

Case Report

Successful treatment of prosthetic joint infection with multidrug-resistant *Acinetobacter* species with debridement and retention: a case report

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Abstract

Acinetobacter spp. is mainly addressed in the entity of healthcare associated infections. The organism has developed substantial antimicrobial resistance, making treatment of infections attributed to *A. baumannii* more difficult to manage. Prosthetic joint infection caused by *Acinetobacter* spp. is uncommon and only few case reports were found in the literature. This case alerts clinicians regarding the unusual aetiology of a prosthetic joint infection caused by multidrug resistant *Acinetobacter* spp. In such situations early institution of appropriate antibiotics is of utmost importance to combat the infection.

Keywords: Acinetobacter spp, prosthetic joint infection, multi drug-resistant

Introduction

Acinetobacter, an aerobic, catalase-positive, oxidase-negative, non-motile Gram negative coccobacillus, was first described in 1911. In the late 1980s, *A. baumannii* emerged as an important pathogen exhibiting increased antimicrobial resistance.¹ Transmission of *Acinetobacter* within the healthcare setting occurs due to lapses in proper hand hygiene and failure to disinfect medical equipment and surfaces within patient care areas. It is associated with device associated infections, nosocomial pneumonia especially associated with mechanical ventilation, blood stream infections, urinary tract infections, skin and soft tissue infections and meningitis in post neurosurgical patients in hospital settings. Recently, multidrug resistant (MDR) *A. baumannii* has been described as a cause of osteomyelitis in soldiers of the Iraq war.² Despite its increasing frequency, there is little data in the literature on the treatment of orthopedic-device associated infections due to MDR *A. baumannii*, specifically on total joint arthroplasties. The recently recommended approach for treating infected arthroplasties consists of a two-stage exchange with use of an antibiotic cement spacer.³

We describe the successful treatment of MDR *A. baumannii* total knee joint arthroplasty infection in a female patient using a debridement and retention approach combined with intravenous colistin plus ampicillin-sulbactam dual therapy. The authors believe this entry would

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add some contribution to fill the scarcity of data in clinical experience in managing prosthetic joint infection due to multidrug resistant *Acinetobacter* spp. with retention of prosthesis.

Case report

A 42 year old female underwent right sided total knee arthroplasty in April 2015 for a compound supracondylar fracture of the right femur following a road traffic accident in December 2011. She presented to a tertiary care hospital with a history of serous discharge from the right knee joint of one day duration in June, 2015. Slight wetting of the wound dressing was noted 3 days prior to the date when the significant discharge was apparent. She denied having had any new injury or trauma to the site. There was no history of fever or pain at the site and no tenderness was elicited. Only slight redness over the discharging point and small wound gaping were noted. Her X rays were normal at the time of admission and a wound swab taken at the time grew no organisms.

The patient gave a history of treatment at another tertiary care hospital after her accident in December 2011. Right lower dynamic condylar screw surgery was done for mal-union of her right distal femur fracture in 2012. She had been treated for osteomyelitis later in the same year which led to removal of the condylar screws. Details pertaining to diagnosis and management of this episode were not available. Pre-operatively to the total knee replacement in April 2015, no inflammatory features were found around the knee joint and there was no radiological evidence of chronic osteomyelitis. ESR and C - reactive protein (CRP) levels were normal at the time. Peri-operative samples from bone tissue and joint fluid taken at surgery revealed no growth.

Two days after the current admission, wound debridement was done and sinus tract formation was noted at surgery. The joint site was thoroughly debrided and the sinus tract excised. No prosthesis loosening was identified at the time of surgery. Three intra-operative specimens comprising of 2 samples of knee joint fluid collection and a tissue sample from the bone-prosthesis interface involving the sinus tract were sent for microbiological culture. All three cultures grew *Acinetobacter* spp. which was of intermediate sensitivity to amikacin and ampicillin-sulbactam and resistant to all other antibiotics. Though a zone of clearance was present around the colistin disc, susceptibility to colistin could not be interpreted as the CLSI does not give cutoff values.⁴ Further identification was not possible at that time due to unavailability of identification panels.

The patient was started on intravenous ampicillin-sulbactam 3g/6 hourly and intravenous colistin 2 million units 8 hourly. The patient was isolated in a cubicle as no separate isolation facilities were available and hand hygiene was advised to interrupt cross transmission.

The patient underwent four repeated surgical debridement procedures, first and second placed two days apart. She responded well to therapy. On day 5 of colistin, at fourth debridement, joint aspirate was taken for culture intra-operatively which was negative. The serous discharge ceased after two weeks of starting the therapy. Colistin and ampicillin-sulbactam were continued for four weeks. Renal function was monitored and was normal throughout the period of treatment though colistin has been documented as nephrotoxic.⁵ She started mobilization with an aid 3 weeks after commencing treatment with intravenous colistin. She was followed up for 9 months

at the orthopaedic clinic and was found to be managing herself satisfactorily with the retained prosthesis. She will be followed up for a period of at least 2 years.

Discussion

Infection is the major problem in managing patients with prosthetic implants. *Acinetobacter* spp. is an uncommon pathogen in orthopaedic device related infections. It is mainly a hospital acquired pathogen with low potential in causing infections. Since, peri-operative cultures were negative and the wound was sutured during surgery, pre or post-operative infection is unlikely. In this case, peri-operative infection is more likely.

The pathogenicity of *A. baumannii* relates to its ability to adhere to surfaces, utilizing pili to create biofilm on surfaces. The production of *Acinetobacter* biofilm-associated protein and the presence of a major facilitator superfamily transporter within the bacterial cell wall are associated with biofilm formation and adherence to host cells.¹

Cardinal signs of inflammation are not always observed in prosthetic joint infections. Infection is more likely when it is associated with an acute onset of a painful prosthesis or any chronic painful prosthesis.⁶ The presence of a sinus tract that communicates with the prosthesis is definitive evidence of prosthetic joint infection; the other two criteria for specific diagnosis of prosthetic joint infection being acute inflammation as seen on histopathological examination of peri-prosthetic tissue (sensitivity >80%; specificity >90%) and two or more positive intra-operative cultures of the same organism.⁶ In this case, two of the three criteria were fulfilled. X ray changes appear later in the course and were not seen in this patient.

The current recommended treatment for complicated infections in orthopedic devices, including resistant Gram-negative rods, consists of antimicrobial therapy with debridement with a two stage approach (removal of prosthesis and re-implantation at the completion of an antibiotic course of six weeks) or resection arthroplasty.^{6,7} Previously published guidelines related to orthopedic device infections suggest that prerequisites for debridement and retention include short duration of symptoms, satisfactory condition of soft tissue and the absence of difficult-to-treat resistant microorganisms.⁶ Debridement and retention of prosthesis has been advocated for patients presenting within 30 days of implantation or within <3 weeks of onset of symptoms.^{3,6} Although this case was associated with a multidrug resistant organism, early presentation was helpful for successful management.

Colistin has proven to be successful in the treatment of multidrug resistant *A. baumannii* bacteraemia, pneumonia, meningitis and orthopedic-device infections in documented case reports.⁸ Although the recommended duration of prosthetic joint infection caused by Gram negative bacilli is 4-6 weeks⁶, there is little evidence on duration of therapy for prosthetic joint infection due to *Acinetobacter* spp. This may be due to rarity of the causative agent or the lack of enthusiasm in clinicians to publish their clinical experience. The duration of therapy in this patient was confined to 4 weeks. The failure rate is believed to be higher if the patient is symptomatic for a longer duration or a sinus tract is formed.⁶ In this case microbiological clearance was documented, contributing to successful eradication of the causative agent. No

recurrence was observed up to 8 months and further follow up for at least 2 years will be carried out.⁹

Conflicts of interest: None

Informed consent was obtained from the patient for publication of this case report.

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