

CASE REPORT: SALMONELLA INFECTION FOLLOWING TOTAL HIP ARTHROPLASTY

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ABSTRACT

A case of a total hip arthroplasty infection with *Staphylococcus aureus*, co-infected with *Salmonella choleraesuis* was treated with two-stage exchange and administration of vancomycin and ciprofloxacin. No signs of re-infection have appeared fourteen months after surgery. Cases of salmonella infection of hip prostheses are quite rare, with only a handful of reports in the literature.

CASE REPORT

A 79-year-old pig farmer presented to our hospital with chronic hip wound purulent drainage eight months following a right total hip arthroplasty. He had a total hip arthroplasty performed for degenerative joint disease at an outside hospital. He otherwise was in good health, with mild chronic obstructive pulmonary disease and benign prostatic hyperplasia. Roughly three months after the index operation, he underwent superficial irrigation and debridement for drainage. The patient had initially been treated with a prolonged course of intravenous vancomycin, but the wound drainage persisted after discontinuation of the antibiotics.

Aspirations of his hip demonstrated heavy growth of gram-positive cocci in clusters consistent with *Staphylococcus aureus*, as well as gram-negative rods later identified as *Salmonella choleraesuis*. A two-stage exchange arthroplasty was recommended to attempt eradication of this chronic infection. A resection arthroplasty using an extended trochanteric osteotomy was performed to remove both the loose cemented stem and cementless cup. This included the excision of two areas of draining sinus tracts that extended into the hip joint containing

a moderate amount of intra-articular purulence. Intra-operative hip joint fluid demonstrated a cell count of 109,000 cells/cm² with multiple positive frozen cultures. Gram stain was negative. Cultures demonstrated light growth of presumptive *Salmonella* species on aerobic culture, later determined to be *Salmonella choleraesuis*. Both the acetabular and femoral components, which were grossly loose, were removed, followed by placement of a Prostalac[®] cement spacer. The spacer contained 1 gm tobramycin and 3 gm vancomycin with Surgical Simplex P bone cement (Howmedica-Osteonics, Allendale, New Jersey).

Infectious disease was consulted, and the patient was placed on vancomycin and ciprofloxacin during his hospital stay. Stool culture post-resection failed to demonstrate *Salmonella*. By time of discharge one week later, his wound was sealed and dry. He was discharged on intravenous vancomycin and oral ciprofloxacin, which he remained on for six weeks.

Eight weeks after resection arthroplasty, his laboratory values had normalized, included an erythrocyte sedimentation rate of 28 mm/hr, white blood cell count of 5.3 k/cm², and C-reactive protein of 0.4 mg/dl. The patient underwent second-stage re-implantation arthroplasty with cementless components. At the time of re-implantation, intra-operative fluid demonstrated a white cell count of 625 cells/cm², and frozen sections from three separate locations were all without acute inflammation. Cultures were also taken, which later revealed no growth. After re-implantation surgery, the patient was discharged five days after surgery with scant serous wound drainage, which resolved.

At latest follow-up sixteen months after resection (fourteen months after re-implantation), the osteotomy site was completely healed, and components were in proper position with radiographic signs of osseous integration.

DISCUSSION

Infection rates following total hip replacement have been reported between 0.5% to 2%, with *Staphylococcus aureus* being the most common agent. Cases of *Salmonella* infection of hip prostheses are quite rare, with only a handful of reports in the literature.¹⁻⁶

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By mid-2002, only 12 case reports of *Salmonella* complication of total hip arthroplasty had been reported in the English-language literature. Almost all of the 12 cases did not involve patients with an underlying illness, such as systemic lupus erythematosus (SLE) or malnutrition, which have typically been associated with native joint *Salmonellosis*. With the exception of re-occurrences in two cases, the *Salmonella* infections were cured. The authors pointed to the use of prompt debridement, early component replacement and appropriate antibiotics in the cure of *Salmonella* prosthetic joint infection.²

Two-stage exchange is a standard procedure for treatment of infection of total joint arthroplasty. In one study of 50 patients, two-stage exchange for infected total hip arthroplasty to cementless components, with minimum three-week placement of antibiotic-impregnated spacer with beads, and three months of follow-up antibiotics kept the re-infection rate at 8% at 5.8 years mean follow-up.⁷

The present case demonstrates the use of two-stage exchange in the treatment of total hip arthroplasty complicated by *Salmonella* infection. In the present case, the implants used in the index procedure had already become grossly loose at the time of resection, presumably from the chronic infectious process. A routine six-week course of antibiotics appeared to be sufficient.

In this patient, a potential source of infection was occupational, with his exposure to farm animals. A bovine-specific *Salmonella* was described in a man who tended infected calves up until the time of his hip replacement operation.⁴ The present case involved a co-infection of both a *Staphylococcus* and *Salmonella* species. Either a direct inoculation to the hip or a hematogenous route could have been involved in either case. It is unclear whether one organism or both were initially involved in the septic joint.

This patient requires continued follow-up for any new signs of infection. At fourteen months after re-implantation, the clinical and radiographic signs are good so far.

Prevention of infection in the first place is the most important consideration in the discussion of infection management. It appears that the use of contemporary aseptic methods such as perioperative antibiotics, laminar air-flow operating rooms, and body-exhaust systems, can help keep incidence of infection very low, even for complex total hip operations.⁸ While keeping perioperative sources of infection at bay is important, the source of infection in the present patient was more likely related to his occupational environment.

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