

Do All Anterior Cruciate Ligament Tears Need Reconstruction?

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ABSTRACT:

BACKGROUND:

Anterior cruciate ligament (ACL) injury is common among active individuals, and mostly associated with other complex injuries in the knee. ACL reconstruction is vital for normal knee function. The treatment of ACL injuries of knee depend on many factors including Age of the patients, degree of laxity, level of activities and associated injuries .

OBJECTIVE:

To assess outcome after conservative management of ACL tear. Moreover, determine the patients who need reconstruction, and the best time to perform surgery.

PATIENTS AND METHODS:

Prospective study of 72 patients who had unilateral ACL tear, 61 males and 11 females (age 18-40Y). 56 patients started management with rehabilitation program without reconstructive surgery, 12 of them have underwent surgery after that because of unsatisfied outcome. ACLR performed for 28 patients 7 of them were female, complete ACL tear was observed in 21 patients. Hamstring graft by one-incision technique were used: same protocol of rehabilitation was followed postoperatively. This study has been achieved in Al Shaheed Ghazi Al Hariri Hospital.

RESULT:

Average follow up period of 18 months, 78.5% of patient with rehabilitation (no ACLR) had good functional result. While all patients with ACLR have been satisfied where 85% of them return to their activity at level of I and II sport and 97% of quadriceps girth gaining compared to the sound side also observed at the end of follow up period.

CONCLUSION:

Not all ACL tear need surgical reconstruction. It is indicated for high-risk life style and repeated attacks of giving way. There is no differences between early and late reconstruction.

KEYWORD: Anterior cruciate ligament, tear, ACLR.

INTRODUCTION:

Anterior cruciate ligament is the most frequently distorted ligament in the knee ⁽¹⁾, the incidence of injury is 2.1 - 9.7 times more common in female than male athletes competing in similar activities ⁽²⁾, yet the males underwent ACL reconstruction (ACLR) more than female because males participate in highly demanding work and at risk sports e.g. (Football).

The injury of ACL is often associated with haemarthrosis where about 70% of acute haemarthrosis of the knee are associated with tear of this ligament while the other 30% of causes of haemarthrosis include peripheral tear of meniscus and osteochondral fractures ⁽³⁾.

Also ACL injury associated with a complex injury in the knee, where the absence of this ligament place additional demands on the

secondary restraints of the knee and resulting in sever instability in 15-66% and a secondary meniscal lesions about 15-86% and knee joint degeneration (30 -100%) at 15-20 years earlier in non-injured ACL patients ^(3,4).

It is widely accepted that reconstruction of ACL is vital for the knee function, there are many factors that determine to go for surgery as first line in the management including, age, degree of laxity, level of sports participation and associated injuries.

AIM OF THE STUDY:

1. To assess outcome after conservative management of ACL tear.
2. To determine the patients who need reconstruction.
3. To determine the favorable time to do surgery.

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PATIENTS AND METHODS:

Prospective study conducted from March 2010 to Sept.2012 , seventy two patients presented to the outpatient clinic at Baghdad medical city complex suffered from unilateral ACL tear , they

were 11 females and 61 males , average age of 22 year (range 18-40 year) body weight 72.2 +- 6 KG, the height 1.75 Cm +- 6 CM, and body mass index 24.8 +- 2.6 KG/M2 . As in table (1) which shows also other characteristics of patients.

Table 1: Characteristics of 72 patients with unilateral ACL tear.

Sex	M =61	F=11	Side	Lt. = 45	Rt. =27
associated injury	- = 12	+ = 60	Age	18-20Y= 20	20-40Y=52
Job	Sportsman =31		Worker =16	Military =15	Others= 10
Activity level	Level I =9		II = 21	III = 22	V =20
Complaint	Giving way = 24		Locking = 22	Both =26	
Clinical tests	Lachman's = (68/72) 94.4%			pivot shift = (59/72) 82 %	

Level 1 activity means very hard sport or work like football and blacksmith.

Level 2 goes with moderate activity like tennis and builder.

Level 3 goes with Biking and entertainment sport.

Level 4 means normal living activity.

The inclusion criteria were:

1. Age from 18-40 year
2. Athletes with high risk life style requiring heavy work or sports.
3. Repeated episodes of giving way and pivoting with daily living activities.
4. Meniscal tears associated with ACL tear or other ligamentous structure in the joint.

• Exclusion criteria were:

1. Patient age less than 18 and more than 40 years.
2. Patients with sedentary life style.

The diagnosis of ACL injury verified through physical examination, Lachman's test, pivot shift, M.RI and finally the states of ACL tear confirmed during arthroscopy performed before deciding to do surgery or during surgical reconstruction.

The patients were divided into two main groups.

1)Group 1 (without ACLR)

The patients managed with arthroscopy for confirming diagnosis and treatment of associated injuries and after that underwent course of rehabilitation then assessed by the improvement in signs and symptoms, 56 patients fall in this group. Only 44 patients satisfied in this type of intervention where 12 of them were not satisfied therefor they were shifted to the second group.

2)Group 2 (ACLR) :Which is subdivided into two subgroups .

A. Early reconstruction surgery (within 3 weeks of injury): 16 patients need reconstruction primarily without course of rehabilitation. Those patients were cooperative, well understanding patients with repeated giving way and unwilling to modify their level of activities.

B. Late reconstruction surgery (after 3 months of injury): When the reconstruction was done after 3months of injury for 12 patients in group 1 who were failed to get satisfactory result of rehabilitation following arthroscopy to deal with the associated injuries .

Total number of patients in-group 2 was 28 they were seven female patients and twenty-one males, during the arthroscopy of this group we found that 21 patients had complete ACL tear and seven patients with partial ACL tear.

ACLR reconstruction was performed for these 28 patients with symptomatic instability because those patients need stable knee, so they could return to a level of activity or work that involve twisting, jumping or working on uneven surfaces. All patients at the pre-operative period underwent rehabilitation to eliminate any effusion, to regain full range of motion.

ACLR were performed under general or spinal anesthesia by using one-incision technique, this technique involved only the incision of the graft harvesting site and the two arthroscopic portals in the knee that are small holes not considered as incision. Reconstruction was completed with the use of hamstring 4-strand graft arthroscopically. Biodegradable screw of 7 - 9mm width and 23-28 mm length for fixation of the graft were used; also, we evaluate and treat any associated meniscal tears.

All patients underwent the same rehabilitation program under supervision of therapist, to check

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for accuracy and techniques , continues passive motion and partial weight bearing during the first week after surgery then braced to maintain extension then regimen to avoid uncontrolled flexion, analgesia used as needed , no intra-articular or subcutaneous injection of drugs . Patients were followed regularly at 10days, 3weeks, 2 and 6 months intervals, the last visit at one year.

Outcome measure assessed by Noyes questionnaire⁽⁵⁾ at 2 , 6 months and 1 year , manual anterior-posterior translation which compared to the contralateral knee, side to side motion checked , and quadriceps muscle girth strength, comparing to the sound limb, rang of motion measured by long arms goniometer. Patient return to fulltime work or active sports level full or partial pre-injury level were recorded.

RESULTS:

Seventy-two patients followed up at 12-24 months with a mean of 18 months. In group 1 78.5% (44 / 56) patients had been satisfied with rehabilitation program and reported good functional condition with decrease of the activity level while 21.5% (12/ 56) were unsatisfied with such management therefore the decision were changed and they underwent ACLR . The last 12 patients (group 2 B) also were assessed after the surgical intervention and compared with the patients in-group 2 A.

Range of motion was assessed and gradual improvement obtained after ACLR as shown in table (2). The evaluation involves quadriceps strength which increases at rate approximately 83% of girth gaining compared to the sound side, at 6 months post-operatively and 97% at one year in the athletes of level I and II shown in table (3).

Table 2: Post-operative range of motion of group 2 In degree of Angles.

Time after surgery	Group 2 A	Group 2 B
1 st week	3-0-95	5-0-90
1 st months	6-0-120	5-0-110
1 st year	6-0-140	6-0-136

One patient (1.3%) developed surgical site infection treated successfully. No D.V.T was observed through the study period. One patient developed numbness because of injury to the infrapatellar branch of saphenous nerve at the site of graft harvesting that resolved with time.

Post-operative clinical examinations: when Lachman's test was +ve in 95% of the patients preoperatively, pivot shift was negative in 20% of patients, meniscal tear associated together with ACL tear in 32.1% (9 patients). Postoperatively Lachman's test was +ve in 32.1% of the patient and pivot shift test was +ve in 10.7 % of cases.

Table 3: Strength of quadriceps muscle in group 2 patient.

Time after Surg.	Group 2A	Group 2B
1 month	58.9%	55.7%
3 months	66.3%	64%
6 months	83.1%	82.8%
1 months	97.1%	96.6%

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The time to return to previous activity was recorded as shown in table (4) , 86% of the patient returned to high activity level and

competition sport . No revision surgery done for all operated upon within the two years follow up period.

Table 4: Time to return to previous activity of group 2 .

	Group 2A	Group 2B
Full time work(Weeks)	3.8 +_ 1	3.9 +_ 1.5
low level sport (weeks)	7.5+_ 3	8 +_ 3
Full sports activity(months)	6.2+_ 2.0	6.4 +_ 2.5

DISCUSSION:

There is a common consensus that ACL injury is problematic issue because of functional instability and long term complications, so addition of one or more of associated injuries adversely affect the outcome of treatment⁽⁶⁾ , wherever posterolateral or lateral disruption if has not been recognized reconstruction of ACL often fail. ACLR improve function, decrease the risk for others forcoming complications, but all authors agreed that not all ACL rupture or deficient need reconstruction.

There is an international performance agreement guidelines and criteria for choosing, indication and inclusion criteria and even rehabilitation after care following ACLR of the knee and specified the technique, those criteria should be addressed before embarking an international criteria.

15.2% of our study patients were females, this ratio slightly lower than the ratio with several authors due to significant social and traditional factors of our locality^(7, 8). Universally accepted indication of ACLR is a high-risk life style requiring heavy work or a high level sports^(9,10), that cover about 70% of our patients.

The younger patients were more prone to ACL injury and are patients more in need for ACLR, 90% of subject in this study were of the age of (18-24). The age by itself is thought not to be significant indicator⁽¹¹⁾ , but of course, younger patients tend to be more active. Harilanian et al⁽¹²⁾ had studied the age factor and came to a conclusion of no difference between young and older than 40 years patient in activity level , knee laxity , clinical out come and complications after ACLR, but all authors agreed that older patients have little exposure to a high risk activities such as sports and heavy work.

ACLR is not performed in preadolescent patients whose physis is open, which presents significant challenge through violation of physis and filling the holes with soft tissues⁽¹³⁾. However Wigar et al advocate very exact establishment of each

patients skeleton maturity when considering the timing and surgical method to be used for ACLR in a growing child, 75% of patients who had surgical treatment had complete rupture, while 25% had partial tear, a situation in which decision has to be made for nonsurgical management due to the fact that the remaining ligament is enough to perform usual activities alternatively or may progress to significant damage by time i.e. complete tear. Henriksson et al⁽¹⁵⁾ and Noyes et al⁽⁵⁾ suggest if knee laxity less than 3mm reconstruction was not necessary. Nan et al (16) stated that arthroscopic probing is the best way to establish the grade of ACL injury before embarking a surgery and this was our strategy of work.

Study by several authors^(16,17) reports that 70% of surgeon used nonoperative approach on 25% of their patients and reported that would be effective for those person willing to avoid high risk activities even some could do well with it . This was occurred in 61 % (44/72) patients of our series and this difference due to low level of activity and patient preference.

The time interval from ACL injury to reconstruction is not as important as the condition of the knee in term of full motion with nil or minimal effusion after a period of rehabilitation (about 8 weeks)^(5, 17).

The one-incision endoscopic reconstruction is used with all patients, proved of less morbidity, cosmetically better prospective, pain is less, hence simple analgesia with no subcutaneous, or intra-articular drug injection postoperatively, short hospital stay, and operation time, technique improves proprioception and allow early rehabilitation. Although Mcdevite et al (18) reported no difference in pain and KT-1000 arthrometer versus Two- incision method. Still Delay et al⁽¹⁹⁾ stated that 85% of surgeons used lincision technique .Bandsson et al⁽²⁰⁾ found that knee extension or flexion strength dose not

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differ from other techniques in the achievement of isokinetic thigh muscle strength.

At one year follow, there was no ACL graft tear, contrary to Yoshiya et al⁽²¹⁾ who reported a torn graft in 3.75% of his series at 24 month after surgery this might be attributed to a large number study group in his series.

In group 2 (ACLR) 71% (20 /28)of patients returned to full activities or even to level I and II and 29% (8/28) patients to level III after 6months of surgery. Patients who know how to limit their activities or jobs showed the best objective results.

CONCLUSION:

1. Not all ACL tears need surgical reconstruction.
2. ACLR can succeed in restoring normal function of the knee.
3. Main indications are a high-risk life style, and repeated episodes of giving way.
4. There is no difference between early and late reconstruction surgery regarding outcome if rehabilitation course adjusted for late surgical reconstruction.

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