ORIGINAL ARTICLE

Functional outcome of ACL reconstruction using patellar bone tendon bone graft

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Abstract

Purpose: To evaluate the mid-term functional outcome using Lysholm score of anterior cruciate ligamentreconstruction using bone patella-tendon bone graft.

Methods: The retrospective study of prospectively collected data was conducted at Liaquat National Hospital, Karachi, from June 2010to June 2013, and comprised patients with complete anterior cruciate ligamenttear who were treated with diagnostic arthroscopy and open reconstruction using bone patella-tendon bone graft. All patients were operated under tourniquet control and knee immobiliser was applied. Straight leg raise procedure was started on 2nd postoperative day. One year after surgery, functional outcome was assessed using Lysholm score.

Results: All the 36(100%) patients in the study were males. Four (11%) patients were lost to follow-up and were excluded, while 32(89%) completed the study. Right knee was involved in 16(50%) patients while left knee was involved in 16(50%) patients. Overall, 31(97%) patients had history of contact sports injury. The average age of patients was 28.25±8.32 years. All patients were operated at an average of 17.5±10.3 weeks. The ligament tear was associated with medial meniscal tear in 16(50%) patients, while lateral meniscal tear was noted in 10(31.25%). The mean Lysholm score was 83.06±4.17at 1 year (fair to good outcome). The average range of motion 1 year after surgery was 127.5±11.25. Loss of extension <3o was noted in 20(62.5%) patients, while >3o was noted in 12(37.5%). The average loss of extension was 3.5±2.3 degrees. Two (6.25%) patients developed superficial infection which subsided with oral antibiotics. Anterior knee pain was reported by 8(25%) patients.

Conclusions: Patellar bone tendon bone graft was a reliable method for reconstruction of anterior cruciate ligament

Keywords: ACL, Arthroscopy Lysholm score. (JPMA 64: S-79 (Suppl. 2); 2014)

Introduction

The knee joint consists of two cruciate ligaments. Out of the two ligaments, the anterior cruciate ligament (ACL) is much weaker compared with the posterior cruciate ligament (PCL). ACL tears are most often overlooked. The incidence of ACL tear in patients suffering from haearthosis is upto 70%.[1] Studies showed that if ACL tears are managed conservatively there is increased incidence of meniscal tears and early arthritic changes in the knee joint.[2] The reason to repair a torn ACL is to provide knee stability, painless range of motion and to prevent osteoarthritis. The gold standard for ACL autograft reconstruction is bone patella-tendon bone (BTB).[3] However, there are controversies regarding the optimal timing of surgery. Some studies report increased knee stiffness if the surgery is done early after ACL reconstruction, but some studies have reported good results after early repair of the torn ligament.[4] The most common side effect of using BTB graft is anterior knee pain.[5] The BTB graft heals when bone plug is united, yielding higher strength of healing.[6] Other graft options for repair of ACL are allograft, autografts and synthetic grafts.[7] Two surgical techniques are available for reconstruction; arthoscopic and open mini-arthotomy. It depends on the surgeon's preference which method of repair gets chosen.

The current study was planned to evaluate the mid-term one-year functional outcome using Lysholm score of ACL reconstruction using BTB graft.

Patients and Methods

The retrospective study of prospectively collected data was conducted at Liaquat National Hospital, Karachi, from June 2010 to June 2013, and comprised patients aged between 18 and 45 years with complete ACL tear who were treated with diagnostic arthroscopy and open reconstruction using BTB graft. The ACL tear was preoperatively reconfirmed with magnetic resonance imaging (MRI). All the patients included had the ability to follow rehabilitation protocol.

Those excluded were patients with history of previous surgery in the same knee, open wounds, associated fractures, PCL injuries, polio-affected extremity, evidence of osteoarthritis in the same knee, and post-septic arthritis sequel.

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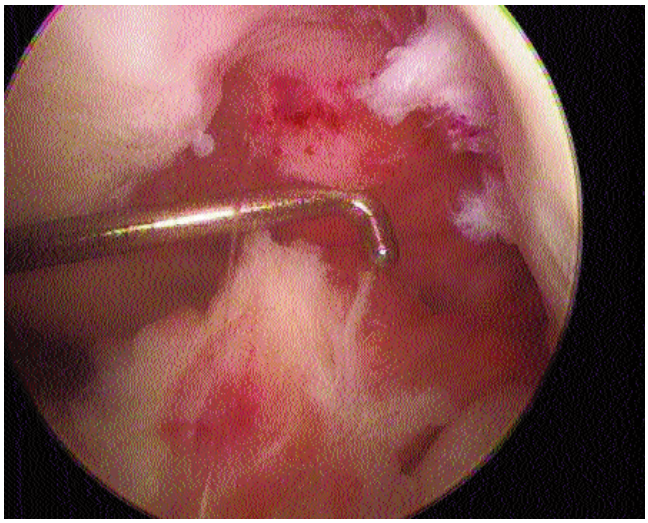

Figure-1: Arthoscopic view of complete ACL tear.

All patients were operated under tourniquet control. Arthroscopy was done in all cases (Figure-1) except one who had previous arthroscopy done a week earlier. Meniscal tears if found were trimmed at the same time. Central portion of BTB graft was harvested in all cases. The patella defect was used to approach the ACL ligament. With the help of ACL guide, tibial guide pin was passed, reaming was done and with the help of another guide femoral entry side was chosen. Graft was prepared, trimmed and checked that it snugly passes through the 9mm tunneler. Two drill holes were made in the bone pieces of the graft through which sutures were passed to provide tension to the graft during insertion. The graft was passed through the medial side of tibial tunnel into the lateral femoral condyle. Interference screws were inserted with the leg in extension (Figure-2). Anterior draw, lachmanand range of motion were assessed

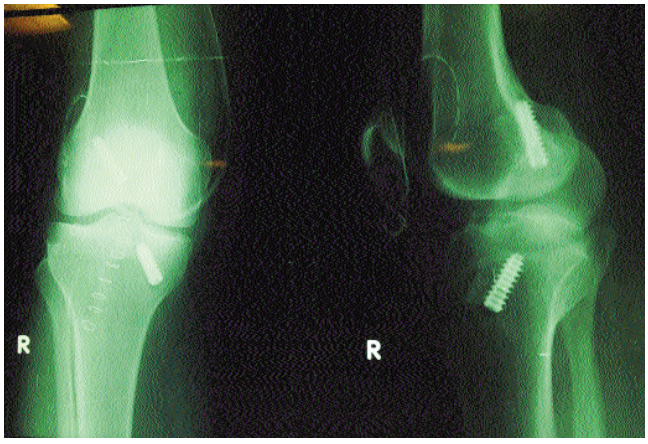

Figure-2: Posoperative x-rays after ACL reconstruction.

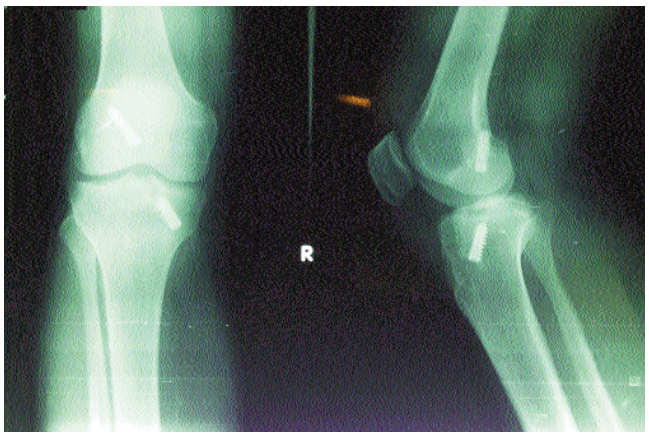

Figure-3: One year postoperative X-rays after ACL reconstruction.

peroperatively. Knee immobiliser was applied while walking for 6 weeks postoperatively. Straight leg raise (SLR) procedure was started on 2nd postoperative day. While knee-bending was started on the 3rd postoperative day. Patients were discharged on 4th postoperative with follow-up after 10 days (for stitches removal), 6 weeks and 4 weeks thereafter (Figure-3). All patients were given a Lyshlom8 questionnaire 1 year after surgery (Appendix).

Appendix: Interpretation of Lysholmscore[8]

Score	Interpretation
98-100	Excellent
93-97	Good to excellent
82-92	Fair to good
66-81	Fair
<= 65	Poor

Results

There were 36patients in the study, but 4(11%) were lost to follow-up and were excluded, while 32(89%) completed the study. The average age (Table-1) of patients was 28.25±8.32 years, and all (100%) subjects were male (Table-2). Right knee was involved in 16(50%) patients while left knee was involved in 16(50%) patients. Overall, 31(97%) patients had history of contact sports

Table-1: Age distribution.

Age	%
<30	68
>30	32

Table-2: Gender distribution.

Male	32	100%
Female	0	0%

Figure-4: Range of motion one year after surgery.

injury (Table-3). All patients were operated at an average of 17.5±10.3 weeks. The ligament tear was associated with medial meniscal tear in 16(50%) patients, while lateral meniscal tear was noted in 10(31.25%). The mean Lysholm score was 83.06±4.17 at 1 year (fair to good outcome) (Table-4). The average range of motion 1 year after surgery (Figure-4) was 127.5±11.25. Loss of extension <3owas noted in 20(62.5%) patients, while >3o was noted in 12(37.5%). The average loss of extension was 3.5±2.3 degrees. Two (6.25%) patients developed superficial

Table-3: Mechanism of injury.

Mechanism of injury	No. of cases	%
Road Traffic Accidents (RTAs)	1	7
Twisting injury (sports related)	31	93

Table-4: Correlation between age and outcome score.

Age average (Years)	Interval from surgery average (weeks)	Lysholmscore average	Infection	ROM after 1 year (degrees)	Loss of extension (Degrees)
28.25 (SD±8.4)	17.5 (SD±10.3)	63.3 (SD±5.28)	2(6.25%)	127.5 (SD±11.25)	<3° 62.5% >3° 37.5%

Table-5: Clinical examination finding.

Test	Positive	Negative
Effusion	4(12.5%)	28(87.5%)
Macmarry	22(68.75%)	10(31.25%)
Anterior draw	28(87.5%)	4(12.5%)
Lachman	24(75%)	8(25%)

Table-6: Correlation between clinical examination and arthoscopic finding.

Test name	Clinical ACL tear on examination	Arthoscopic findings
Anterior draw + lachman test	24(75%)	32(100%)
Macmarry	24(75%)	28(87.5%)

infection which subsided with oral antibiotics. Anterior knee pain was reported by 8(25%) patients. Clinical examination findings were also correlated with arthoscopic findings (Tables-5, 6).

Discussion

Patients suffering from ACL tear have few, if any, symptoms.[9] The symptoms appear when patients return to sports activities causing recurrent subluxation.[10] In our study, 32 patients completed the one-year follow-up. Most (31/32) had sports related injury resulting in their torn ligament, while one patient suffered road traffic accident (RTA). The mean Lysholm score was 83 1 year after surgery.

One study showed that functional outcomes similar to those of healthy legs can be achieved following ACL reconstruction with BTB grafting and rehabilitation.[11]

Another study showed long-term follow-up of patients treated with BTB achieving excellent results with Lyshoms score in 56.1% patients while good results in 39.7% of patients. In our study, which showed short-term functional outcome,50% patients achieved good results, while 50% had fair functional outcome. The incidence of medial meniscus injury associated with ACL tear was noted in about 50% patients while lateral meniscal injury was noted in 31% patients. One study[12] showed medial menical injury in 46% patients and lateral meniscal injury in 23% patients, showing increased incidence of medial

meniscal injury with ACL tear.

The incidence of anterior knee pain after ACL reconstruction varies from 5-35%. It can be decreased with early and vigorous physiotherapy. Our study reported anterior knee pain in 25% patients while loss of extension <3° was noted in 62.5% patients and >3° was noted in 37.5% patients. One study showed anterior knee pain in 20% patients, loss of extension <3° in 96% and 4% patients had >3° loss of extension. However that study showed results using medial third of patella tendon.[13]

The retrospective nature and a small sample size were limitations of our study. Besides, none of the patients joined sports activity after ACL reconstruction.

Conclusion

ACL reconstruction using BTB graft is a reliable method of fixation achieving fair to good functional outcome results one year after surgery.

Acknowledgment

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