

Management of an Infected Total Knee Replacement with Implant Removal, Antibiotic Cement Spacer, and Revision Total Knee Arthroplasty: A Case Report

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ABSTRACT

Periprosthetic joint infection is one of the most serious complications following total knee replacement and may result in implant failure, persistent pain and functional disability. This is a case report of a 65-year-old male who presented with persistent discharge from the left knee, severe pain while walking and inability to squat or sit cross-legged 15 months after undergoing bilateral total knee replacement. Clinical examination revealed a discharging sinus over the left knee with painful restriction of movement. Radiographs demonstrated loosening of both femoral and tibial components, raising suspicion of chronic periprosthetic joint infection. The patient underwent implant removal, thorough debridement, synovectomy and placement of an antibiotic-loaded gentamicin cement spacer. Intraoperative cultures grew Methicillin-Sensitive *Staphylococcus Aureus* (MSSA). Based on the culture sensitivity report, intravenous vancomycin was administered for 10 days, followed by oral doxycycline for three weeks. After clinical and laboratory evidence of infection control, a second-stage revision total knee arthroplasty was performed. The postoperative recovery was uneventful, with marked improvement in pain, knee function and walking ability during follow-up. This case highlights the importance of early recognition of chronic periprosthetic joint infection, meticulous surgical debridement, staged revision arthroplasty and culture-guided antimicrobial therapy in achieving favourable clinical outcomes.

Keywords: Antibacterial agents, Bone cements, Debridement, Prosthesis-related infections, Treatment outcome

CASE REPORT

A 65-year-old male presented with complaints of persistent discharge from the left knee for one year associated with severe pain while walking and difficulty in performing routine daily activities. Patient has no other comorbidities. The patient had undergone bilateral total knee replacement 15 months earlier at a private hospital for advanced osteoarthritis of both knees. According to the patient, he remained asymptomatic for approximately three months following surgery, after which he gradually developed pain, swelling and discharge from the operated left knee.

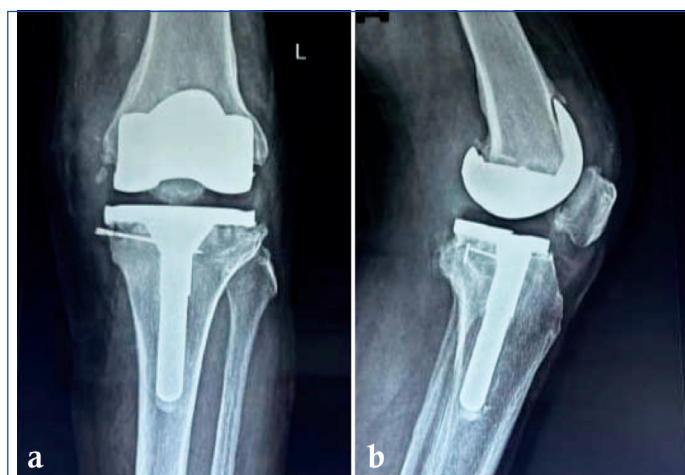
The discharge was continuous, yellowish in colour and non foul smelling. The patient also complained of progressive difficulty in walking and inability to squat, sit cross-legged, or walk long distances because of severe pain. He had received multiple courses of antibiotics and dressing procedures at different hospitals, but symptoms persisted without significant improvement.

Radiographic evaluation revealed loosening of both femoral and tibial prosthetic components with surrounding soft tissue swelling, suggestive of chronic periprosthetic joint infection [Table/Fig-1]. On local examination, diffuse swelling of the left knee was present along with a discharging sinus over the anterior aspect of the knee [Table/Fig-2]. Local tenderness and painful restriction of knee movements were noted.

Laboratory investigations showed raised inflammatory markers suggestive of ongoing infection [Table/Fig-3]. Considering the persistent sinus, implant loosening and clinical evidence of infection, the patient was planned for staged revision arthroplasty.

Under combined spinal and epidural anaesthesia, the patient was taken for the first-stage procedure. The previous midline incision was utilised and thorough exposure of the knee joint was achieved. Intraoperatively, infected tissue, unhealthy granulation tissue and purulent material were identified surrounding the prosthesis. Extensive synovectomy and thorough debridement of all necrotic

and infected tissue were performed. The femoral and tibial components were carefully removed along with residual cement. Thorough wound irrigation was performed using copious amounts of normal saline. Following adequate debridement, an antibiotic-loaded gentamicin cement spacer was prepared and inserted into the knee joint to maintain joint space and provide local antibiotic



[Table/Fig-1]: X-ray images of the patient.



[Table/Fig-2]: Clinical images of the patient with discharging sinus.

MICRO REPORT																			
SPECIMAN		CULTURE																	
PUS		Growth of Methicillin sensitive Staphylococcus aureus(MSSA). kindly correlate clinically.																	
Antibiotic Sensitivity Report																			
REPORT_DATE	ORGANISMS					AZITHROMYCIN		CLINDAMYCIN		CO-TRIMOXAZOLE		DOXYCYCLINE		ERYTHROMYCIN		TETRACYCLINE		VANCOMYCIN	
	Coagulase positive Staphylococci					Resistant		Sensitive		Sensitive		Sensitive		Resistant		Sensitive		Sensitive	
Patient Name : BHAIKAVY RATNAM GHADKAR OPD NO : 2012190226																			
CBC investigations on Cell counter with PS																			
REPORT DATE	Hb%	MCV	MCH	MCHC	MPV	Total RBC Count	RDW	HCT	Total WBC Count	Monocytes	Granulocytes	Lymphocytes	Eosinophils	Basophils	Total Platelet Count	Peripheral Smear			
18-12-2025 13:45:54	10.5	81.8	27.4	33.5	6.7	3.83	15.9	31.3	4400	04	65	30	01	00	2.01	Reduced RBC mass RBCs - Normocytic Normochromic WBC - Within normal limits. Platelets - Adequate on smear. No Haemoparasite seen.			
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MICRO REPORT																			
SPECIMAN															CULTURE				
SERRIUS DISCHARGE															No growth				

[Table/Fig-3]: Preoperative investigations of the patient.

delivery. The operative steps including implant removal, debridement and spacer insertion are shown in [Table/Fig-4]. Multiple tissue samples were collected and sent for microbiological culture and sensitivity analysis. Culture and sensitivity testing demonstrated MSSA [Table/Fig-5a,b]. Wound closure was done in layers over a suction drain.



[Table/Fig-4]: Intraoperative images with removal of implant and antibiotic cement-coated spacer application.

Postoperative radiographs confirmed satisfactory positioning of the antibiotic-loaded cement spacer [Table/Fig-6]. Multiple intraoperative tissue samples were sent for culture and antibiotic susceptibility testing. The culture grew MSSA. The susceptibility report showed sensitivity to clindamycin, doxycycline, vancomycin, cotrimoxazole and tetracycline. Beta-lactam susceptibility was not included in the microbiology report. Therefore, antibiotic treatment was planned according to the available culture sensitivity results, with availability of antibiotic in the hospital, affordability and the treating physician’s recommendation. The patient received intravenous vancomycin for 10 days, followed by oral doxycycline for three weeks. He was advised to remain non weight bearing mobilisation with walker support for six weeks.

During follow-up after four weeks, the patient showed gradual clinical improvement with complete cessation of discharge and reduction in pain. Repeat clinical and radiological assessment after four weeks showed satisfactory spacer position without evidence of persistent infection. After confirmation of infection control, the patient was planned for second-stage revision total knee arthroplasty.

After three months the revision procedure was performed under spinal and epidural anaesthesia. The antibiotic cement spacer was removed and repeat debridement was carried out. Revision femoral and tibial components were implanted with satisfactory alignment and stability. The intraoperative images of the revision procedure are shown in [Table/Fig-7]. Postoperative radiographs confirmed proper implant positioning on second postoperative day [Table/Fig-8]. Intravenous antibiotics were given for seven days and physiotherapy was continued postoperatively. Full weight-bearing mobilisation was started on the second postoperative day [Table/Fig-9]. Sutures were removed on postoperative day twelve. At subsequent follow-up one month later, the patient demonstrated significant improvement in pain relief, range of motion and functional mobility.

DISCUSSION

Periprosthetic joint infection is one of the most serious complications following total knee arthroplasty. It is associated with prolonged treatment, repeated surgical procedures, increased healthcare costs and considerable patient morbidity [1]. In the present case, the combination of a persistent discharging sinus, ongoing knee pain and radiographic evidence of implant loosening indicated a chronic infection rather than an acute postoperative problem. In such

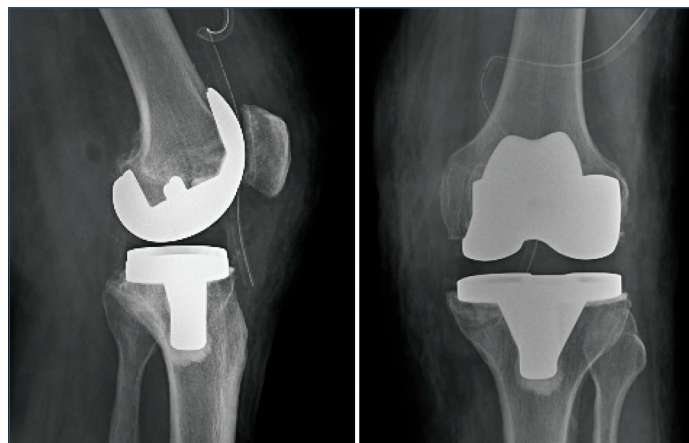
[Table/Fig-5a,b]: Postoperative microbiological culture sensitivity report of patient.

cases, retaining the implant is less likely to eradicate the infection successfully. Therefore, removal of the prosthesis followed by a

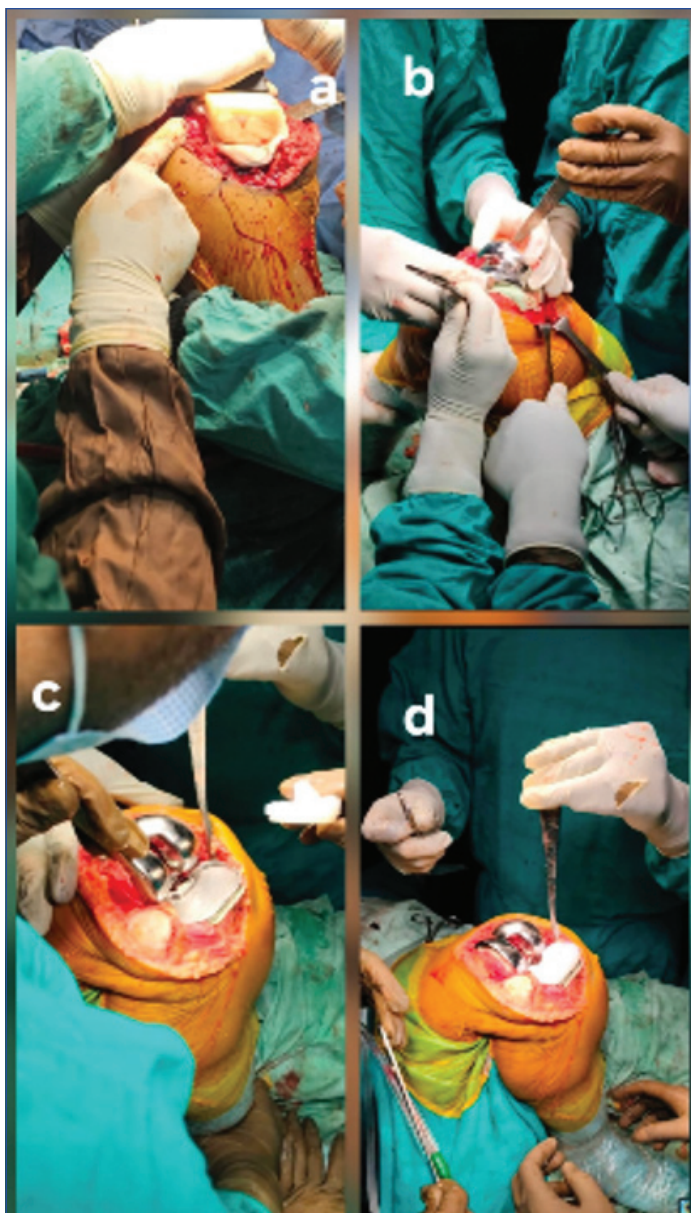
staged revision procedure is considered the preferred treatment for patients with chronic PJI and loose prosthetic components [2,3].



[Table/Fig-6]: Postoperative X-ray images of patient following cement spacer insertion.



[Table/Fig-8]: Postoperative X-ray images of patient with revision total knee replacement.



[Table/Fig-7]: Intraoperative images of patient with revision total knee replacement.



[Table/Fig-9]: Full weight-bearing of patient with revision total knee replacement.

Management of chronic Periprosthetic Joint Infection (PJI) aims to eradicate infection while preserving joint function. Among the available treatment options, two-stage revision arthroplasty continues to demonstrate reliable infection control rates and remains the most commonly employed strategy for chronic infections. Kunutsor SK et al., in their systematic review, reported favourable reinfection outcomes following two-stage revision procedures, supporting its role as the preferred treatment approach in appropriately selected

patients. Based on these principles, implant removal with extensive debridement was chosen in the present case.

Thorough debridement is considered a critical step in the treatment of infected knee arthroplasty because residual infected tissue may contribute to persistent infection and treatment failure. After removal of the prosthetic components, an antibiotic-loaded cement spacer was placed in the joint. In addition to delivering a

high concentration of antibiotics at the site of infection, the spacer helped preserve joint space, maintain soft-tissue balance and facilitate the subsequent revision procedure. These advantages have been reported in earlier studies [4]. In this patient, the spacer maintained limb alignment and allowed infection control before the second-stage procedure.

Identification of the causative organism remains equally important. Current recommendations emphasise obtaining multiple intraoperative tissue samples to guide culture-specific antibiotic therapy [5]. In the present case, cultures isolated MSSA, which enabled targeted antimicrobial treatment during the interval period. Clinical improvement, resolution of discharge and absence of progressive radiological changes suggested successful infection control before revision arthroplasty.

Once there was clinical and laboratory evidence that the infection had resolved, revision total knee arthroplasty was carried out three months later. Previous studies have shown that a two-stage revision approach provides reliable infection control and satisfactory functional recovery in patients with chronic periprosthetic joint infection [6]. Current evidence also supports staged revision arthroplasty as an effective treatment for chronic periprosthetic joint infection. Careful debridement, together with culture-guided antibiotic therapy, plays an important role in achieving successful infection eradication and favourable functional outcomes [7].

The successful outcome in this case can be attributed to early recognition of implant failure, aggressive surgical debridement, culture-directed antibiotic therapy and adherence to a staged reconstruction protocol. At follow-up, the patient demonstrated pain relief, restoration of mobility and the ability to bear weight comfortably. This case further supports the role of two-stage revision arthroplasty as a dependable treatment option for chronic infected total knee replacements.

CONCLUSION(S)

Periprosthetic joint infection after total knee replacement is a serious condition that requires early diagnosis and appropriate management. Persistent discharge, painful knee movements and implant loosening should raise strong suspicion of chronic infection. Two-stage revision arthroplasty with implant removal, extensive debridement, antibiotic-loaded cement spacer insertion and delayed revision total knee replacement remains an effective treatment strategy for chronic infected knee prosthesis. Careful surgical technique combined with culture-directed antibiotic therapy can help eradicate infection, relieve pain, restore joint stability and improve functional outcomes.

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