Tripolitana Medical Journal; 2015, Vol. 4, No. 1, pp. 36 - 40

Short Communication

ISSN 2077-5628

Arthroscopic Assisted Anterior Cruciate Ligament Reconstruction: Our Experience in Tripoli Medical Centre

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Received 15 April 2015/Accepted 15 May 2015

ABSTRACT

Deficiency of the anterior cruciate ligament (ACL) is a common disorder which can lead to changes in lifestyle. We followed twenty patients who had arthroscopic reconstruction of the ACL using a central-third patellar-tendon autograft for two years to assess the long-term effectiveness of recent advances in reconstruction of the ACL. The standard criteria for evaluation of the International Knee Documentation Committee, the Lysholm knee score deterioration in the clinical performance after two years was associated with osteoarthritic changes and correlated with chronic ligament injuries and meniscectomy. We report our experience of the first 20 cases of arthroscopic assisted ACL reconstruction using Bone Tendon Bone Graft (B.T.B) graft in two years. We believe that the procedure can be successful, but remain concerned about failure of the graft and osteoarthritis. The results raise questions about the best time to operate and suggest that early surgery may reduce the risk of osteoarthritis.

Keywords– *ACL; Reconstruction; Autograft; Osteoarthritis; Meniscectomy.*

INTRODUCTION

Rupture of the anterior cruciate ligament (ACL) is a common sports injury which often markedly reduces athletic activity and the quality of life. The ACL is the primary stabilizer against anterior translation of the tibia on the Femur[1]and is important in counteracting rotation and valgus stress.

In activities which demand pivoting, cutting and side stepping such as football, basketball and tennis, deficient function of the ACL leads to instability. This results in recurrent injuries and an increased risk of intra-articular damage, including meniscal tears. Reconstruction of the ACL often allows patients to resume these activities and can also delay the onset of osteoarthritis associated with the loss of meniscal function.[2-6]

In recent years there have been rapid advances in techniques for ligament reconstruction and rehabilitation. These include open surgical repair of the ruptured ligament, open reconstruction using an intra-articular graft and extra-articular augmentation, arthroscopic reconstruction with extra-articular augmentation, and arthroscopic intra-articular reconstruction.[7-11] The method using a patellar-tendon. Autograft is popular[12-14] recent research has shown that this procedure is effective in the short term,[8,9,13,15-17] but there is little information regarding the long-term outcome of it or other procedures for reconstruction of the ACL. We describe the results in patients who had reconstruction of the ACL with a central-third patellar-tendon auto graft for two years.

Surgical repair depends on the extent of instability and level of activity. It is typically recommended for patients who expect to return to relatively high functional activities required of recreational athletics. In chronic cases, the major indication for surgical reconstruction is recurrent instability. Indications for non-operative management include patients with active infection, soft-tissue abrasion, and reluctance to participate in the complex rehabilitation required. Conservative care includes a comprehensive rehabilitation program, a functional brace for sports, and activity modification.[18] Relative contraindications are common and include the following: patient is less than two weeks from injury, low activity levels, preexisting steoarthrosis, skeletal immaturity, and inflammatory arthropathy.

Some people are able to live and function normally with a torn ACL. However, most people complain that their knee is unstable and may "give out" with attempted physical activity. Unrepaired ACL tears may also lead to early arthritis in the affected knee.[19]

MATERIALS AND METHODS

We report our experience of the first 20 cases of arthroscopic assisted ACL reconstruction using B.T.B graft in two years.

The study was conducted at the Tripoli Medical Center, Orthopedic Department, between June 2005 and June 2007. Patients with ACL deficit knee who were symptomatic and wished to maintain an active lifestyle or continue sporting activities were recruited to the study. The mean age was 27 years (range, 20 to 38 years). There were 19 male and one female. Injuries to the right side were 12 cases (60%), and to the left side were 8 cases (40%). Injuries caused by sporting activities 12 cases (60%) (football was the most common cause), road traffic accident 2 cases (10%), others are 6 cases household injuries (30%). Some patients had associated injuries

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of the knee (meniscus tears, collateral ligament tears, condylar defect). The guideline of management was medical history, pre-op clinical examination (ant. drawer test, lachman's test, pivot-shift test), MRI finding and diagnostic arthroscopy

(**Figures 1:** A and 1B). Figure 1B: MRI image show rapture ACLThe surgical management of this start by Graft harvesting and preparation the patellar tendon bone-tendon-bone (BTB) graft has been the "gold standard" graft choice for ACL reconstructions since it was popularized in the mid-1980's.[20] It has been used extensively by surgeons since that time and still remains the graft of choice for a high number of orthopaedists who perform this surgery regularly. The patellar tendon BTB graft has consistently demonstrated excellent surgical outcomes with a 90-95% success rate in terms of returning to pre-injury level of sports.[21]

A skin incision was made from the lower pole of the patella to 2cm below the tibial tuberosity and extended medially. The mid-third of the patellar tendon was cut, oscillating saw was used for bone plug harvesting.

Two holes perpendicular to each other were drilled on the tibial plug and one on the femoral plug using a 2mm drill bit and Ethibond suture was threaded through.

The graft then assembled and measured. A few surgeons harvest through two shorter horizontal incisions centered over each end of the tendon. The middle third of the tendon 9-10-11mm wide is then removed longitudinally along with 2-2.5cm long bone blocks in continuity at each end of the graft from the tibial tubercle and the outer surface of the patella respectively (Figure 2 A and B). This yields a composite bone-tendon-bone graft that has very strong insertion points of the tendon soft tissue into bone. The tensile strength of this graft has been measured by Noyes (1984) to be about 2950 Newton to failure, versus the strength of an intact ACL at 2160 N.[22]

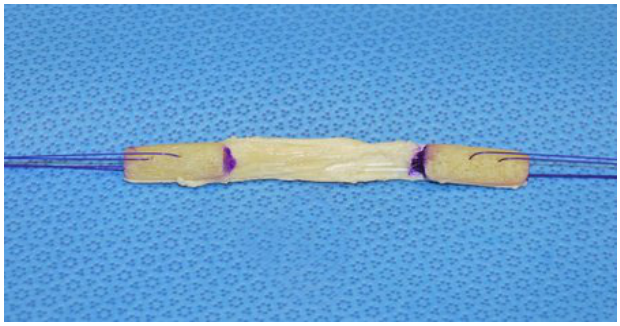

Figure 2A: BTB graft after harvesting

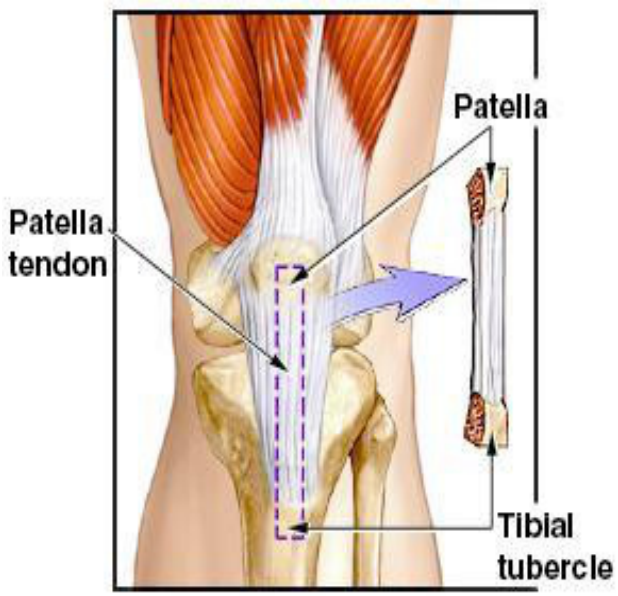

Figure 2B: Anatomical dimension of graft harvesting

For Tibial tunnel Tibial jig's hook was positioned via the antro-medial port just anterior to the PCL. The tibial guide pressed against the tibial cortex 1.5cm medial to the tubercle and 1cm proximal to the pes anserinus tendons (Figure 3). A pin was drilled and observed arthroscopically.

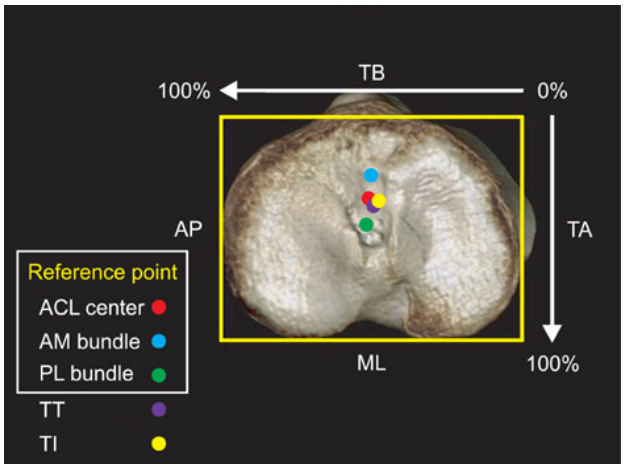

Figure 3: On the top view of the proximal tibia, the location of the transtibial and tibial independent tibial tunnel are shown.

The location of tunnel was measured from the anterior border (distance TA) and medial border (distance TB).[31]

AP: distance anterior to posterior, ML: distance medial to lateral, AM: anteromedial, PL: posterolateral, TT: transtibial, TI: tibial tunnel-independent, TA: tibia 'A' line, TB: tibia 'B' line.

For Femoral tunnel Femoral guide was placed in the lateral condylar area (some cases the guide was introduced under T.V screen). The mouth of the tunnel was cleared of all soft tissue.

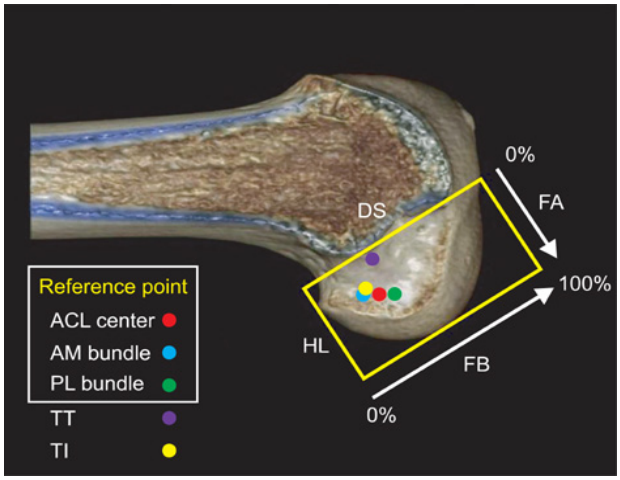

Figure 4: On the lateral femoral side of three-dimensional computed tomography, the location of the transtibial and tibial independent femoral tunnel are shown.

The location of tunnel was quantified from center of the tunnel to the deepest subchondral bone contour (distance FA) and the intercondylar notch roof (distance FB). [31]

ACL: anterior cruciate ligament, AM: anteromedial, PL: posterolateral, TT: transtibial, TI: tibial tunnel-independent, DS: distance deep to shallow, HL: distance high to low, FA: femur 'A' line, FB: femur 'B' line.

Graft placement and fixation with A pin was drilled across both the tibial and femoral tunnels to exit through the anterolateral aspect of the thigh.

A 2-mm kirschner's wire was placed into the femoral tunnel alongside the graft at 110 degree knee flexion, an interference screw was threaded over it arthroscopically to fix the graft (Figure 5).

The tibial fixation was done at 20 degree knee flexion using interference screw.

Figure 5: Post op screw fixatio

Postoperative management

A compression dressing and rigid knee brace were applied postoperatively. Partial weight bearing with crutches was encouraged early postoperatively, 4 weeks later full weight bearing and intensive rehabilitation program was instituted.

RESULTS

The evaluation of the post-op cases was depend on the medical history, clinical examination and physiotherapy department reports.

One-year follow-up was completed by 10 patients (50%), and 3 (15%) were lost to follow-up. Other 7 (35%) they are finished they full rehabilitation program. Most patients have good range of movement. Knee function was considered excellent in 6 cases (35%), good-to-excellent in 7 cases (41%), fair-to-good in 3 cases (18%), and poor (unstable knee) in one case (6%).

2 cases (10%) had more than 15 degree loss of terminal flexion, and 2 cases (10%) had 10 to 90 degree flexion. All cases gain their full extension (Figure 6).

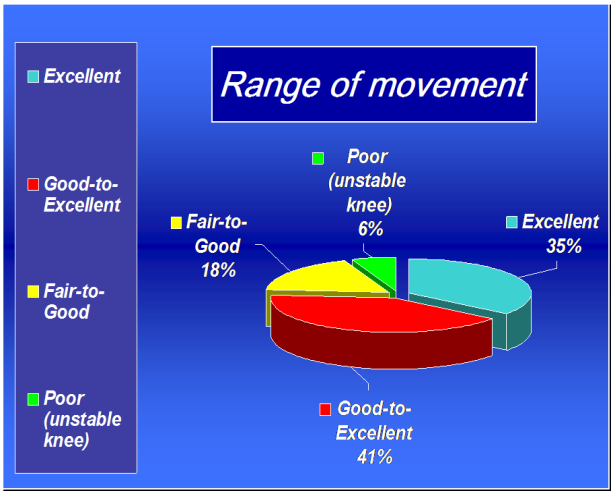

Figure 6: Statistic incidence of recovery after the surgery and the rehab.

Postoperative complication (Figure 7)**.**

- Superficial wound infection: 2 cases
- Tourniquet's complication: parasthesia (4 cases for 3 days)
- Knee effusion: 2 cases (aspiration done and C/S was -ve)
- Quadriceps muscle weakness: 6 cases
- Anterior knee pain (at the patellofemoral joint): 4 cases.

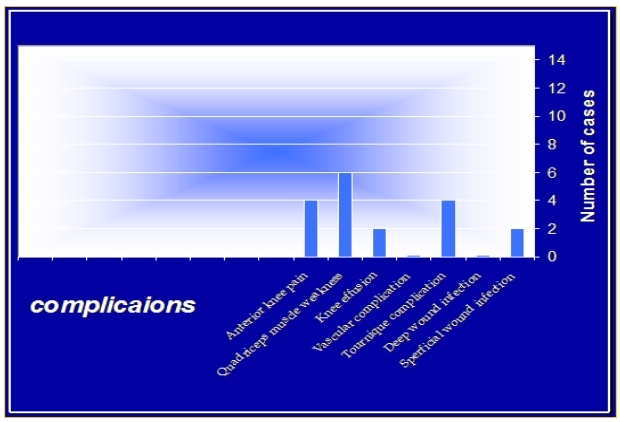

Figure 7: Post-operative complication

DISCUSSION

The ideal graft for ACL surgery should have similar anatomic and biomechanical characteristics to the native ACL, provide for strong initial fixation, allow for prompt biologic incorporation, and have minimal donor site morbidity for that particular patient.[23] Rupture of ACL compromises the knee stability and leads to episodes of giving way, recurrent injury to the menisci, and premature degenerative changes.

Arthroscopically assisted ACL reconstruction facilitates early recovery and rehabilitation, and the management of associated injuries can be carried out simultaneously.[24]

Most patients had associated injuries of the knee (meniscal tears, collateral ligament tears, condylar defect), these associated injuries compromise the results of ACLreconstruction.[25]

There is a lot of advantages of arthroscopic assisted ACL reconstruction using B.T.B graft in comparison to the hamstring or prosthetic grafts.

The outcomes of revision surgery are worse than those in primary reconstruction. We regard allografts with massive bony blocks, adjusted as required, as an optimal method. The risk of disease transmission is low, operative time is shorter, incision is smaller and further trauma to the treated or the other, healthy knee due to graft harvest is avoided. Only patients without signs of gonarthrosis who have motivation are indicated for revision surgery, because they can be expected to cooperate well in the postoperative period.[21] Studies evaluating the results of hamstring tendon versus patellar tendon grafts in ACL reconstructions for the most part indicate comparable results in terms of successfully stabilizing the knee. Both grafts seem to provide excellent results both functionally as well as by clinical and instrumented ligament exam.[26] There are some studies that suggest that patellar tendon grafts give a tighter result to instrumented measurement (KT 1000 testing), but there hasn't been a significant correlation with this measured difference and any functional significance. That is, patients have had similar results in terms of achieving a useful, stable knee using either graft material. And there may even be a down-side to this tightness - a greater risk of a too tight, or "over-captured" knee that is stiff or suffering from extensor mechanism pain. Too tight a graft may also lead to degenerative arthritis in the long term.[27] To date there have been a number of prospective and retrospective studies completed comparing patellar tendon bone-tendon-bone grafts to four-strand (DSTG) hamstring grafts.[24] Five of these have found similar laxity values and functional results between the two types of graft tissues[23]while three[28,29]found statistically tighter instrument measured values with the patellar tendon graft but this did not correlate with functionally different outcome. At this point, there doesn't appear to be any strong evidence to suggest that one of these graft choices is "better" than the other and most knee specialists consider them equivalent grafts. The bigger issue for a patient remains which tissue is best donated, i.e. which graft has the least implications for that individual in terms of having it removed in the first place. And with that goal in mind, other, less frequently used.[30.32-34.]

We find out that the Auto graft use in ACL reconstruction satisfies the criteria of remonstrative surgery of ACL, and the best option for a primary ACL reconstruction is in the young, active patient. We use BTB auto graft for most younger, active patients who will tend to test the limits of the graft. This allows them to return to play sooner with a graft that has proven optimal incorporation and a lower incidence of revision surgery.

CONCLUSION

Patients with ACL-deficient knees undergoing arthroscopically assisted reconstruction using B.T.B auto graft is the best method for all reconstructive and give consistent and reproducible surgical results. And early intensive rehabilitation allows an earlier return to preoperative levels of sporting activity with minimal residual morbidity.

ACKNOWLEDGMENTS

The authors acknowledge to everyone in Orthopedic Department, Physiotherapy Department and everyone who participated in this study.

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