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Rajni Ranjan
Associate Professor,
School of Medical Sciences &
Research, Knowledge Park -3,
Greater Noida, Uttar Pradesh,
India

Rakesh Kumar
Assistant Professor,
School of Medical Sciences &
Research, Uttar Pradesh, India

Ajeet Singh
Consultant Orthopaedic Surgeon,
R.K. Lifeline, Sirsa, Haryana,
India

Correspondence
Rajni Ranjan
Associate Professor,
School of Medical Sciences &
Research, Knowledge Park -3,
Greater Noida, Uttar Pradesh,
India

Original Research Article

Arthroscopic reconstruction of anterior cruciate Ligament injury with autogenous hamstring graft and functional recovery of the patients

Rajni Ranjan, Rakesh Kumar and Ajeet Singh

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Abstract

Introduction: Arthroscopic Anterior Cruciate Ligament reconstruction is common surgery in orthopaedics. Hamstring graft is commonly used with excellent results. Aim of our study was to review functional outcome of patient who had undergone ACL reconstruction using Hamstring autograft.

Material and method: A prospective study was done and patient included in the study on the basis of inclusion and exclusion criteria. Arthroscopic ACL reconstruction done with autogenous hamstring graft. At final follow-up functional assessment was done according to Lysholm and Tegner Knee Scoring system.

Result: Total 20 patient included in the study, with age range of 20-56 years. There were 17 male and 3 female. Road traffic accident was most common mode of injury in our study. Lysholme and Tegner Knee Score were excellent in 15 and good in 5.

Conclusion: Arthroscopic ACL reconstruction with autogenous hamstring graft give high success rate in terms of functional recovery of patients.

Keywords: Anterior Cruciate Ligament, Hamstring Graft, The Bone Patellar tendon bone graft, Lysholm and Tegner Knee Scoring system, Osteoarthritis

1. Introduction

Anterior Cruciate Ligament (ACL) Injuries are the commonest among ligamentous injuries of the knee. ^[1] ACL injuries are common among athletes whose sports involves with knee pivoting movement such as football. ^[2, 3] As this condition mainly affect young individual who practice sports, the treatment provided must allow them to return their sports early. ^[3] Conservatively treated Patient has unstable knee s with increased anterior laxity and higher risk of severe degenerative arthritis of knee joint. ^[4] Reconstruction to ACL allows the patient to return to the pre trauma activity level and delay the onset of tibio-femoral degenerative arthritis ^[2]. ACL reconstruction improve stability and function of the knee and reduces the risk of long term cartilage and meniscal injuries. ^[5] The quadruple hamstring tendon (Semitendinosus-Gracilis) graft has excellent material strength, minimal effect on the knee extensor mechanism and excellent postoperative recovery. ^[2]

Aim of our study was to review functional outcome of patient who had undergone ACL reconstruction using Hamstring autograft.

Material and Method

This prospective study was done in School of Medical Sciences and Research and associated Sharda Hospital, Greater Noida, from January 2013- December 2016. The patients were included in the study on the basis of inclusion and exclusion criteria.

Inclusion Criteria

1. Skeletally Mature Patient
2. Positive Lachman's test
3. Unilateral ACL tear
4. MRI Confirmed ACL tear
5. Patient willing to undergo post-operative rehabilitation protocol
6. Less than 1 year since injury

Exclusion Criteria

1. Anterior cruciate Ligament Avulsion injury
2. Previous surgery in same knee
3. Associated MCL or LCL tear
4. Associated injury of any other joint of lower limb

Technique: All patients operated under spinal anesthesia. Under anesthesia through clinical examination of knee was done to confirm ACL tear and to rule out any other concomitant ligaments and collaterals tears. Limb was elevated for 5 minutes before inflation of tourniquet.

Graft harvesting: In all cases we used hamstring grafts. 3 to 4cm longitudinal incision was given over the anteromedial aspect of tibia, 3 cm below the joint line and 2 cm medial to tibial tubercle. Sartorial fascia identified incised proximally parallel to the tendons. Semitendinosus and gracilis tendons identified by rolling under the finger. After releasing tendons from fascia blunt finger dissection done to free the graft from all fascial bands. Tendon freed from tibial attachments. Tendon ends secured with loop sutures to prevent retraction. Graft harvested with help of closed tendon stripper. Graft is cleared from any muscle and prepared by whipstitching the each end with ethibond no 5 suture. The two strands are looped around a suture to get a quadrupled graft and final length and diameter of graft measured.

Portal placement: anterolateral portal for viewing is made in standard method near to patellar tendon 1cm above the joint line in 90 degree of knee flexion. Medial portal made with help of spinal needle without injuring articular cartilage and medial meniscus.

Notch preparation and femoral tunnel placement: Femoral notch (laterally) cleaned with help of shaver the femoral foot print identified. We prepare femoral tunnel before tibial tunnel. For femoral tunnel preparation knee flexed more than 90 degree. The intraosseous tunnel length is measured. It is desirable to keep at least 20 mm of the graft in the femoral tunnel to allow secure bio integration of graft.

Tibial tunnel: Tibial tunnel is placed in the Centre of tibial foot print. Jig is placed through anteromedial portal and guide pin is drilled into the articular surface under vision. Tibial reamer is used next to create a tunnel of size based on the graft size.

Final preparation of graft and passage: we used the fixed length looped button with graft depending on tunnel length. We put the mark on graft to confirm adequate intraosseous portion. The implant usually suddenly gives way indicating that it has flipped outside the cortex which can be confirmed by pulling back the graft.

Graft tensioning and tibial fixation: The graft is now tensioned by applying gentle traction and taking the knee through 15-20 cycles of flexion and extension. We fixed the tibial side of graft in 20 degree of knee flexion by bio-absorbable or metallic screw one size larger than tunnel size. The joint is inspected for any impingement and smooth movement of graft. Through lavage of joint done at end of procedure.

Post-operative protocol: Patient was allowed to bear weight with crutches with long knee extension brace on 2nd post-

operative day or on the basis of pain tolerance of patient. Close chain exercise started at 2 week.

The patient was followed up at 6 week, 3 month, 6 month 9 month and 1 year. At final follow-up functional assessment done according to Lysholm and Tegner Knee Scoring system. [6, 7]

Result

Out of 20 patients 17 were male and 3 were female with 12 right knee and 8 left knee. The mean age of patient was 31.6 years with age range 20-56 years. Most of the patient (n=10) were in age range of 20-30 years. Most common mode of injury was Road Traffic Accident (n= 10) followed by sports injury (n=6). Average time between injury and surgery was 18 weeks. In one patient there was anterior cortex blowout of tibial screw fixation which was revised on next day of surgery, with new tibial tunnel preparation. One patient developed infection in immediate post-operative period which resolved on intravenous antibiotic based on culture sensitivity report. No patient developed any graft donor site related complications. None of patients developed knee stiffness. All patients had full range of movement knee at one year follow-up. Lysholme and Tegner Knee Score were excellent in 15 and good in 5.

Discussion

The ACL has poor potential for spontaneous healing when it is completely torn. Two third of patients develops knee instability following injury to ACL. Conservative treatment may function well in those who are minimally exposed to high risk activities or an advanced process of degenerative arthritis in the knee already had taken place. [3] Surgical reconstruction is the gold standard for the treatment of ACL injury in sportsman and young individual in achieving high rate of success in terms of recovery of normal knee function and return of pre injury level of activity. [8, 9] Reconstruction of ACL allow the patient to resume sporting activity and delay the onset of osteoarthritis. [10] Three autografts are commonly available for ACL reconstruction. The Bone Patellar Tendon Bone (BPTB) allows for bone to bone healing within femoral and tibial tunnel and has theoretical advantage of fast healing. Semitendinosus and gracilis tendon has less donor site morbidity compared to BPTB graft. Third option is the quadriceps tendon. [11] There is conventional single bundle reconstruction technique which involves placing single bundle of graft in a tunnel whereas double bundle reconstruction involves two graft bundle in separate tunnel and is considered more anatomical. [12] Age is important key factor influencing results, younger patient show better functional score and a rapid return of activity. [8]

Table 1: Age Distribution

Age Group	NO	Percentage
20-30	10	50%
31-40	7	35%
41-50	1	5%
51-60	2	10%

Table 2: Mode of Injury

Mode	No	Percentage
Road traffic Accident	10	50%
Sports	6	30%
Fall	4	20%

Table 3: Functional outcome (Lysholm & Tegner Knee Score)

Score	No of Patient	Percentage
Excellent	15	75%
Good	5	25%
Fair	0	00%

Conclusion

Arthroscopic ACL reconstruction with autogenous hamstring graft is an excellent procedure. High success rate has been achieved after this procedure with regard to functional recovery of patients.

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