

Original Research Article

Functional outcome of anterior cruciate ligament reconstruction using bone-patellar tendon-bone graft: a descriptive observational study from Telangana

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ABSTRACT

Background: The knee joint is the most commonly injured of all joints and the anterior cruciate ligament is the most commonly injured ligament. The bone-patellar tendon-bone (BPTB) autograft is the most commonly used autograft for reconstruction. The bone-patellar tendon-bone autograft has been widely accepted as the gold standard for ACL reconstruction with a high success rate. Objectives of the study were to study the functional outcome of ACL reconstruction using BPTB graft.

Methods: The present descriptive observational study was carried out at department of orthopedics, Medicity institute of medical sciences, Hyderabad involving 30 patients of ACL tear by simple random sampling method. Patients were then evaluated by both subjectively and objectively. They were evaluated by using Lysholm and Gilquist knee scoring scale. Data was analyzed by using SPSS 24.0 version IBM USA.

Results: Majority of the patients i.e., 13 (43.3%) were from 26-35 years age group with right sided involvement in 60%. The result was found to be good in 16 i.e., 53.3%, excellent in 10 i.e., 33.3% and fair in 4 i.e., 13.3% patients. Prevalence of complications was reported as 23.3% in our study.

Conclusions: Our study of ACL repair using BPTB gives good to excellent results within a span of one year.

Keywords: Functional outcome, ACL reconstruction, BPTB graft

INTRODUCTION

The knee joint is the most commonly injured of all joints and the anterior cruciate ligament is the most commonly injured ligament.^{1,2} The modern high-speed vehicular trauma and sporting life style has led to increased ligament injuries of the knee. The anterior cruciate ligament forms the pivot in the functional congruence and stability of the knee in association with the other ligaments, capsule, muscles and bone.^{3,4}

Anterior knee instability associated with rupture of ACL is a disabling clinical problem in general and especially in

athletic individuals. ACL has a poor capacity of healing. The need for surgical correction of ACL injuries arises because, untreated complete injury to the ligament leads to progressive symptomatic instability leading to recurrent injury and damage to the menisci and articular cartilage thus resulting in early osteoarthritis.⁵⁻⁷

Numerous authors have described successful reconstruction of ACL (ACLR) with use of autografts (e.g., Patellar tendon, hamstring tendons, distally based iliotibial band (ITB), fascia late etc.) and allografts (e.g., Achillis tendon, tibialis anterior, patellar tendon, hamstring tendons etc.).⁸⁻¹²

The BPTB autograft is the most commonly used autograft for reconstruction.¹³⁻¹⁷ The bone-patellar tendon-bone autograft has been widely accepted as the gold standard for ACL reconstruction with a high success rate.¹⁸⁻²⁰

So, the present study was planned with the objective to analyze the outcome of surgical management of ACL reconstruction using autologous ipsilateral BPTB graft.

Objectives of the study were to study the functional outcome of ACL reconstruction using BPTB graft.

METHODS

The present descriptive observational study was carried out at department of orthopedics, mediciti institute of medical sciences, Hyderabad. All patients with diagnosis of ACL tear were included during the period of January 2019 to December 2019.

We planned to include all the subjects with ACL tear fulfilling the eligibility criteria of the study approaching to our centre during the period of January 2019 to December 2019 and hence all 30 patients were selected for study.

Inclusion criteria

Inclusion criteria for the study- anterior cruciate ligament tear confirmed by Latchman test, anterior drawer test, classic pivot shift maneuver of MacIntosh and Galway, flexion-rotation drawer test, McMurrays test, valgus and varus test and MRI, patients having age between 15-50 years and those willing to participate after informed consent were included.

Exclusion criteria

Exclusion criteria for the study excluded patients having below 15 and above 50 years age, pregnant and lactating mothers, ACL injury associated with bone injury around knee, osteoarthritic changes on X-ray and those who are not willing to participate.

Patients with ACL tear meeting inclusion and exclusion criteria were enrolled in our study after consent. Detailed history and thorough clinical examination were carried out with special emphasis on features of ACL injury. Systemic examination and routine blood investigations were carried out. X-ray and MRI of knee was done as indicated. A detailed physical examination of ACL tear under anesthesia was carried out. The data was collected in patient information sheet. Patients were then evaluated by both subjectively and objectively. They were evaluated by using international knee documentation score 2000 (IKDC) and Lysholm and Gilquist knee scoring scale.

Lysholm and Gilquist knee pain scoring system²¹

It included scoring system like-Excellent-95-100, good-84-94, fair-65-83 and poor-64 and less.

Statistical analysis and methods

Data was collected by using a structured proforma. Data thus was entered in MS excel sheet and analyzed by using SPSS 24.0 version IBM USA. Qualitative data was expressed in terms of percentages and proportions. Quantitative data was expressed in terms of Mean and Standard deviation.

RESULTS

We included total 30 patients in our study according to eligibility criteria. In our study, majority of the patients i.e., 13 (43.3%) were from 26-35 years age group followed by 10 i.e., 33.3% from 15-25 years, 5 (16.7%) from 36-45 years group. Least were from 45-55 years age group i.e., 2 (6.7%) (Table 1).

Table 1: Distribution according to age.

Variables	Frequency	Percentage (%)
Age group (years)	15-25	10
	26-35	13
	36-45	5
	45-55	2
Total	30	100.0

Male predominance was found in our study. 24 (80%) patients were males and 6 (20%) patients were females. Male to female ratio was 4:1. This was probably because males are more frequently involved in sports and road traffic accidents (Figure 1).

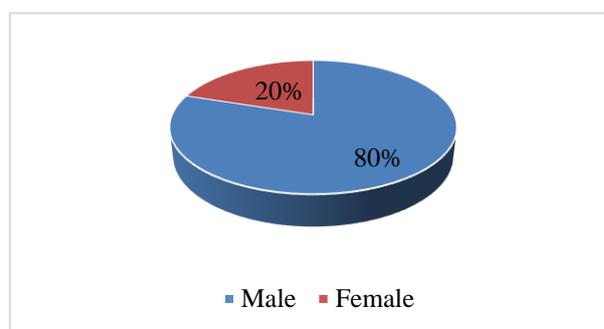


Figure 1: Pie diagram of distribution according to gender.

Out of 30 knee injuries, right sided involvement was seen in 18 patients i.e., 60% and left sided knee involvement was seen in 12 i.e., 40% (Table 2).

Table 2: Distribution according to knee involved.

Variables	Frequency	Percentage (%)
Knee involved	Right	17
	Left	13
	Total	30
		100.0

In majority of the patients i.e., 15 (50%), sports were the commonest mode of injury, followed by road traffic accidents in 12 i.e., 40% and falls in 3 i.e., 10% patients (Figure 2).

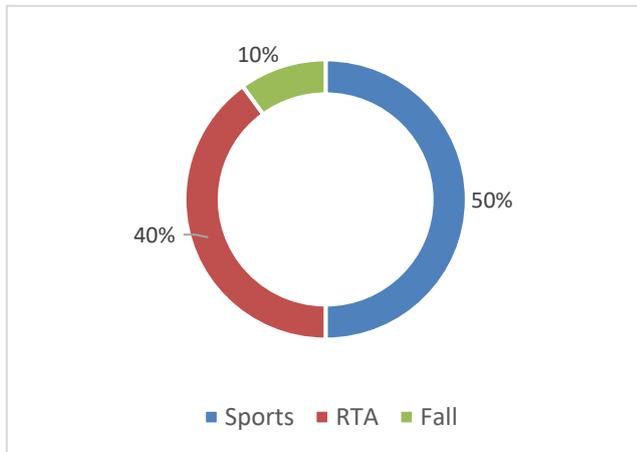


Figure 2: Pie diagram of distribution according to mode of injury.

Outcome evaluation after surgery was assessed by using Lysholm and Gillquist knee scoring scale. The result was found to be good in 16 i.e., 53.3%, excellent in 10 i.e., 33.3% and fair in 4 i.e., 13.3% patients (Table 3).

Table 3: Outcome assessment according to Lysholm and Gillquist knee scoring scale.

Variables	Frequency	Percentage (%)
Lysholm and Gillquist knee scoring scale	Excellent	10
	Good	16
	Fair	4
	Total	30
		100.0

Out of 30 patients who underwent surgery, complications were seen in only 7 patients. So, prevalence of complications was reported as 23.3% in our study. In 4 patients i.e., 13.3% anterior knee pain was commonly observed complication. Superficial infection, deep infection and extensor leg was seen in 1 patient each i.e., 3.3% (Table 4).

Table 4: Distribution according to complications.

Variables	Frequency	Percentage (%)
Complications	Anterior knee pain	4
	Superficial infection	1
	Deep infection	1
	Extensor leg	1
		3.3

DISCUSSION

At present the most commonly used grafts for ACL reconstructions are bone-patellar tendon-bone autograft and hamstring tendon grafts. The central one third of the bone patellar tendon bone graft was used because of its excellent biomechanical properties. It is the strongest of the immediately available substitute. Precise location of its tissue ends influences joint kinematics. The graft can be placed accurately during the surgery for it to act isometrically both in its location and tension. Bone to bone healing is more secure and rapid when compared to other grafts. It does not sacrifice the knee stabilizers. The bone-patellar tendon-bone graft is time tested and has lesser complications and less significant morbidity.

Age and gender

We included total 30 patients in our study according to eligibility criteria. In our study, majority of the patients i.e., 13 (43.3%) were from 26-35 years age group followed by 10 i.e., 33.3% from 15-25 years, 5 (16.7%) from 36-45 years group. Least were from 45-55 years age group i.e., 2 (6.7%) (Table 1).

Male predominance was found in our study. 24 (80%) patients were males and 6 (20%) patients were females. Male to female ratio was 4:1. This was probably because males are more frequently involved in sports and road traffic accidents (Figure 1).

Average age at surgery in the present study group was 28.46±9.97 years and that of Jomha et al was 26 years and Bach et al was 25 years.^{22,23}

Average duration of follow-up of the present study was 12 months with a minimum follow-up period 6 months and maximum follow-up period was 18 months. Average duration of follow-up Bach et al was 26 months.²³

Elveos et al mentioned 55 women and 45 men in his study.²⁴ The mean age at surgery was 25 years (range, 16-42 years) for the BPTB group. The mean time from injury to surgery was 40 months (range, 1-180 months) for the BPTB group and 46 months (range, 3-168 months) for the LAD group, and the ACL rupture was detected both clinically and arthroscopically.

Awasthi et al reported that physically active age group (18-40 years).²⁵ The age of the patients ranged from 18-45 years. The average age was 32.32 years. 92.19% of patients. Out of the 64 patients, 55 patients (85.93%) were male, and nine patients (14.07%) were female.

Lu et al reported that mean age for 35.20±14.92 years.²⁶ Our findings are comparable with the findings of above-mentioned authors.

Knee laterality

Out of 30 knee injuries, right sided involvement was seen in 18 patients i.e., 60% and left sided knee involvement was seen in 12 i.e., 40% (Table 2).

Awasthi et al reported that right side anterior cruciate ligament deficiency was seen in 36 (56.25%) patients, and left-sided involvement has been observed in 28 (43.75%) patients.²⁵

Outcome and complications

In our study, outcome evaluation after surgery was assessed by using Lysholm and Gillquist knee scoring scale. The result was found to be good in 16 i.e., 53.3%, excellent in 10 i.e., 33.3% and fair in 4 i.e., 13.3% patients. (Table 3).

In our study, out of 30 patients who underwent surgery, complications were seen in only 7 patients. So, prevalence of complications was reported as 23.3% in our study. In 4 patients i.e., 13.3% anterior knee pain was commonly observed complication. Superficial infection, deep infection and extensor leg was seen in 1 patient each i.e., 3.3% (Table 4).

Awasthi et al reported that pain in 9.4%, infection in 7.8% and stiff knee in 6.25% patients.²⁶

Spindler et al, 104 in their first prospective cohort study of five-year outcomes after ACL reconstruction stated that weight control education and regular exercise leads to an increased functional outcome.²⁷ The rehabilitation following surgical reconstruction focuses on three main goals i.e., the restoration of ligament stability, restoration of muscular strength and the restoration and improvement of general state of fitness.

CONCLUSION

Most commonly affected age group was 15-25 years with male preponderance. Commonest cause of ACL tear was sports injury. In 86.7% cases, good to excellent result was observed. Prevalence of complications was reported as 23.3%. So, our study of ACL repair using BPTP gives good to excellent results within a span of one year.

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Ethical approval: The study was approved by the institutional ethics committee

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