ORIGINAL RESEARCH PAPER

Orthopaedics

ANTERIOR CRUCIATE LIGAMENT INJURY: A COMPARISON BETWEEN RECONSTRUCTION AND REHABILITATION

KEY WORDS: instability, anterior cruciate ligament, tear, conservative treatment, reconstruction

Dr Ashish Dubey MBBS, MS (ORTHOPAEDICS) Arthroscopic and Joint Replacement Surgeon Director and Consultant Peetambara Hospital, Gwalior, Visiting Consultant Global Hospital, Gwalior

ABSTRACT

Anterior cruciate ligament (ACL) rupture is a serious injury in patients who are typically young and athletically active, with potential long-term complications including functional limitation, posttraumatic osteoarthritis of the knee, and impaired quality of life. A randomised controlled trial in 40 Patients with symptomatic knee problems (instability) consistent with an ACL injury was done. Patients were randomly assigned (1:1) to either surgery (reconstruction) or rehabilitation (physiotherapy). Mean KOOS4 at 18 months was 71 0 (SD 16 3) in the surgical group and 66 6 (22 6) in the rehabilitation group. The adjusted mean difference was 4.4, in favour of surgical management. Interpretation: Surgical reconstruction as a management strategy for patients with non-acute ACL injury with persistent symptoms of instability was clinically superior and more cost-effective in comparison with rehabilitation management.

Introduction

Anterior cruciate ligament (ACL) rupture is a common knee injury that can have a profound effect on knee kinematics (knee movement and forces) with recurrent knee instability (giving way) as the main problem.

Although there are more than 2000 scientific articles in the literature (1) illuminating several aspects of ACL rupture, there is no consensus on the optimal treatment. Whereas some authors reported adequate outcomes after operative treatment using various techniques (2, 3), others documented sufficient clinical results after conservative treatment with various protocols of immobilization and physiotherapy (4, 5). Although several instruments and scoring systems (6,7) have been developed to facilitate standardized reporting and comparison of differently treated patients, decision towards one or the other, namely, conservative or surgical treatment seems currently challenging (8) due to lack of randomized controlled trials with information on long-term results (9).Nonsurgical treatment following ACL injury is less frequently reported, especially in recent years, and unfortunately non-surgical treatment was poorly defined in studies comparing surgical and non- surgical treatment (10).
This study was a prospective controlled trial to determine whether a strategy of structured rehabilitation plus early ACL reconstructive strategy is superior to a strategy of conservative treatment.

Materials and Methods

This was a prospective randomized controlled analysis of cases having complete ACL tear, conducted at Peetambara hospital, Gwalior, between 2020-2022. All the patients attending emergency or Out Patient Department (OPD) of our hospital with knee injury were evaluated for ACL tear. Patients who met inclusion criteria and gave consent for participation in the study were randomized (using computer randomization technique) into two groups of 20 patients each. Group A patients underwent arthroscopic ACL reconstruction + rehabilitation and group B patients were treated conservatively (Arthroscopic debridement+ rehabilitation) (11).

After taking informed consent, all subjects were provided a self-administered patient questionnaire containing Knee injury and Osteoarthritis Outcome Score (KOOS), International Knee Documentation Committee (IKDC) score and Tegner Activity Level (TAL) scores. Surgeon questionnaire was completed at the time of surgery and included history of knee injury, general and knee examination (including tests for anterior laxity- Lachman test and Pivot shift test), radiological examination and surgical technique used for procedure. One independent orthopaedic surgeon kept all records and evaluated results (12).

Inclusion criteria

Age between 18 to 35 years, either sex, Isolated ACL tear not more than 4 months old to a previously uninjured knee, anterior cruciate ligament rupture diagnosed via magnetic resonance imaging (MRI) or TAL up to 5.

Exclusion criteria

Professional athletes, Collateral ligament rupture, full thickness cartilage lesion visualized, TAL 6 or more than 6, Posterior cruciate ligament injuries, Preclinical laboratory tests, Meniscal tear grade III on MRI.

Group A patients: Patients were examined under Spinal anaesthesia. Meniscal injury and articular cartilage lesion were ruled out. ACL reconstruction was done using transportal technique. The tibial tunnel and femoral tunnel were made. Femoral fixation was done using endobutton. Wound closure was done in layers and aseptic sterile dressing was applied and compression bandage was given to all patients.

Group B patients: All patients of group B were symptomatic. All of these had history of locking and severe pain. Like group A all patients were examined under Spinal anaesthesia, routine diagnostic arthroscopy followed by debridement done. Loose body if any removed and stump of ruptured ACL debrided. After surgery patient was shifted to recovery room and long knee brace was applied. Patient discharged on next day and rehabilitation started from post-op day one.

Table 1.Age, sex and BMI distribution.

Variables	Group A (N=20)	Group B (N=20)
Sex Ratio (M: F)	12:8	11:9
Age (Mean ± SD)	27.41 ± 5.48	27.28 ± 5.21
BMI (Mean ± SD)	24.30 ± 3.04	25.15 ± 3.09

Findings: Mean KOOS4 at 18 months was 71 0 (SD 16 3) in the surgical group and 66 6 (22 6) in the rehabilitation group. The mean difference was 4.4, in favour of surgical management. 3 (15%) of 20 patients allocated to rehabilitation underwent subsequent surgery according to protocol within 18 months. We found no differences between groups in the proportion of intervention-related complications.

Interpretation: Surgical reconstruction as a management strategy for patients with non-acute ACL injury with persistent symptoms of instability was clinically superior and more cost-effective in comparison with rehabilitation management.

Although in term of stability surgically treated group was found better but functionally (measured by TAL) there was no difference between two groups in our study. Both groups were comparable in terms of Age, sex and side distribution.

Complications: Group A - Anterior knee pain in five patients, hardware prominence in one patients and superficial infection in one patient while in group B haemarthrosis was noted in two patients and urinary retention in one patient(Table 2).

Table 2. Complications

Complications	Group A		Group B	
	Frequency	%	Frequency	%
None	13	65%	17	85%
Anterior knee pain	5	25%	0	0.0%
Haemarthrosis	0	0.0%	2	10%
Hardware prominence	1	5%	0	0.0%
Superficial infection	1	5%	0	0.0%
Urinary retention	0	0.0%	1	5%
Total	20	100%	20	100%

Discussion:

Nonsurgical and surgical treatment plans differ not only in terms of whether patients undergo ACL reconstruction but also in terms of rehabilitation and recommendations for future sports participation. Clinicians are routinely asked to advise patients on whether surgical or nonsurgical treatment is the best option (13, 14). Individuals who choose conservative treatment must undergo physical therapy to strengthen the muscles around the knee, notably the quadriceps femoris and hamstring muscles (14).

Several patients cannot participate in cutting or pivoting-type sports after a total ACL tear, while others have instability during even typical tasks such as walking (15). This diversity is influenced by the degree of the initial knee injury and the patient's physical demands. Approximately half of all ACL injuries are associated with the meniscus, articular cartilage, or other ligament injuries (15). Secondary damage can occur in patients who have recurrent bouts of instability due to an ACL injury (15).

Although instability was significantly higher in nonoperative group as compared to operative group but functionally there was no difference between two groups in our study. In group A five patients had anterior knee pain , relieved by physiotherapy and oral analgesics, one case with superficial infection which healed with antibiotics, and one patient reported hardware prominence (at tibial post) and required removal of tibial post implant at 6 months post-op. There were two cases of haemarthrosis and one cases of urinary retention in group B which were relieved by symptomatic treatment. Some other complications also reported in literature like infection, bacterial arthritis of the knee, embolus of the popliteal artery, a fatal pulmonary embolism, patella fracture and localized pain (16, 17). None of these complications were seen in our study.

There have been several studies conducted that have compared different patient outcomes when dealing with ACL injuries. The study by Meuffels et al. (18) compared the long-term outcomes of highly active patients with ACL ruptures treated surgically versus non-surgically. van Yperen et al. conducted a study to compare the long-term treatment outcomes of operative versus nonoperative ACL rupture treatment in elite athletes (19). In the study conducted by Streich et al., 80 patients with arthroscopically proven ACL insufficiency to see treatment outcomes of operative versus nonoperative ACL rupture treatment (20).The conclusion of all the studies determined that at the time of the examination during follow-up, the patients who had undergone surgical treatment had significantly improved knee stability. However, at a 10–15-year follow-up, both treatment options show comparable patient outcomes, therefore, no statistical difference between patients treated conservatively or surgically was seen (18). Although it is claimed that surgical treatment is superior for restoring overall knee function, the clinical outcomes in these studies suggest that outcomes were similar.

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