Case Report

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Graft Salvage in Management of Septic Knee Post-ACL Reconstruction: A Case Report

Orthopaedics Section

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ABSTRACT

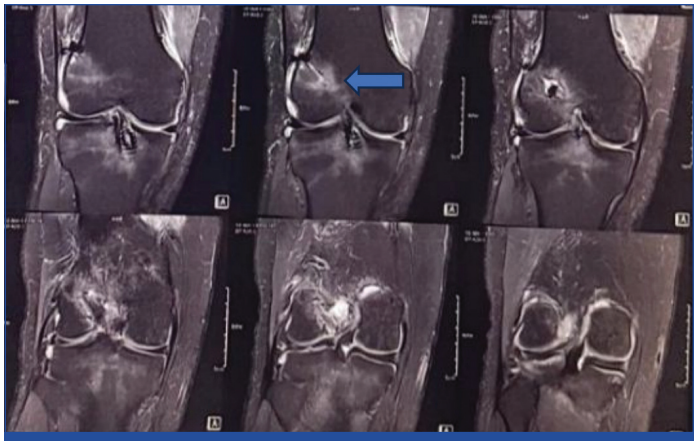
The frequency of Anterior Cruciate Ligament Reconstructions (ACLR) has risen in recent years and is projected to continue increasing. Knee-joint infections consequent to this procedure, although rare, present a significant concern due to their potential severity. Hence, comprehending the progression of this complication and its detrimental effects if not promptly addressed is crucial. The impact of infection on the joint can vary depending on the duration between onset, diagnosis, and initiation of appropriate treatment. In some cases, the infection may have minimal consequences for the joint, while in others, it could lead to compromised viability of the Anterior Cruciate Ligament (ACL) graft, damage to the articular cartilage, or even premature onset of osteoarthritis. In the present case, a 42-year-old male had presented to the Orthopaedics Outpatient Department (OPD) six weeks postoperatively following an ACL reconstruction with clinical and laboratory findings pointing towards a septic knee. Lab findings suggested a raised ESR-71 mm/hr, CRP-127 mg/dL, and TLC-10,200/microL. The decision for immediate arthroscopic debridement with synovectomy was taken to achieve decompression all the while preserving the graft. This was followed by antibiotic saline irrigation for two days with strict antibiotic coverage following it.

Keywords: Anterior cruciate ligament, Arthroscopy, Debridement, Infection, Saline irrigation

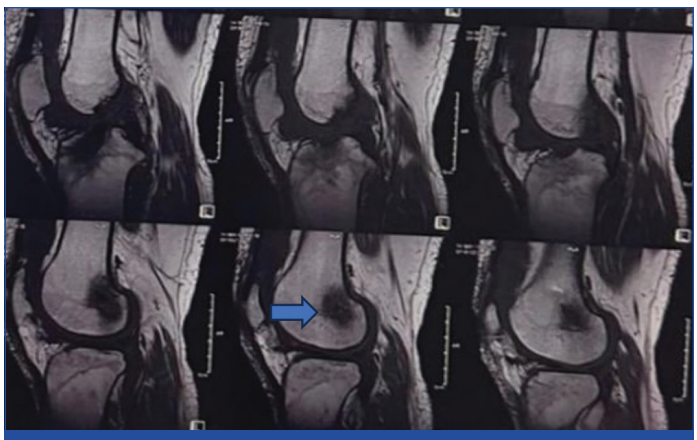
CASE REPORT

A 42-year-old male who underwent Anterior Cruciate Ligament Reconstruction (ACLR) presented to the Orthopaedics Department with a septic knee postoperatively at six weeks. The patient was immediately admitted for the same for further management. Upon inspection, it was found that there was diffuse swelling over the operated knee along with red discolouration of the skin ([Table/Fig-1] showing the condition when presented). On palpation it was seen that there was tenderness along the operated knee, local rise of temperature, patellar tap test was positive and the knee Range of Motion (ROM) was restricted and painful. The Lysholm score was taken into consideration and was found to be 18/100 upon presentation. Laboratory investigations showed raised inflammatory markers, namely, ESR-71 mm/hr, CRP-127 mg/dL, and TLC-10,200/microL, thereby confirming the diagnosis of septic knee postoperatively. Magnetic Resonance Imaging (MRI) of the affected knee was carried out to understand the extent of infection involved as shown in the images below- [Table/Fig-2] showing the coronal view of the septic knee, [Table/Fig-3] showing sagittal (T1) view, [Table/Fig-4] showing sagittal (T2) view and [Table/Fig-5] showing axial view.

[Table/Fig-1]: Clinical image of the affected knee preoperatively.

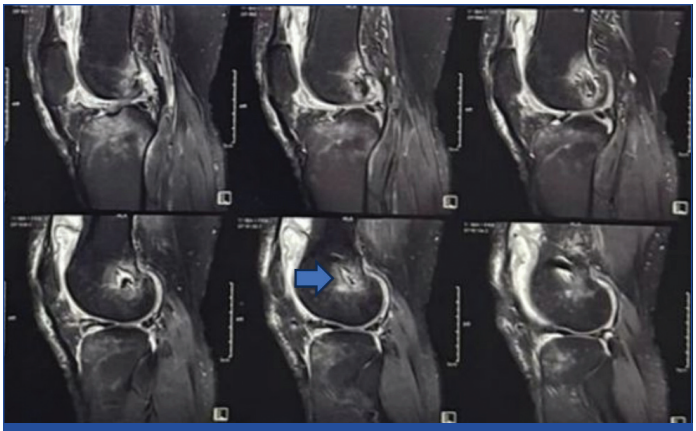


[Table/Fig-2]: Coronal view of the septic knee.

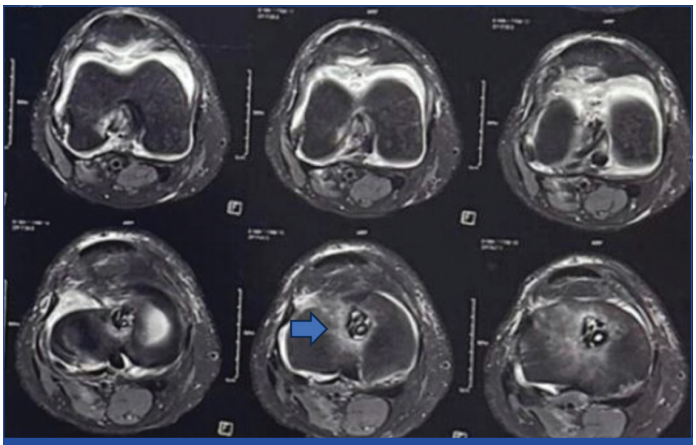


[Table/Fig-3]: Sagittal (T1) view of the septic knee.

The decision to aggressively debride was taken along with near total synovectomy to achieve adequate decompression of the infection while conserving the graft itself. The decision of preserving the graft

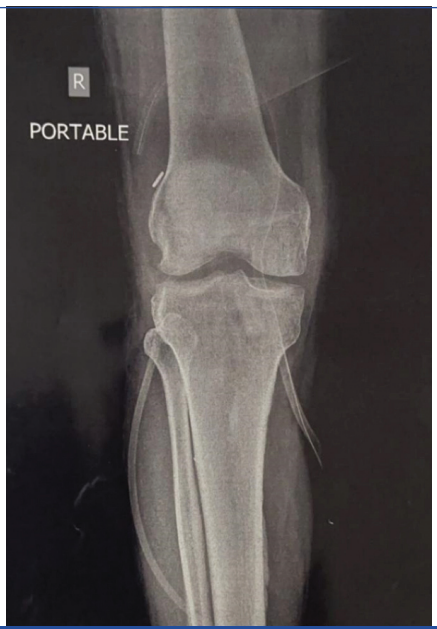


[Table/Fig-4]: Sagittal (T2) view of the septic knee.



[Table/Fig-5]: Axial view of the septic knee.

was taken intraoperatively after confirmation that there was no graft laxity and was still viable as infection had not affected it's function. This revealed frank pus that was taken for further evaluation and was sent for culture and sensitivity. Knee ROM was checked and found to be satisfactory before shifting the patient to the ward. The image [Table/Fig-6] below shows the postoperative X-ray following debridement and synovectomy.



[Table/Fig-6]: Post debridement X-ray.

Postoperatively the decision to start antibiotic (Vancomycin) irrigation was taken by placing two ports, one was inserted at the superolateral aspect of the debrided knee which connected to the vancomycin infused normal saline bottle (3L) and the second port was inserted into the anteromedial aspect of the knee which connected to a dependant drain No.12. This was done for a duration of 48 hours, following which intravenous antibiotics (Cefuroxime, Amikacin and Metronidazole) were given from day two to day seven postoperatively. The dosing and frequency for the antibiotics administered intravenously were- Cefuroxime 1.5 g BD for five days, Amikacin 750 mg once a day for three days and Metronidazole 100 cc TDS for three days. The cultures sent intraoperatively revealed no active microorganisms in spite of the frank pus that was debrided, which could be a sterile inflammation. The patient was then discharged with oral Linezolid 600 mg BD which was taken for six weeks and was asked to follow-up every month. The following image below [Table/Fig-7] shows the placement and application of saline irrigation circuit.

[Table/Fig-7]: Image showing the placement of the antibiotic saline irrigation ports.

Upon follow-up (approximately 6 weeks) following discharge, which was done after completion of the Linezolid course, it was found that the clinical signs of septic knee had significantly subsided and after three months following discharge, the laboratory values improved (ESR-12 mm/hr, CRP-22 mg/dL, and TLC-9,800/microL). There was also improvement in the overall mobility of the affected knee achieving full ROM, which was confirmed by an improved Lysholm score of 80/100. Below is the clinical image of the affected knee upon follow-up [Table/Fig-8].

[Table/Fig-8]: Clinical image of the affected knee upon follow-up.

DISCUSSION

Septic arthritis, an inflammatory joint condition often stemming from an infectious cause, primarily involves bacterial agents but can also be attributed to viruses, fungi, or less common pathogens [1]. While larger joints like the hip or knee are frequently affected, smaller joints such as those in the hands or feet can also be involved. It constitutes an orthopaedic emergency, necessitating immediate treatment to prevent further joint damage and potential impacts on patient morbidity and mortality. Arthroscopic reconstruction of the ACL has become a cornerstone in orthopaedic knee surgery, witnessing a steady rise in procedures over recent years. Although rare, postoperative infection poses a potentially severe complication, particularly concerning outcomes. Recent literature reports an incidence rate for septic arthritis after ACL reconstruction ranging between 0.14% and 1.8% in studies encompassing more than 800 reconstruction procedures [2].

It's been seen that while graft removal [3] has been the usual route of management of septic knee following ACLR, in the present study the authors have managed the condition at six weeks postoperatively while salvaging the graft. This was done effectively by a combination of timely arthroscopic debridement, decompression of the infection by synovectomy, use of antibiotic saline irrigation and administration of intravenous and oral antibiotics. This combination of techniques ensured that the graft was still viable and did not require a revision surgery for the same, making it cost-effective for the patient all the while not compromising on the functional outcome of the patient in the present case.

As elicited in the study by Schuster P et al., [2] they chose not to carry out synovectomy as it can prevent the spread of infection or act as a barrier. In the present study, the decision to carry out synovectomy was taken, as the infection was well beyond this barrier and preserving the synovium was not an option owing to the presence of frank pus throughout. The decision to carry out arthroscopic debridement and synovectomy along with antibiotic saline irrigation was taken as saline irrigation alone cannot be carried out to supress the infection [4], while this may be a viable option on rare occasions where the patient has co-morbidities which make it difficult to operate. The saline irrigation itself consists of two wide bore cannulas of 14G where the inflow cannula was inserted into the suprapatellar recess and the outflow cannula anterolaterally into the knee joint. The inflow cannula was connected to a standard physiological saline solution with infused antibiotic (in this case, vancomycin). The outflow cannula was connected to a drain of appropriate size (uncharged). This irrigation is usually carried out for a period of four days, but in the present study this was carried out for two days. The progress of the patient's recovery was measured by means of administering Lysholm scoring system during the time of presentation and three months following treatment along with a reduction in inflammatory markers, especially the White Blood Cell (WBC) count, which is the most reliable factor for diagnosing septic arthritis in a patient as described by Costa GG et al., [5]. The scoring system [6] includes eight major sections with various sub-headings. Three months following discharge the score was 80/100 which is considered as a fair score (65-83) compared to the previous score of 18/100 which is considered as a poor score (0-64). Retrospectively, according to recent advances, the use of presoaked Vancomycin or Gentamicin graft during ACLR further reduces chances of postoperative septic arthritis, which needs to be considered and was not carried out in the present index surgery [7].

While graft salvage was possible in the present case, it is important to note that factors such as graft laxity and extent of infection (if involving the graft) need to be considered before carrying out procedures to salvage the graft. If the infection is long-standing and involving the graft itself, then a more radical approach would be needed to manage as described by Schulz AP et al., [8] which involved open debridement, complete synovectomy and insertion of Gentamicin coated beads.

CONCLUSION(S)

Septic arthritis is considered as an emergency condition usually treated by complete resection of the graft to prevent recurrence. In the present case report, the graft was conserved by means of arthroscopic debridement with graft preservation, antibiotic saline irrigation and intravenous antibiotic administration. This showed excellent results in subsequent follow-ups and helped in early mobilisation of the patient while being cost-effective. However, it would be wise to remember that this is only possible after understanding the extent of infection and graft laxity.

Author's contribution: Both RVP and AD had equally contributed to this research work.

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