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no Constant Hais	Orthopaedics A COMPARATIVE CLINICAL STUDY ON OUTCOME OF FEMORAL FIXATION WITH HAMSTRING GRAFT BY INTERFERENCE SCREW VS ENDOBUTTON IN ARTHROSCOPIC ANTERIOR CRUCIATE LIGAMENT RECONSTRUCTION
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ABSTRACT ACL tear is one of the most common soft tissue injuries of knee. It is diagnosed clinically as well as radiographically by MRL It is generally reconstructed arthroscopically by semitendinosus or bone-patellar tendon-bone autograft. In this	

MRL. It is generally reconstructed arthroscopically by semitendinosus of bone-patenar tendon-bone autograft. In this study we tried to find out the clinical outcome of ACL reconstruction fixed by either endobutton or interference screw in the femoral side. The study was done on 60 patients divided into 2 groups i.e endobutton and interference screw group. The outcome was measured by LYSHOLM score, IKDC score and Lachman test after interval of 6 weeks, 6 months and 1 year. Finally, the study revealed that there is no superior method of femoral fixation in Arthroscopic Anterior Cruciate Ligament reconstruction between Interference Screw and Endobutton.

KEYWORDS : endobutton, interference screw, ACL reconstruction, hamstring graft

1. INRODUCTION-

Anterior cruciate ligament (ACL) tear of the knee is one of the most common sport injuries which leads to instability of knee. The diagnosis of ACL tear can be made by clinical evaluation by various tests and radiological evaluation by magnetic resonance imaging (MRI). The treatment of choice is arthroscopic assessment and ACL reconstruction using either a bone-patellar tendon-bone autograft or a quadrupled semitendinosus and gracilis (hamstrings) tendon autograft. The newer reconstruction techniques aim to improve restoration of the kinematics of the knee, and thus possibly protect the knee from recurrent injury, meniscal tear and concomitant osteoarthritis⁽¹⁾. Clinically, the biomechanics of the final graft construct is determined by multiple factors including femoral fixation, tibial fixation, graft characteristics and surgical technique. Femoral fixation of quadrupled hamstring graft is the key element to a durable ACL reconstruction, and there are many methods or options to achieve it; including interference screw, endobutton, adjustable loops, femoral cross-pin etc, each bearing its own advantages and disadvantages⁽²⁾. Endobutton is a device placed against the anterolateral cortex of the distal femur, suspending the graft inside the femoral tunnel. In this type of fixation, vectors of resistance are parallel to and opposite the external forces, and they concentrate on the cortical bone of the distal femur, on the bone-device surface. Interference screw is also a reliable and frequently used method for graft fixation. It provides excellent fixation and pull-out strength to the graft ⁽³⁾. Various factors affect the pull-out strength of the graft: bone block size, quality of bone, gap between bone block and tunnel, screw diameter and length, and the angle between screw and bone block (parallel or divergent). Parallel placement of screw with respect to femoral tunnel is desired as it is one of the factors which affect pull-out strength of the graft. A comparative study was not done or documented on young population in this part of Eastern India with a significant no. of patients and follow-up period previously and hence the relevance of such study in Indian perspective.

2. PATIENTS AND METHODS

This was prospective interventional non randomised study done over 2 years, which included 60 patients of both sex of age group of 18-40 years were divided into two groups. Patients with primary unilateral ACL tear with at least 12 months of follow-up were included and patients with previously operated, skeletally immature and with other ligament injury were excluded from the study.

3. PROCEDURE-

All patients were clinically examined and radiographically assessed by help of X-rays and MRI of the affected knee. After proper counselling and preoperative tests patients were taken to the operation theatre. After spinal anaesthesia patients were clinically examined by Lachman and pivot shift test. Antiseptic dressing and draping were done and prophylactic antibiotic were given. Surgery was done using

pneumatic tourniquet control, with a bolster under foot to fix the knee in around 90 degrees flexion and a side support. Anterolateral and anteromedial ports were made and diagnostic arthroscopy was done to corroborate clinical findings. Semitendinosus and gracilis grafts were dissected, released, harvested, prepared and measured by a separate 3 cm incision in anteromedial aspect of leg starting approximately 4 cm distal to the joint line and 3 cm medial to the tibial tuberosity. Femoral and tibial tunnels were prepared with respective jigs and reamers after shaving off anteromedial ports were made and diagnostic arthroscopy was done to corroborate clinical findings. Semitendinosus and gracilis grafts were dissected, released, harvested, prepared and measured by a separate 3 cm incision in anteromedial aspect of leg starting approximately 4 cm distal to the joint line and 3 cm medial to the tibial tuberosity. Femoral and tibial tunnels were prepared with respective jigs and reamers after shaving off ACL remnants. The hamstring graft with endobutton was passed through tibial tunnel and then through femoral tunnel by controlled pulling with the knee in 120° flexion. A flipping movement on pulling both the sutures ensured correct placement of endobutton beyond femoral tunnel. Tensioning of the graft was done by manual cycling motion of the knee performed on table. Then, the knee kept at 20° flexion and posterior drawer test position, interference screw was placed in the tibial tunnel by means of a guide-wire. Lachman's test was done to check post-operative ligament laxity as well as arthroscopically checked for graft strength. Ports were closed in single layer by monofilament. Post-operative period was uneventful and standard rehabilitation procedure was started immediately. The outcome was measured by Lysholm and International Knee Documentation Committee (IKDC) Scoring system and Lachman test.



Figure 1 : hamstring graft passing through tibial tunnel



Figure 2:post op xray of fixation of hamstring graft with interference screw and endobutton on femoral side

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4. RESULTS

Among all the patients the mean age for endobutton and interference screw group was 26.3 and 26.1 respectively with male predominance of 93.3%. The mode of injury was mainly due to sports 87% with road traffic accident and activities of daily living comprising of 10% and 3.3% cases respectively. Hamstring graft was used in all of the cases. The pre-operative IKDC score in endobutton group was 68.8±1.5 which was increased to 85.4 ± 1 , 86.6 ± 1.1 , 87.4 ± 1 after 6 weeks, 6 months, 1-year follow-up, whereas IKDC score in interference screw group was increased from 68.7±1.8 to 85.6±1.1, 86.9±1.3 and 87.5±1.1 respectively. The pre-operative LYSHOLM score in endobutton group was 62.8+-6.3 which was increased to 89.6±0.8, 91.1±1.9, 92.1±2.1 after 6 weeks, 6 months, 1-year follow-up, whereas LYSHOLM score in interference screw group was increased from 64.3±5.6 to 89.6±0.8, 91.4±2 and 92.6±2.3 respectively. A repeated measures two-way mixed ANOVA determined that mean IKDC and Lysholm score differed statistically significantly between time points (within each group) (F=3167.76, P=.00) but corresponding scores had non-significant difference between the endobutton and interference screw fixation group (F=1.65, P=.15). Patients with preoperative Lachman grading in endobutton group 10% in grade 1, 36.6% in grade 2 and 53.3% in grade 3 whereas in interference screw group was 10%, 43% and 46.6% respectively. While 60% of patients were having Lachman of 0 grade and 40% of grade1 in both groups post-surgery.



Figure 3:post op Lysholm score

5. DISCUSSION

ACL reconstruction is mainly done arthroscopically using hamstring autograft or patella bone tendon bone graft. Fixation of graft in femoral tunnel is done by either aperture fixation device like interference screw, post or suspensory fixation like endobutton and transfix. Many studies were done to find out the superior methods of fixation worldwide. Hakimi et al. (2012)⁽⁴⁾ found that in the UK the hamstring femoral fixation was done with a suspension device in 79% and interference screw in 18%. Of those using a suspension device, the Endobutton was most common (48%), followed by Transfix (26%) and Rigid Fix (19%). Tibial fixation was most commonly achieved by interference screw (57%) followed by intra fix (30%). Choice of fixation devices did not lead to significant differences in clinical outcome. Kim et al. (2013)⁽⁵⁾ concluded that the type of graft fixation device did not affect the clinical outcome and stability. More recent studies like Browning et al. (2017)⁽⁶⁾ also came to a conclusion that there were no differences in IKDC, Lysholm, Lachman, and pivot-shift outcomes between suspensory and aperture fixation. The results showed no statistically significant difference in mean continuous IKDC (P = .80), Tegner (P = .34), or Lysholm (P = .84) scores. Some studies like Naveen et al. (2016)⁽⁷⁾ concluded that suspensory fixation was found to be better but the study period was short and only Lysholm scale was used to assess outcome in a study group of 20 patients only. Other studies like Fauno et al. (2005)⁽⁸⁾, Rose et al. (2006)⁽⁹⁾, Capuano et al. (2008)⁽¹⁰⁾ etc compared various methods of fixation devices including endobutton and interference screw and their results were similar; post-operative IKDC, Lysholm scores and clinical examination results were comparable in all fixation methods and the differences in outcome were statistically insignificant. Most studies opined that the choice of fixation devices for ACL reconstruction is mostly surgeon-dependent and results don't vary drastically. But all these studies were done on western population and there were very few studies on Indian sub-population. Most studies were of short study period or assessment was based on a single scaling method or clinical examination only. Hence the above study was done with the study group comprising of 60 patients from urban and rural Eastern India, with at least 12 months of followup; the assessment was also based on two scores i.e IKDC and LYSHOLM and clinically by Lachman Test.

6. CONCLUSION In Arthroscopic Anterior Cruciate Ligament reconstruction, femoral fixation with both Interference Screw and Endobutton yield similar clinical results as measured by Lachman test, IKDC and Lysholm scoring system. There is significant improvement in Quality of Life after surgery using either methods of femoral fixation. There is no difference in post-operative rehabilitation outcome or return to activities in either methods. Finally, it can be said that there is no superior method of femoral fixation in Arthroscopic Anterior Cruciate Ligament reconstruction between Interference Screw and Endobutton as evident from the above clinical study. However larger sample size with longer follow-up are needed. More precise measurement of post op outcomes with arthrometer and comparison between other femoral fixation methods will increase the impact of study further.

CONFLICT OF INTEREST-

No conflict of interest

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