FUNCTIONAL OUTCOME OF ARTHROSCOPIC ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION WITH HAMSTRING AUTO GRAFT

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ABSTRACT

BACKGROUND

Arthroscopic Anterior cruciate ligament reconstruction is most common surgery in orthopaedic practice. Various types of grafts are available for reconstruction, hamstring tendon graft is commonly used with excellent results. The aim of this study was to evaluate the functional outcome of arthroscopic anterior cruciate ligament reconstruction by quadrupled single bundle hamstring graft through accessory anteromedial portal by clinical outcome score international knee documentation committee (IKDC).

MATERIALS AND METHODS

A prospective study was done. 30 patients were included in the study based on inclusion and exclusion criteria. All patients underwent arthroscopic anterior cruciate ligament reconstruction with autogenous hamstring tendon graft. All patients were followed up according to postoperative rehabilitation protocol. At final follow up functional assessment was done according to IKDC.

RESULTS

All cases were males, majority of the patients belonged to 20-30 years age group. The most common cause was sports injuries (53.33%) followed by road traffic accidents (26.66%). 100% patients presented with giving way of the knee. Clicking of knee was appreciated in 66.66%. Swelling and pain was seen in 60% patients. According to IKDC score postoperative recovery as normal was seen in 90% patients whereas 3 patients (10%) graded recovery as abnormal.

CONCLUSION

Arthroscopic ACL reconstruction with autogenous hamstring graft gives high success rate in view of functional outcome.

KEY WORDS

Anterior Cruciate Ligament, IKDC Score.

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BACKGROUND

Knee joint injuries plays a major role in many popular knee pivoting sports including soccer, basketball, skiing etc.¹ In the past 20 years Anterior Cruciate Ligament (ACL) injury has been studied extensively. It is more common than the posterior cruciate ligament injury. Due to poor capacity to repair ACL, patients who have knee symptoms related to ACL deficiency may consider ligament reconstruction as a means of stabilizing the tibio-femoral joint and restoring high-level function of the knee joint. Nearly 40% of all knee injury problems are related to ligamentous injury, and isolated ACL injury constitutes nearly 50% of all knee ligament injuries.^{2,3,4}

Approximately 3,00,000 ACL reconstructions are performed in the USA alone each year⁵. Various types of grafts used for ACL reconstruction like auto graft (Quadriceps tendon patellar tendon, hamstring tendon) and allograft (Patellar, hamstring, achilles or tibialis anterior) tendons.

Some surgeons use silver wire, fascia lata,⁶ and Iliotibial band⁷ for ACL reconstruction. ACL reconstruction with hamstring tendon is becoming increasingly popular in patients with symptomatic instability and in appropriately selected patients can yield successful and satisfactory results.⁸ Arthroscopically assisted ACL reconstruction has the advantage of being minimally invasive, accurate graft placement, less disturbance of normal tissue resulting in quicker recovery and rehabilitation, less infection rate, minimal hospital stay.

This study aimed to assess the outcome of arthroscopic ACL reconstruction using semitendinosus auto graft at our Centre using IKDC score.

MATERIALS AND METHODS

This study was a prospective study. Study was conducted in Maharaja Institute of Medical Sciences, Nellimarla, Vizianagaram, 30 cases were included in the study according to inclusion and exclusion criteria and treated from January 2016 to June 2017 and all patients were followed up according to postoperative protocol.

Inclusion Criteria

1. Complete ACL tear confirmed by MRI requiring primary ACL reconstruction.
2. Radiographic evidence of skeletal maturity; patient between 15 and 55 years of age.

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Exclusion Criteria

1. Anterior cruciate ligament tear of less than 3 weeks.
2. Anterior cruciate ligament tear associated with other ligament injuries (Posterior cruciate ligament tear, collateral ligament injuries and postero-lateral corner).
3. Anterior cruciate ligament tear associated with bony injury around the knee.
4. Patients with ACL avulsion injury.

Surgical Procedure

Under strict aseptic conditions, patient is in supine position, initial diagnostic arthroscopy done. ACL tear was found and remaining PCL, MM, LM, MCL, LCL were found normal. Remnant ACL stem was shaved off. Now semi tendinosis and Gracilis graft was collected and prepared. Later appropriate size measured, and graft inserted through tibial and femoral tunnel using zigs and fixed with titanium screws of appropriate size. Wound closed after through lavage and compression bandage applied.

RESULTS

Our study included a total of 30 patients with mean age group of 29.6 years and majority of patients being 26-30 years (40%) followed by 21-25 yrs. (23.34%) with all patients being males. This male predominance could be attributed to their active involvement in sports, farming and road traffic accidents. Sports activities like football, kabaddi and athletics like jumping, police physical training, etc (53.33%) were the most common cause and next most common is road traffic accidents (26.66%). Some patients (20%) has fall while walking/ climbing down stairs. Giving way of the knee seen in 100% patients. Clicking of knee seen in 66.66%, swelling associated with pain seen in 60% cases. 46.66% gave history of locking of knee which was correlated with associated injuries in the knee. Medial meniscal tear was the commonest associated injury (36.67%) detected by MRI followed by lateral meniscus (26.67%). Their postoperative recovery was normal in 57% and near normal in 33%. The abnormal group included three patients with 1 superficial infection, 1 with laxity and 1 with FFD. Pre-injury level achieved in 87% of patients, but 4 patients were noncompliant to protocol.

Figure 5. Postoperative IKDC Score

Figure 6. Postoperative Complications

Clinical Photographs

Figure 7. Anterior Drawers Test

Figure 8. Pivot Shift Test

Figure 9. MRI Images

Figure 10. Single Hop Test

Figure 11. Post-Operative X Ray

DISCUSSION

Anterior cruciate ligament (ACL) tears can lead to subsequent knee disability, with potentially devastating long-term consequences which can be severe enough interfering with day to day daily activities. With improving results and increasingly reliable outcomes. Patient and physician expectations have evolved to include the goal of return to activities and sports to pre-injury level at normal or near

normal levels. Physiotherapy and rehabilitation programmes are used after ACL reconstruction surgery. These programmes are designed to maximize function by increasing the strength, improving range of motion, and neuromuscular coordination. Less donor site morbidity associated with hamstring graft than that of patellar bone- tendon- bone grafts and carries no risk of patellar fractures.

Various options of grafts available for ACL repair, but hamstring auto grafts have increasingly become more popular over the past decade. Multiple-strand hamstring tendon ACL reconstructions have higher strength, stiffness, and cross-sectional area compared with patellar tendon grafts. Stable initial graft fixation is required for a successful ACL reconstruction using hamstring autograft and, ultimately, graft- to- bone healing. Hamstring reconstruction using femoral endo button fixation has been shown to have excellent initial mechanical properties, including pull out strength. Tibial fixation is done with interference screw. Maurilio Marcacci et al study, out of fifty patients 40 were men and 10 were women.⁹ Vassilios S Nikolaou et al study, there are 30 males and 16 females among 46 patients with ACL injuries.¹⁰ Our study all 30 patients were male. Brown et al study mean subject age was 28.8 +/- 12.8 years¹¹. Maurilio Marcacci et al study, mean age was 28 years, ranging from 18–39 years.⁹ Vassilios S Nikolaou et al study, the mean age was 32 (18 – 45) years.¹⁰ Our study mean age was 27.66 years. (15-45 years).

Vassilios S Nikolaou et al, in June 2008, after a retrospective analysis of MRI efficiency in diagnosing internal lesions of the knee, reported that the accuracy for tears to the medial, lateral meniscus, anterior and posterior cruciate ligaments and articular cartilage was 81%, 77%, 86%, 98% and 60% respectively.¹⁰ They concluded that MRI is very helpful in diagnosing meniscal and cruciate ligament injuries and found that the clinical examination had significant lower reliability in the detection of these injuries. But its importance is still vague in a countable percentage reports with false results and in chondral defects. The arthroscopy still remains the gold standard for definitive diagnosis. Clinical evaluation of the patients for instability was an essential component in our study. In our study, MRI showed complete Anterior Cruciate Ligament tear in all patients and Medial meniscus was most commonly associated followed by Lateral Meniscus which correlated with arthroscopy with accuracy more than 90%. So in our study, as MRI may help to look out for other lesions and repair them, we conclude that MRI is preferable to arthroscopy before surgery, which improves clinical outcome of the patients. In Vassilios S Nikolaou et al study, there are 29 Medial meniscus tears, 21 Lateral meniscus tears, 23 isolated ACL injuries and 3 PCL injuries noticed during arthroscopy. In our study there are 11 Medial meniscus tears, 8 Lateral meniscus tears, 11 isolated ACL injuries and no PCL injuries in arthroscopy.

In 2003, Fareed H et al reported the results of a retrospective study on patients who underwent arthroscopic ACL reconstruction¹². The purpose of their study was to evaluate their initial experience with this procedure. Between July 97 and March 2001, 29 patients underwent arthroscopic ACL reconstruction with 4 strand hamstring tendon graft. 25 were available for follow up. Same rehabilitative program was followed by all the patients. IKDC ligament evaluation system used for evaluation. Button K¹³ and others, in 2005,

evaluated the outcome of ACL reconstruction with semitendinosus tendon autograft with same rehabilitation protocol in 48 patients at 20 months.

	Fareed H¹² et al (2003)	K Button & Others (2005)	Present Study
No. of Patients	25	48	30
Average Follow Up	25.4 Weeks	20 Weeks	24 Weeks
IKDC Normal	12 (48%)	26 (54%)	17 (56.66%)
Near Normal	12 (48%)	18 (38%)	10 (33.33%)
Abnormal	01 (4%)	04 (8%)	03 (10%)
Table 1. Comparison of Our Study with Fareed H et al and K Button & Others			

	Andrea Reid¹⁴ et al. Study, 2007	Gulick TD¹³ Study, 2002	Present Study
Number of Patients	42	57	30
Average Age	26 Years	27 Years	29 Years
Rehabilitation Protocol	4 – 6 Months	4 – 6 Months	4 – 6 Months
Hop Test- Mean Limb Symmetry	88.2 +/- 9.5 (63.8 – 103.2) At 22 Weeks	-	83.503 +/- 3.65 (66.36– 93.33) At 24 Weeks
Laxity Up to Grade 1	72%	74.6%	76.67%
Return to Prior of Function	-	84%	86.67%
Table 2. Andrea Reid et al & Gulick TD & Our Study Comparison			

	Paolo Aglietti et al Study¹⁵	Kyung- Wook Nha et al Study¹⁶	Present Study
Normal	37	42	17
Near Normal	25	13	10
Abnormal	3	0	2
Severely Abnormal	4	0	1
Total	69	55	30
Table 3. Post-Operative Outcome IKDC Scoring			

In Andrew D Lynch et al study,¹⁷ there is absence of giving away in 96.6%, 84.1% have absence of joint effusion, 91.1% returned to sports and there is laxity in 72.9% patients who has been operated. In present study no patient had postoperative giving away, 90% have no joint effusion, 87% returned to sports activities, 4 patients (13.33%) had pain at the graft donor site. Numbness around graft site seen in one patient but resolved gradually. Superficial skin infection seen in two patients and resulting in delayed wound healing.

CONCLUSION

ACL reconstruction with quadrupled semitendinosus graft has high success rate with good functional results. MRI is very helpful in diagnosing meniscal injuries, cruciate ligament injuries and extra articular ligament injuries like medial and lateral collateral ligaments and is also helpful in planing surgery.

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