Samah Boulis, BSc, MRCS

Department of Trauma & Orthopaedics, Ipswich Hospital

Alexander Wee, BSc, FRCS(Ortho)

Department of Trauma & Orthopaedics, Ipswich Hospital

Mark Bowditch, BSc, FRCS (Ortho)

Department of Trauma & Orthopaedics, Ipswich Hospital