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A Retrospective Study of the Functional Outcome of Revision ACL Reconstruction with Autograft

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Abstract

Introduction: Isolated ACL injuries account for about half of the knee injuries in a given year. ACL tears are common in young active persons 70% occurring during sports activities. In general, the incidence of ACL injury is higher in people who participate in high-risk sports, such as basketball, football, skiing, and cricket. *Methodology:* As soon as the patient is admitted, a detailed history was taken & meticulous examination of the patient was done. The required information was recorded in the proforma. The patient's Knee radiographs were taken in AP & Lateral views. The diagnosis was established by clinical & Radiological examination. Initially in patients with acute knee injuries, the Knee is immobilized in a long knee brace till reduction of Haemarthrosis / Joint effusion. *Results:* The functional outcome was fair in 60% of patients, 20% of patients had poor results and 20% of patients had excellent functional outcome. *Conclusion:* Males are more prone for anterior cruciate ligament injuries.Household injuries and sports related injury are the most common modes of injury.

Keywords: ACL Injury; Autograft; Functional Outcome.

Introduction

The knee is one of the most frequently injured joints because of its anatomical structure, its exposure to external forces, and the functional demands placed on it [1]. The anterior cruciate ligament (ACL) is one of the most frequently injured ligaments in the human body. These injuries are most often a result of low-velocity, non-contact and contact injuries with a rotational component. Estimated incidences of 0.24 to 0.34 ACL injuries per 1000 population per year have been reported. Some authors made an estimation of 250,000 ACL injuries per year worldwide. The Anterior Cruciate ligament (ACL) is the primary stabilizer of the knee and prevents the knee against anterior translation. It is also important in counteracting rotational and valgus stress [2].

The anterior cruciate ligament (ACL) rupture is the most common serious injury of the knee [3].

Isolated ACL injuries account for about half of the knee injuries in a given year. ACL tears are common in young active persons 70% occurring during sports activities. In general, the incidence of ACL injury is higher in people who participate in high-risk sports, such as basketball, football, skiing, and cricket. However, ACL injuries are very commonly seen with road traffic accidents as well. Contact sports produce injury to the ACL secondary to twisting, valgus stress, or hyperextension, directly related to contact or collision.

When matched for activities, a greater prevalence for ACL injury is found in females compared with males. The incidence of ACL tear in indoor soccer players is 6 times greater than in male indoor soccer

players of all ages.

Patients with acute ACL injuries present frequently with acute haemarthrosis. More than 70% of patients with an acute traumatic haemarthrosis have an ACL tear, either partial or complete. The best time to diagnose such a tear is within the first few hours before there is gross swelling and muscle spasm, but this is not always possible.

Because of its high prevalence of injury, the ACL continues to be intensively studied, and outcomes of ACL surgery receive considerable attention. This has included research on technical factors such as tunnel position, graft choices, and fixation methods, as well as postoperative rehabilitation protocols. As a result, ACL reconstruction techniques have improved significantly over the last several decades [4].

Although primary reconstructions result in a satisfactory outcome more than 75% to 90% of the time, a significant number of patients will require revision procedure [5].

At our institution, the approach to revision procedures is based on a methodical algorithm starting with identifying the etiology of failure. Once the mode of failure has been identified, the revision can be planned based on similar principles used in primary reconstruction.

Failure after ACL reconstruction can occur for multiple different reasons, and proper identification of the etiology of failure is necessary to properly plan the approach to revision surgery. The most common causes of failure include recurrent instability, loss of motion, persistent pain, and patient dissatisfaction [6].

Methodology

This is a retrospective study and 25 patients operated for Arthroscopic revision ACL reconstruction, using Bone-Patellar-Tendon-Bone graft and Hamstring Graft by a single surgeon were chosen all of them were initially examined in out patientdepartment, and later MR scanning was do neinall patients. All the patients had clinical examination under anaesthesia.

A personal followup evaluation was done in all 25 patients by a single observer.

Inclusion Criteria

1. Patients clinically detected to have anretear of ACL.
2. Patients clinicall ydetected to have an lax ACL
3. Previous reconstruction of ACL
4. No associated in sufficiency of Posterior cruciate ligament.
5. Instabilityduring activity of daily living.
6 Confirmed by clinical examination and M.R.I.

Exclusion Criteria

1. BilateralACLtears.
2. History of reconstruction of the ACL on the contralateral side.
3. Patients with posterior cruciate ligament tears.
4. Patients with posterolateral rotator deficiency.
5. Patients with partial ACL tears as determined arthroscopically. This was a retrospective study.

As soon as the patient is admitted, a detailed history was taken & meticulous examination of the patient was done. The required information was recorded in the proforma. The patient's Knee radio graphs were taken in AP & Lateral views. The diagnosis was established by clinical & Radiological examination.

Initially in patients with acute knee injuries, the Knee is immobilized in a long kneebrace till reduction of Haemarthrosis / Joint effusion.

MRI investigation was done to confirm the diagnosis at 3 weeks after injury.

Physiotherapy was administered during this time period of 3 weeks.

Drugs are given to alleviate pain. Patients with chronic ACL rupture were admitted.

Lysholm Knee Score noted. All patients were taken for elective surgery as soon aspossible after necessary Blood, Urine and Radiographic workup.

Discussion regarding management options was presented in a confidentialenvironment with access for relatives with the availability of notes, X-rays and in thepresence of a team of Orthopaedic surgeons, Anaesthetist, & Physiotherapist.

The patient's attenders were explained about the nature of injury & it's possible complications. Written and informed Consent was obtained from the patient & the attenders for surgery.

Medical evaluation is done after consulting the physician. Hygiene of skin was maintained with regular scrub & Betadine. Injection Tetanus is given. The whole length of the affected limb including private parts were prepared, scrubbed with Savlon

& Betadine. The Anaesthetist is informed.

Preoperative parenteral antibiotics (preferably Cephalosporins) are administered one hour before surgery (post operatively continued for 5 days & then converted into Oral antibiotic for 5 days). The patient was shifted to the operation theatre with X-rays & drugs.

Preoperative Planning

Depending on the stress tests, the possible associated ligamentous injuries which are expected, like Meniscal tear, Medial collateral ligament injury the fixation is planned. The type of Interference screws and size of the screws which may need to be used isdetermined.

Results

In our study, 16 percent of patients were under 25 years of age, 28 percent of patients were in the age group of 26-35.

20 percent of patients were more than 36 years of age.

In our study 50 percent of revisions involved right knee and the rest 50 percent involved the left knee.

In our study 60 percent of patients d mode of failure was traumatic, Sports injury was the most common type ofnew trauma.

The rest 40 percent of patients it was due to technical failure.

Table 1: Age Distribution

Age	No of Patients	Percentage
20 - 25	4	16
26 - 30	10	4
31 - 35	6	24
>36	5	20
Total	**25**	**100**

Table 2: Side of Injury

Side	No of Patients	Percentage
Left	10	50
Right	10	50
Total	20	100

Table 3: Mode of Injury

Mode of Injury	No of Patients	%
Lax	10	40%
Retear	15	60%
Total	25	100

Table 4: Graft Used in Primary

Primary	No of Patients	%
Hamstring	4	20
BPTB	16	80
Total	20	100

Table 5: Graft used in incision

Incision	No of Patients	Percentage
Hamstring	7	35
BPTB	13	65
Total	20	100

In 80 percent of patients who had undergone primary ACL reconstruction the graft used was Bone patellar tendon bone graft, and in the rest 20 percent it was hamstring graft.

In the revision ACL reconstruction cases the graft used was 100 percent autologous grafts.

In 65% of cases Bone patellar tendon bone graft was used and in 35% of cases hamstring graft was used.

Tibial tunnel malposition was observed in 75% of cases of the primary ACLR.

In 44% of them it was anterior, and in 31% of cases it was posterior.

In the rest 25% of patients the tibial tunnel was normally placed.

Table 6: Position of the Tibal Tunnel

Tibial tunnel	No of patients	%
Anterior	11	44
Normal	10	25
Posterior	4	31
Total	25	100

Table 7: Position of the Femoral Tunnel

Femoral Tunnel	No of Patients	%
Anterior	11	44
Anterior +vertical	10	40
Normal	1	4
Vertical	3	12
Total	25	100

In 96% of patients femoral tunnel malposition was observed.

44% of patients had a anteriorly placed tunnel,

12% of patients had a vertical tunnel.

40% of patients had a anterior with vertically placed tunnel.

Table 8: Lyschom Score

Lysholm	No of Patients	%
Fair	9	36
Good	12	48
Poor	4	16
Total	25	100

36% of patients showed a fair result

48% of patients showed good results

16% of patients showed poor results

Table 9: IKDC Score

IKDC	No of Patients	%
Fair	12	60
Excellent	4	20
Poor	4	20
Total	20	100

The functional outcome was fair in 60% of patients

20% of patients had poor results

20% of patients had excellent functional outcome

Discussion

There is an ever increasing number of anterior cruciate ligament (ACL) reconstructions being performed using multiple techniques. Revision anterior cruciate ligament (ACL) surgery is becoming increasingly common as the number of primary ACL reconstructions continues to rise. Revision ACL surgery is indicated for selected patients with recurrent instability after a failed primary procedure. Preoperative planning, meticulous surgical technique by a skilled ACL surgeon, and a single technique that can revise the majority of primary ACL reconstructions are necessary. The two-incision technique is a reproducible method that can accommodate nearly all the primary ACL reconstruction failures.

What constitutes a failure after ACL reconstruction is not well agreed upon, but the 4 major reasons for failure have been described as arthrofibrosis, degenerative arthritis, extensor mechanism disruption, and recurrent instability (graft failure) [3]. The most common reason for revision ACL reconstruction is thought to be recurrent instability with most of these believed to be related to an error in surgical technique [3,4,5]. Non-anatomic placement of the ACL graft tunnels is believed to be the most common surgical error. We have found the two-incision technique utilitarian in dealing with the majority of the variables encountered in either endoscopic (single-incision) or rear entry (two-incision) primary ACL reconstruction failures.

Rehabilitation for primary ACL reconstructions has undergone an evolution, although very little has been published regarding rehabilitation following revision surgery. It is established that rehabilitation protocols following revision reconstruction should be more conservative than those used for patients with primary ACL reconstructions. The goal of revision surgery and rehabilitation is to recreate a functional knee that is stable for activities of daily living, and perhaps, stable enough to permit a return to sport. Rehabilitation following revision surgery must be individualized depending on a variety of factors including: staging, removal of hardware, graft selection, graft fixation, chondral defects, meniscal pathology, associated instability patterns, and alignment concerns. However, as with primary ACL rehabilitation, in general, the goal of early range of motion is crucial.

The MARS group study showed a male predominance, in 76% the cause for trauma was while playing sports. It was the first revision for 89% of patients, second revision for 9% of patients, third revision for 2% of patients. Femoral tunnel malposition was rated as the most common technical failure in 80% of patients, tibial tunnel malposition in 75% of cases. The primary graft was autograft in 70% of cases, BPTB was used in 49% of all grafts.

Our study showed similar results as The MARS group cohert study which included 460 patients.

Martin Lind et al from the Danish ACL reconstruction registry again showed a male predominance. Time from primary ACLR to revision was a average of 1.8 years. The primary cause for graft failure after primary ACLR was traumatic (38%), graft failure due to technical causes was 24%. Sports was the most frequent type of new trauma.

These Findings were Similar to our Study

Hamstring graft was used in 42% cases and BPTB graft was used in 28% of cases showed a slight variation from our study group.

Our study group involved revision ACLR performed by a single surgeon while the primary ACLR was performed by multiple surgeons.

Conclusion

- All patients had instability of knee in the form of giving way evaluated by Lachmantest, Anterior drawer test and slocum test and confirmed by arthroscopy.
- Anterior cruciate ligament injuries are common in younger age group individuals.
- Revision Arthroscopic anterior cruciate ligament reconstruction with autograft reduces postoperative morbidity and enables early rehabilitation. The functional outcome of arthroscopy assisted anterior cruciate ligament reconstruction with Bone Patellar tendon Bone autograft is excellent to good and allows the patients to return to preinjury level of activity.
- Revision ACLR showed fair to good functional outcome.

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