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Original research article

Arthroscopic ACL reconstruction: Complications

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Abstract

Results of nonoperative treatment of anterior cruciate ligament tears have been discouraging and can be attributed partially to the associated injuries that occur at the time of the anterior cruciate ligament rupture. As a result of abnormal loading and shear stresses in the anterior cruciate ligament deficient knee, the risk of late meniscal injury is high and appears to increase with time from the initial injury. Our study population included all patients on whom anterior cruciate ligament reconstruction surgery has been performed using 4 stranded hamstring autograft and preservation of hamstring graft tibial insertion operated. The estimated number would be 52 patients. A total of 3 patients out of 52 experienced complications in varying combinations, all patients reporting complications reported more than one complication. Complications reported included persisting instability, pain at operated site, numbness at operated site, occasional swelling, and occasional locking.

Keywords: Arthroscopic ACL reconstruction, tibial attachment, complications

Introduction

The method chosen for treating an anterior cruciate ligament tear is influenced by the natural history of the injury. Not all knee injuries are reported and accurately diagnosed as anterior cruciate ligament injuries. It has been well documented that an individual with an anterior cruciate ligament-deficient knee who resumes athletic activities and has repeated episodes of instability will sustain meniscal tears and osteochondral injuries that eventually lead to arthrosis [1].

Results of nonoperative treatment of anterior cruciate ligament tears have been discouraging and can be attributed partially to the associated injuries that occur at the time of the anterior cruciate ligament rupture. As a result of abnormal loading and shear stresses in the anterior cruciate ligament deficient knee, the risk of late meniscal injury is high and appears to increase with time from the initial injury [2].

MRI is the most helpful diagnostic radiographic technique. The reported accuracy for detecting tears of the anterior cruciate ligament has ranged from 70% to 100%. Because the anterior cruciate ligament crosses the knee joint at a slightly oblique angle, the complete ligament rarely is captured in its entirety by a single MRI scan in the true sagittal plane. More recent investigators reported that the accuracy for MRI in evaluating injuries to the anterior cruciate ligament approaches 95% to 100%. Sagital images are most useful for evaluation of ACL, fiber orientation of the femoral and tibial attachments. Coronal images are useful for evaluation of the collateral ligaments and for assessing the signal characteristics of the ACL within the intercondylar notch. The ACL appears oriented like a 'hand in pocket coursing superolateral to anterior inferomedial [3].

Axial views are used for assessment of ACL and posterior cruciate ligament in the notch, bone contusion, para articular fluid collections and the joint capsule. T2 weighted water sensitive sequences are the most useful for evaluation of contusions, edema and hemorrhage seen in association with ACL tears.

ACL has "Propeller" or "fanlike" configuration gray, slightly inhomogeneous signal intensity may be seen in the normal ligament and the ligament may not be seen in its entity on a single sagittal slice [4].

In Acute ACL tears-Poor (or) Non-visualization of the ACL on sagittal images, an amorphous edematous mass with focally increased Signal on T2-weighted images, is observed. In chronic ACL tears: The most useful finding in differentiating chronic tears is abnormal course and focal angulation of the ligament without edema. Focal thickening wavinar and indistinct margin are non-specific findings that may be seen with chronically torn or normal ligaments. Non-visualization of the ACL was uncommon with chronic tears [5, 6].

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Methodology

Our study population included all patients on whom anterior cruciate ligament reconstruction surgery has been performed using 4 stranded hamstring autograft and preservation of hamstring graft tibial insertion operated. The estimated number would be 52 patients. Case notes would be used to establish all demographic details including mechanism of injury, time to surgery, post-operative immobilization and intra-operative details. Complications are also will be recorded and confirmed with the patients. The functional questionnaire will be both e-mail based and in-person format methods. Patients will be followed up at least 9 months post-operatively. IKDC subjective functional scoring system & The Lysholm score and Tegner pre-operative and post-operative scoring system will be utilized to assess the functional outcome.

All the surgeries are performed by a single orthopedic surgeon. All patients had semitendinosus and gracilis tendon autografts harvested in a similar manner. Single bundle reconstruction technique with quadrupled hamstring autograft is used in every case. In all cases Endo-Button was used for femoral side fixation and preservation of hamstring graft tibial insertion on the tibial side. Indications for surgery were clinically and radiologically confirmed cases of anterior cruciate ligament deficient knees.

Inclusion criteria

1. All the patients who have undergone arthroscopic ACL reconstruction using 4 stranded hamstring autograft and preservation of hamstring graft tibial insertion.
2. Age between 18 to 55 years.
3. Radiologically ACL deficient knee confirmed by MRI.
4. Patients with or without Associated meniscus injuries.

Exclusion criteria

1. Bilateral knee injury.
2. ACL tears associated with fractures.
3. Revision ACL reconstruction.
4. current or prior Infection.
5. Patients who were lost to follow up.
6. Patients with Associated PCL tear.
7. Patients with medical contraindication to surgery.

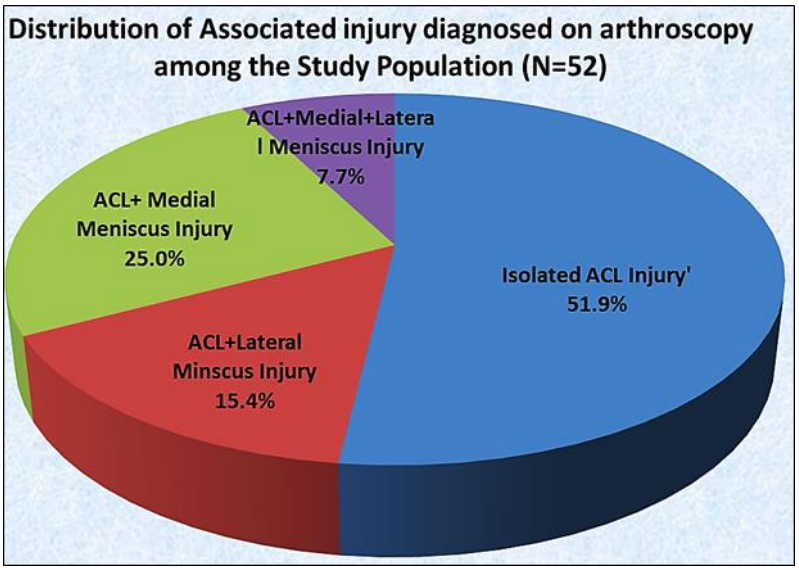
Investigations required for the study

1. Routine pre-operative investigations.
2. Pre-Operative MRI of ACL deficient Knee.

Results

Table 1: Time to Surgery (Wks)

N	Mean	SD	Median	Min.	Max.
52	15.8	12.268	11.0	4	52



Graph 1: Associated injury diagnosed on arthroscopy

A total of 3 patients out of 52 experienced complications in varying combinations, all patients reporting complications reported more than one complication. Complications reported included persisting

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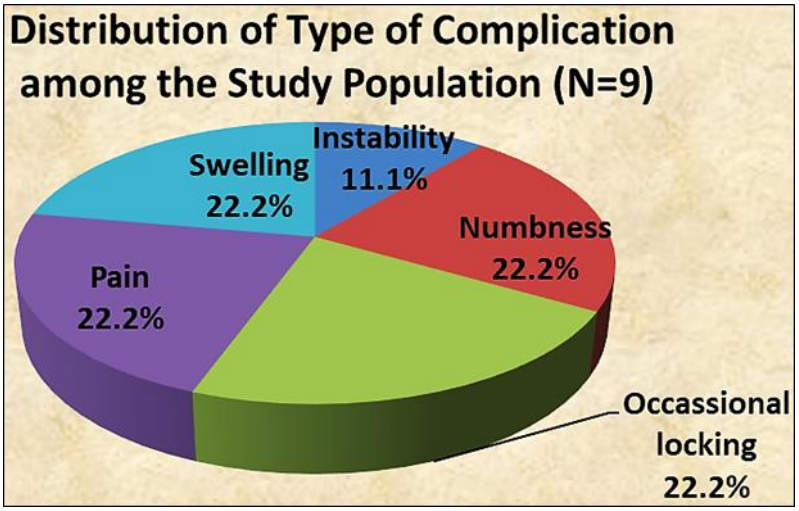
instability, pain at operated site, numbness at operated site, occasional swelling and occasional locking as follows.

Table 2: Complications

Complication	Frequency	Percent
No	49	94.2
Yes	3	5.8
Total	52	100.0

Table 3: Individual complication distribution

Type of Complication	Frequency	Valid Percent
Instability	1	11.1
Numbness	2	22.2
Occasional locking	2	22.2
Pain	2	22.2
Swelling	2	22.2
Total	9	100.0



Graph 2: Individual complication distribution

Discussion

A total of 3 patients (5.8%) out of 52 experienced complications in varying combinations, all patients reporting complications reported more than one complication. Complications reported included persisting instability, pain at operated site, numbness at operated site, occasional swelling and occasional locking.

Anterior cruciate ligament (ACL) tears are among the most common injuries in young athletes, has been associated with tibiofemoral instability, decreased functional outcomes, and meniscal injury.

The damage that leads to these sequelae may occur at the time of the initial event because of associated meniscal injury, chondral injury, ACL injury, subchondral bone impaction, hemarthrosis, and associated ligamentous injuries. Alternately, continued ligamentous deficiency may lead to loss of neuromuscular feedback, altered knee kinematics increased shear and contact stress, an increased rate of meniscal injury, and an increased rate of chondral injury, each of which could accelerate degenerative changes. Ligamentous reconstruction may protect against continued instability improve functional outcomes and decrease rates of degenerative joint disease [7].

Conservative management is useful in sedentary patients, but for other physically active patients, it is associated with a significant drawback when they can't resume high-level sports activities successfully. Anterior cruciate ligament (ACL) ruptures left untreated lead to subsequent knee disability, which can be severe with potentially devastating long-term consequences. With improving results and increasingly reliable outcomes, patient and physician expectations have evolved to include the goal of return to activities and sports at normal or near normal levels (83).

Anatomic ACL reconstruction is a concept rather than a technique and can best be described based according to the following four principles. The first principle is to restore both functional bundles of the ACL, the AM and PL bundle. The second principle is that the graft needs to be placed anatomically, with the tibial and femoral tunnel apertures placed within the native ACL insertion sites. To ensure similar functional properties as the native bundles have, the third principle is to tension each bundle in accordance with the native tensioning 70 patterns from full knee extension through flexion. The fourth

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and final principle is to customize the surgery for each individual patient by considering the variation in anatomic characteristics, activity level, lifestyle and personal preferences [8].

Distinct knowledge of anatomic landmarks of the femoral and tibial insertion sites is essential to ensure anatomic placement of the bone tunnels, since non-anatomic femoral tunnel position has been shown to be the most common cause of graft failure 12 Inaccurate femoral tunnel placement is one of the most common causes of failure in ACL reconstructions. Graft placement is critical as inappropriate graft placement can lead to notch impingement or graft stretching [9].

The inside out drilling technique of femoral tunnel for single bundle ACL reconstruction is simple, reproducible and results in satisfactory clinical outcome. The unconstrained placement and angling of free hand femoral guide result in a femoral tunnel which is through footprint of ACL. The graft is placed very low, oblique and as posterior as possible on femoral side mimicking the native ACL. It creates femoral tunnel of adequate length and coronal obliquity through the femoral footprint of ACL with minimal chances of blow out.

The tibial tunnel-independent technique in which the femoral tunnel is drilled through an accessory arthroscopic portal was used which was originally described by Bottoni *et al*. Drilling the femoral tunnel separately with a standard AM portal may be complicated by an inappropriate arthroscopic visualization of the ACL. In addition, the possibility of creating a shorter femoral tunnel may increase. Therefore, an accessory AM portal has been developed to drill the femoral tunnel separately in a more horizontal orientation. An accessory AM portal allows creation of longer femoral tunnel for fixation and incorporation of the graft, more accurate placement of the femoral tunnel guide and improved visualization of the ACL footprint with maintaining the arthroscope in the standard AM portal [10].

Conclusion

A total of 3 patients out of 52 experienced complications in varying combinations, all patients reporting complications reported more than one complication. Complications reported included persisting instability, pain at operated site, numbness at operated site, occasional swelling, and occasional locking.

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