

Evaluation of 80 Cases of Anterior Cruciate Ligament Arthroscopic Reconstruction done in Al-Wasity Teaching Hospital, Baghdad

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Abstract

Background: The objectives of anatomic anterior cruciate ligament (ACL) reconstruction is to reproduce the native anatomy of the ACL by restoring native insertion site, the tension pattern of the (ACL), the two functional bundles, and individualizing the surgery for each patient. This can be achieved using either the single-bundle or double-bundle technique depending on the patient condition. **Objective:** The goal of anatomic reconstruction in short term is to benefit clinical outcome and in long term is to reduce the prevalence of osteoarthritis. To review the results of patients who underwent arthroscopic reconstruction of the (ACL) using the semitendinosus and gracilis tendon double or triple stranded graft. **Materials and Methods:** Eighty cases (72 males, 8 females) who met the inclusion criteria of study that underwent arthroscopic reconstruction for (ACL) injury and followed up for 6 months in Al-Wasity Hospital between September 2012 and October 2014 were included in this study. **Results:** Excellent clinical outcome was reported with 92.5% of the patients, 2(2.5%) cases had delay flexion and extension, failure of surgery was reported with only one case and deep venous thrombosis, and infection were reported with two cases only. No significant difference regarding complications was reported according to the method of fixation or sex difference. **Conclusion:** Excellent functional outcome was obtained with all methods of fixation which confirm the reliability and safety of these techniques.

Keywords: Anterior cruciate ligament, arthroscopic reconstruction, hospitals

INTRODUCTION

Anatomically, the anterior cruciate ligament (ACL) is consisting of two bundles: the anteromedial (AM) and posterolateral (PL) bundle. The origin of AM bundle at the most posterior part of the intercondylar wall while the PL bundle at the more distal part closer to the cartilage border of the femoral condyle.^[1] Mean length of the AM bundle is 33 mm and for the PL bundle is 18 mm while the width of the ACL ranged from 7 to 17 mm (average 11 mm). The average ACL cross-sectional area is 36 for women and 47 mm for men.^[2]

The rupture of ACL is considered one of the most common sport injuries that result in impairment of stability of the knee joint, especially during exercise that mostly require surgical intervention to restore normal function.^[3] Risk factors that differ between the sexes are anatomic factors that related to the

width of the notch and the size of the ACL, hormonal factors, and neuromuscular properties.^[4]

The contact injuries account for only about 30% of ACL injuries and require a fixed lower leg (i.e., when planted) and torque with enough force to cause a tear.^[5] The remaining 70% of ACL injuries are noncontact, occurring primarily during deceleration of the lower limb, with the quadriceps maximally contracted and the knee at or near full extension.^[6]

In addition to the history of the patient concerning the mechanism of trauma, the diagnosis of ACL injury usually established by physical examination and imaging modalities

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such as magnetic resonance imaging (MRI) scanning and confirmed by arthroscopic examination. Anterior stability of the knee is usually evaluated with the Lachman test where it has been found to have a sensitivity of 85% and a specificity of 94% for ACL ruptures.^[7]

According to the literature, the patients operated at more than 3 weeks from the occurrence of the trauma had better postoperative outcomes with greater motion ranges, which were obtained faster than in the case of the patients operated during the acute phase and did not require a surgical intervention for the stiffness of the knee.^[8]

ACL reconstruction is a common orthopedic procedure, and its indications have expanded based on good results. Although 40 years of age was previously proposed as an upper limit for this procedure, several studies have expanded this age barrier.^[9]

The semitendinosus gracilis (ST-g) arthroscopic ligamentoplasty offers the following advantages; minimal size of the wound lowers the risk for postoperative infections, clear sight of the inner components of the joint, the decrease of the postoperative pain, decrease of the hospitalization costs, and faster rehabilitation.^[10]

The aim of this study was to evaluate the short and midterm outcome of arthroscopic reconstruction of ACL using the ST and G tendon double- or triple-stranded graft with special emphasis on the methods of fixation and sex difference.

MATERIALS AND METHODS

Between September 2012 to October 2014, 80 cases (72 males and 8 females) that underwent arthroscopical reconstruction for ACL injury in Al-Wasity Teaching Hospital, Baghdad were included in this study. Plain radiography and MRI scanning were done for all the patients to support diagnosis and rule out other pathology. Before admission to theater room 1 g of ceftriaxone antibiotic was given. With the patient under general anesthesia, ACL arthroscopic reconstruction was done using the ST and G tendon double- or triple-stranded graft with thickness between 7–11 mm. The muscle tissues were removed to have only pure tendon to be used as graft. Graft was taken by streaper. A total of 14 cases were fixed by standard method using two bioabsorbable screws to the femur and tibial tunnel, (2) cases were fixed by ordinary cancellous screws where it was fixed to the femur through accessory lateral femoral incision using cancellous screw with washer and to the tibial bone through the medial tibial incision using cancellous screw with washer and nonabsorbable suture fixed on this screw.

Nineteen cases were fixed by transtibial DE PUY rigid-fixed system where two bioabsorbable pins were used for fixation to the femur tunnel while sheath and screw were used for fixation to the tibial tunnel. A total of 45 cases were fixed by Curved Rigid-Fixed DE PUY System in the same manner of previous method (DE PUY Rigid-fixed system); but the

difference here that the fixation to the femur tunnel done separately from the AM portal and not through the tibial tunnel. Partial meniscectomy was done for those who had associated meniscus injury. Standard rehabilitation with special emphasis on early motion as well as quadriceps strengthening was accomplished during the first 6 weeks postoperatively. After the 6 weeks, the patient was allowed to bear weight as tolerated. The final outcome was assessed depending on timing of flexion and extension, range of movement, strength of hamstring and quadriceps muscle, and results of Lachman, drawer, and pivot tests. SPSS statistics program version 23, (IBM, Armonk, NY, United states of America). was used for data entry and analysis. Chi-square test (Fischer exact test if not applicable) was used to confirm significance. $P \leq 0.05$ was considered statistically significant.

RESULTS

The mean age of studied sample was 24 ± 3.4 standard deviation, 90% was male and 10% was female, all cases was reconstructed by ST and G tendon double- or triple-stranded graft, 60% had medial meniscus tear, 12.5% had associated lateral meniscus tear, and 27.5% had pure ACL injury as illustrated in Table 1.

The results showed that the majority (92.5%) had no complications with excellent outcome, only 2(2.5%) cases demonstrated delay flexion and extension at 3 months of follow-up and one case showed failure of surgery as well as 2 cases (2.5%) presented with infection, one patient presented with deep venous thrombosis (DVT) as summarized in Table 2.

Table 1: Descriptive characteristics of studied group

	<i>n</i> (%)
Gender	
Female	8 (10.0)
Male	72 (90.0)
Surgery	
Semitendinosus and gracilis tendon double- or triple-stranded graft	80 (100.0)
Associated injury	
LMT	10 (12.5)
MMT	48 (60.0)
Pure ACL	22 (27.5)

LMT: Lateral meniscus tear, MMT: Medial meniscus tear, ACL: Anterior cruciate ligament

Table 2: Frequency of complications

Complications	<i>n</i> (%)
Delay flexion and extension	2 (2.5)
DVT	1 (1.3)
Failure	1 (1.3)
Infection	2 (2.5)
Non	74 (92.5)

DVT: Deep venous thrombosis

The findings showed that there was no significant difference in frequency of complications between male and females patients ($P = 0.4$) where the delay flexion and extension were reported with male and female as well as the infection status as seen in Table 3.

No significant difference was reported according to the method of fixation as displaced in Table 4.

DISCUSSION

For the postoperative clinical outcome with all methods of fixation, excellent results were reported in 92.5% of our patients where healing was achieved by the first intention, pain, and tenderness was reduced over time and the extension and flexion function were restored normal at 8–10 weeks of surgery. Lachman drawer and pivot tests were negative. Delay flexion and extension were reported with 2 (2.5%) cases, failure with 1 case (1.3%) as well as the physiotherapy was delayed in 3 cases due to DVT and infection so the patients delayed in restoring the normal activity. The data we obtained are comparable with the finding of Chen *et al.*;^[11] however, they had been found that the results of drawer test and Lachman test were positive in 3 cases and suspiciously positive in 8 cases and the results were excellent in (23) patients, good in (18), and fair in (9) in their patients.

In our series, the construction was carried out within 3 months of occurring the injury, really in ACL injury, there is debate about the suitable time of surgery for ACL reconstruction and the question here do the timing of surgery or condition of knee joint at the time of surgery is more important, where many literatures concluded that the timing of surgery not correlated to the final outcome; however, the condition of the knee joint at the time of surgery seems to be more important; however, Papastergiou *et al.*^[12] concluded in their study that ACL

reconstruction should be carried out within the first 3 months post-injury to minimize the risk of secondary meniscal tears.

Our results showed that the patients were revealed good results after 6 months of follow-up regarding the strength of hamstring and quadriceps muscle that assessed by measuring the thickness of these muscles and compare their thickness with contralateral side with excellent knee joint stability. A study conducted by Li *et al.*^[13] showed that the increasing the hamstring strength helped to stabilize the knee joint.

In our cases, the graft was placed to femoral origin of PL bundle and to native tibial origin of ACL with 3–4 mm intraoperative measured elongation to overcome the expected fiber lengthening with motion of knee joint, and finally, we had an ideal anteroposterior and rotational stability for the knee joint after 6 months of follow-up. Authors Amis and Dawkins^[14] had been reported that femoral graft placement affects the fiber length pattern more than the tibial placement so that intraoperative measured elongation of up to 3 mm is acceptable as long as it recreates as the native pattern of ACL.

In our cases, the bioabsorbable screw was used where these materials not interfere with postoperative magnetic resonance scanning so no need for removal as they turns into the bone and degrade, however, no tunnel widening was reported with our cases. Authors Robinson *et al.*^[15] was reported that some of bioabsorbable material causing more tunnel widening than others.

The current study revealed no significant gender base difference regarding the clinical outcome or for the incidence of complications with the specified period of follow-up and these findings are partly in consistent with the results of Ahldén *et al.*^[16] that who found no significant difference after 2 years of follow-up between female and male regarding the functional score or clinical outcome.

Table 3: Association between frequency of complication and gender of patients

Complications	Gender		P
	Female, n (%)	Male, n (%)	
Delay flexion and extension	1 (50.0)	1 (50.0)	0.4
DVT	1 (100.0)	0	
Failure	0	1 (100.0)	
Infection	1 (50.0)	1 (50.0)	

DVT: Deep venous thrombosis

CONCLUSION

The excellent functional outcome was obtained with all methods of fixation as well as no gender base difference was reported.

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Conflicts of interest

There are no conflicts of interest.

Table 4: Association between the frequency of complication and methods of fixation

Complications	Methods of fixation			P
	Curved Rigid-fixed DE PUY System, n (%)	Ordinary cancellous screws, n (%)	Standard method, n (%)	
Delay flexion and extension	1 (50.0)	1	1 (50.0)	0.3
DVT	0	0	1 (100.0)	
Failure	0	0 (100.0)	0	
Infection	1 (50.0)	1	1 (50.0)	

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