Does Septic Arthritis after Anterior Cruciate Ligament Reconstruction Always Affect Knee Range of Motion?

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Abstract

Background: Arthroscopic Anterior Cruciate Ligament (ACL) reconstruction is an effective method of restoring stability to the knee after injury to the ACL. Post-operative septic arthritis is an uncommon but potentially serious complication with a reported incidence rate of between 1.3% and 1.7%. The functional outcomes after eradication of postoperative infection have been variable. This report reviewed 13 cases with postoperative ACL reconstruction infections, identified potential risk factors, described our treatment, and evaluate the effect of variable factors on the final knee Range of Motion (ROM).

Objective: Evaluation of septic arthritis after anterior cruciate ligament reconstruction and its effect on Knee range of motion after eradication of infection.

Patients and Methods: The study included 13 knees in 13 male patients, out of 290 cases ACL reconstruction. All patients were subjected to full clinical evaluation and laboratory investigations. Infection was confirmed by culture of the wound discharge and knee aspirate. Patients were managed by wound debridement and arthroscopic lavage. Different factors supposed to affect ROM were evaluated.

Results: After eradication of infection, 9 patients (69.2%) were able to flex the knee beyond 110º, 2 patients (15.4%) could flex the knee to 90º, while another 2 patients had 5º & 30º knee flexion deformity.

Conclusion: Knee stiffness is not always found after infection ACL reconstruction.

Key Words: ACL reconstruction – Knee sepsis – Arthroscopic knee lavage – Knee suction irrigation.

Introduction

ACL rupture is the most frequent ligamentous injury of the knee. It is frequently injured in the young athletes performing cutting and pivoting sports, and predisposes the knee to subsequent injuries, as well as the potential for earlier onset of osteoarthritis [1-8]. ACL reconstruction is a common and effective method of restoring stability to the knee after injury. Overall, infection rates are low after ACL reconstruction. Despite, infection after ACL reconstruction can be a devastating complication, not all cases end with knee stiffness and different co-factors may affect the final range of knee motion [6-8].

Patients and Methods

A retrospective review was performed of all arthroscopic ACL reconstructions (290 cases) performed at our hospitals from January 2015 to August 2016. Patient was suspected to have postoperative infection if he/she developed a fever with the knee swollen, tender, with limited range of motion, and/or persistent discharge from the surgical wound in the postoperative 3 weeks. Infection was confirmed by elevated ESR, CRP, together with positive culture from a knee aspiration. Patients’ sheets were evaluated for age, gender, graft type, associated knee injuries, and systemic comorbidities including diabetes, smoking, renal or hepatic problems. ESR, CRP, causative organism from the aspirate culture, and the clinical signs presented were added to the patient sheet.

The study included 13 male patients between 21 & 42 years old (average 32 years), 3 patients (23%) were non-insulin dependent diabetics, 4 patients (30.8%) were smokers, with no other renal or hepatic problems. In all patients, ACL was reconstructed by hamstring grafts (semitendinosus and gracilis). 4 patients (30.8%) had associated medial meniscus injury, 4 others (30.8%) had associated lateral meniscus injury, and 5 patients...
(38.4%) had an isolated ACL tear. All associated injuries are managed at time of ACL reconstruction.

Only one patient (7.7%) presented within the 1st week after surgery, while 6 patients (46.2%) had the clinical signs of infection within the 2nd week postoperatively. The infection affected the harvest site in 2 patients (15.5%), the knee only in 3 patients (23%), and both the knee and the harvest site in 8 patients (61.5%). All patients were feverish with variable degrees of temperature ranging from 37.5° to 40° (average 38.3°).

Once the patient was suspected to have infection, he was admitted to the hospital, ESR and CRP were evaluated, and a culture was studied from the wound discharge and aspirated fluid. All patients received 2gm IV 3rd generation cephalosporin every 12 hours, then antibiotic was modified according to culture and sensitivity. Staphylococcus aureus was the causative organism in all cases. In the following 24 hours after admission, patients with harvest site infection (only 2 patients) were exposed to surgical wound debridement, while those with knee involvement were arthroscopically debrided. Suction irrigation in the internal ward from 1 to 4 days (average 3 days) was added in 9 patients. 3 patients needed arthroscopic debridement twice, and single arthroscopic debridement was enough for 7 patients.

The patients were followed up clinically, and by ESR and CRP. When the patient fever subsided and CRP decreased below 50, antibiotics were shifted to oral route for 6 weeks or until CRP was below 10. CRP and physical examination were repeated 1 week after discontinuity of antibiotics and knee range of motion was measured. Patients were followed-up to a minimum of 4 months and knee range of motion was recorded every 6 weeks.

**Results**

We reviewed the charts of patients with ACL reconstruction, in the period between January 2015 and August 2016. We found 13 out of 290 patients (4.48%) developed postoperative infection. We reviewed the final ROM obtained after management and follow-up for a minimum of 4 months. We compared the final records of ROM with the patient’s age, co-morbidities, associated injuries, body temperature, CRP level, ESR level, onset of symptoms, site of infection, graft preservation, and technique of management performed.

All diabetic patients (3 patients) showed no return to normal knee ROM, 2 of them showed flexion deformity of 30° and 5°, and the 3rd patient showed knee ROM ranging from 0° to 100°. When comparing the final knee ROM regarding the ESR at time of presentation, there was significant correlation (p-value=0.045).

Results showed that higher range of motion was achieved with lower CRP level, lower body temperature, but the results were significantly weak (p-value=5.09 & 1.18) respectively. The results were not significantly related to the onset of symptoms post-operatively (early or late), or to the technique used in management.

The graft was removed in 3 patients. It was found that knee range of motion was not significantly affected by graft preservation, harvest site infection, or associated meniscal injury at the time of surgery.

**Discussion**

Knee sepsis after ACL reconstruction is a quite rare but an annoying problem to both the patient and the surgeon. International studies showed infection rate after ACL reconstruction ranged between 0.14%-1.7%. This infection rate was lower than ours which was 4.48%. Many earlier researchers have shown bad results for patients suffering postoperative septic arthritis after ACL reconstruction [5].

However, not all authors showed inferior functions after infection. Viola et al., reevaluated 14 knees on average 14.4 months after septic arthritis after ACL reconstruction, the results were better than those of earlier reports [6].

This study confirmed that the infection can be controlled without taking out the graft, although the possibility of keeping the graft with eradication of the infection was also reported in the literature using correct antibiotics, and repeated arthroscopic lavage and debridement.

Despite different risk factors, associated knee injuries and systemic comorbidities, only diabetic patients with relatively high ESR at the time of presentation carried a significant high risk of knee stiffness. Further studies and metaanalysis are needed to confirm the correlation between ROM and CRP, fever, and when the symptoms developed after surgery.

**Conclusion:**

Septic knee after ACL reconstruction is not always associated with knee stiffness. Certain factors may be associated with increase risk of
stiffness, like diabetes and elevated ESR at the time of presentation.

References


