Augmented Repair of Massive Rotator cuff tear with Tensor Fascia Lata Autograft.

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ABSTRACT

Objective: To determine the functional outcome of massive rotator cuff tear treated with tensor fascia lata autograft.

Methods: This descriptive study was conducted in Hand and Upper limb surgery Center CMH Lahore Medical College Lahore from 23rd December 2016 to 23rd December 2020.All adults patients of either gender and age with massive rotator cuff teat fulfilling the inclusion criteria were operated with tensor fascia lata autograft. Post operative functional outcome was assessed with Shoulder Pain and Disability Index(SPADI). Pre operative and post operative SPADI score was compared and *P* value was calculated with paired-t test. *P* value < 0.05 was considered significant.

Results: The total number of patients in our study were 10. Mean age was 46.21±8.21 years. Male patients were 8(80%) and female 2(20%).Right shoulder was involved in 7(70%) patients and left in 3(30%). A significant improvement in SPADI score at 2 years follow up was noted(from 94.34±7% to 19.2±3% with *P* 0.001).Repeat MRI at 12th week revealed complete cuff healing in 9(90%) patients and partial healing in 1(10%) patient. No retear was noted.

Conclusion: Massive rotator cuff tears treated with tensor fascia lata autograft produced complete healing and excellent functional results without any retear. Fascia lata autograft should be the technique of choice for massive irreparable rotator cuff tear.

Keywords: Autograft, Fascia lata, Massive tear, Rotator cuff, Shoulder.

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INTRODUCTION

Rotator cuff tear affects 40% of elderly patients in the United States and 30,000 to 75,000 rotators cuffs are repaired annually.[1,2] Studies have shown good results of treatment of small and medium sized rotator cuff tears but treatment of massive rotator cuff tears is a challenge for the surgeon because inconsistent treatment results have been obtained with various options.[3] Massive rotator cuff tear is defined as the coronal or axial plane retraction of rotator cuff tendons to the glenoid rim or a tear of the rotator cuff exposing 67% of the greater tuberosity in the sagittal plane.[4] Treatment failure of massive rotator cuff tear is reported in 40% to 94% of cases.[5-7] Treatment options for massive rotator cuff tears include debridement, partial repair,[8] biceps tenodesis,[9,10] tendon transfer with Latissimus Dorsi[11], reconstruction of the superior capsule[12] and implantation of balloon or spacer.[13-15] Massive Rotator cuff tear with shoulder joint arthropathy is treated with arthrodesis or reverse shoulder arthroplasty.[16] To provide optimum healing environment for massive rotator cuff repair and reduce the failure rates various "Bridging or Interposition Grafts" like autograft of long head of Biceps tendon, [17]autograft or allograft of fascia lata,[18] allograft of dermal patch[19] and synthetic poly L-Lactic Acid[20] have been used with variable results.It has been demonstrated that autograft and synthetic grafts have superior mechanical properties than biological allografts.[21] Fascia lata autograft had been shown to had significantly lesser retear rate (8.3%) than partial repair of massive rotator cuff tear

(41.7%).[18]Interposition grafting whether done arthroscopically or open had similar functional outcome.[22]

The objective of our study was to determine the functional outcome of massive rotator cuff tear treated with tensor fascia lata autograft.

METHODS

This descriptive study was conducted in Hand and Upper limb surgery Center CMH Lahore Medical College Lahore from 23rd December 2016 to 23rd December 2020. All adults patients of either gender and age with clinical rotator cuff tears of more than 6 weeks duration and confirmed massive rotator cuff tear(>5cm) on MRI, rotator cuff retraction at the level of glenoid(Patte's grade 3) with intra-operative gap in the rotator cuff preventing tendon to bone repair were included. All patients with fat infiltration and fat-muscle ratio of 50%(Goutallier-Fuchs stage 3) or >50%(Goutallier-Fuchs stage 4), neurological involvement, associated fractures, previous surgery and rotator cuff arthropathy of above stage 3 (Seebauer classification) were excluded. The study was approved by the Hospital Ethical Committee and informed written consent was taken from all study participants. In the included subjects complete history, physical examination and relevant investigations were ordered. Clinical examination included supraspinatus assessment (Jobe test), Infraspinatus (external rotation against resistence), subscapularis (Bear-Hug test) and combine Infraspinatus and teres minor (Hornblower sign).Range of motion was assessed for forward elevation, abduction, internal rotation and external rotation. Pre operative shoulder function was assessed with Shoulder Pain and Disability Index(SPADI).[23] Radiographs were ordered for determining arthritis and upward migration of the humeral head. MRI was done for assessment of tear size.Pre operative physiotherapy was advised to strengthen the shoulder muscles. Rotator cuff tears rterations were classified on MRI per Patte classification[24] and fatty infiltration as per Goutallier-Fuchs classification [25,26] using sagittal cuts of MRI. Cuff arthropathy was classified according to the Seebauer classification.[27]

Surgical Technique

After induction of general anesthesia, the modified beach-chair position was used. Standard portals like posterior and anterolateral were established through which diagnostic arthroscopy was performed and all intra-articular pathologies were observed. Subacromial decompression was performed with an arthroscopic shaver in every patient as a standard procedure and a radiofrequency probe was used to achieve intra- and extra-articular releases. Mobility of the torn tendons was evaluated. Rotator cuff tears were identified and measured, Tears >5cm in length or width were labelled massive tears. The capsule was released and sliding of the rotator interval was done to approximate the tendons to bone using fscia lata to reconstruct the cuff tension free.

For massive rotator cuff tear an open deltoid splitting approach was used according to the magnitude and configuration of the tear. The shaver was used to debride the greater tuberosity footprint up to the bleeding surface. A tensor fascia-lata graft was harvested from ipsilateral thigh abot 12 x 4 cm in size and double layer it to get 6 x 4 cm graft. Graft was placed over the gap such that it completely covered the defect and repair was carried out with ethibond suture proximally and distally secured with anchor sutures.

Post operatively the shoulder was immobilized in abduction pillow for 6 weeks. At 3rd week pendulum exercises were initiated. Patients were instructed for passive range of motion for 6 weeks, strengthening exercises at 12 weeks and resistance exercises at 16th week.All the patients were fully rehabilitated at 24th week. Rotator cuff healing using fascia lata autograft and re rupture was evaluated with repeat MRI at 16th week using established criteria stated in literature.[28-30] Functional outcome was assessed with Shoulder Pain and Disability Index(SPADI)[23] at 2 years follow up. SPADI score ranges from 0(Best) to 100(Worst).The score was graded as no disability(0 to 20%)moderate disability(21% to 40%), sever disability(41% to 60%) and crippled(>60%).

We analyzed our data with SPSS version 27.Frequency and percentages were calculated for qualitative variables. Mean and standard deviation was calculated for quantitative variables. Pre operative and post operative SPADI was compared and P value was calculated with paired-t test.*P* value < 0.05 was considered significant

RESULTS

The total number of patients in our study were 10. Mean age was 46.21±8.21 years. Male patients were 8(80%) and female 2(20%).Right shoulder was involved in 7(70%)patients and left in 3(30%).The pre operative mean SPADI score was 94.34±7%.Moderate disability(SPADI score 21% to 40%) was noted in 1(10%) patients, sever disability (Score 41% to 60%) in 4(40%) and crippled (>60%) in 5(50%) patients. Repeat MRI at 12th

week revealed complete cuff healing in 9(90%) patients and partial healing in 1(10%) patient. The post operative mean SPADI score at 2 years follow up was 19.2±3%.(P 0.001)Majority(90%,n=9) of our patients had no disability while only 1(10%) patient had moderate disability. There was an average increase of 60° in forward flexion and 10° in external rotation and increase of 3mm in acromiohumeral distance. No retear was noted. There was no donor site morbidity.

Table I: Advantages and disadvantages of fascia lata autograft for massive rotator cuff repair.

Advantages	Disadvantages
The counterforce couple mechanism of the rotator cuff is restored	Donor site morbidity due to graft harvesting.
The dynamic rotator cuff control mechanism is reestablished.	Medial rotator cuff tissue must be of higher quality.
Costly Allografts are not required.	Tangling of the suture
Extensive rotator cuff release is not required.	Orientation of the graft
Excessive tension on the repair is avoided and reconstruction is completed.	
Reconstruction reinforces partial repair.	

DISCUSSION

We treated 10 patients of massive rotator cuff tear with fascia lata autograft. The advantages and disadvantages of fascia lata autograft for massive rotator cuff tear is given in table I.[31] In our study the pre operative mean SPADI score improved from pre operative 94.34±7% to post operative 19.2±3%. (P 0.001). Balsini [32] treated 8 patients with mean age 67 years with fascia lata autograft and followed for 9 months. Significant pain reduction (P <0.05) was noted with pre op VAS of 7.87±0.55 to post operative 1.25±0.37. Functional outcome was assessed with Constant score which significantly improved (P<0.05) from 34.38±2.73 to 85.0±1.73,UCLA (University of California at Los Angles) score improved from preoperative 10.50±1.82 to 32±0.48 (P<0.01).Complete graft healing was noted in 7(87.5%) patients on repeat MRI at 16 weeks while partial healing in 1(12.5%) patient.

Repeat MRI at 12th week revealed complete cuff healing in 9(90%) patients and partial healing in 1(10%) patient jn our study. Mori and colleague[33] assessed the healing potential of fascia lata autograft in 69 patients of rotator cuff repair and noted 35(50.7%) intact repair on MRI with histologic evidence of healing while 7(10.1%)patients had graft not on greater tuberosity and in 27(39.1%) patients the graft was on greater tuberosity. These authors advocated the use of fresh autograft fascia lata to achieve good to excellent healing rate of rotator cuff tear. Dimitrios[34] was of the opinion that no standard treatment protocols existed for managing massive rotator cuff repair. Dimitrios treated 68 patients of massive tear with fascia lata allograft and noted Improvement of constant score from 32.5 to 88.7.Dimitrios however documented that the results of post operative ultrasound were more reliable than MRI for assessing cuff healing.

We treated massive rotator cuff with fascia lata with open technique. In systematic review by Duquin TR[35] it was noted that no significant differences existed in retear rate whether repair had been done arthroscopically or non arthroscopically. Rosales-Varo treated[36] 10 patients of rotator cuff with fascia lata augmentation and 10 patients without fascia lata.At six months follow up significant pain reduction and improvement in Constant Murley shoulder score was noted in fascia lata group.Retear was noted in one patient in fascia lata group and two patients in non graft group.At one year no significant difference between the two repair was found in terms of pain reduction or Constant Murley shoulder score. Ono and Herrera[37] conducted a meta-analysis of 242 graft repairs and 185 in the control group.The grafts were autograft,allograft,xenografts and synthetics.The healing rate and functional score was better in the graft group than non graft group.

The design of our study was descriptive and we had smaller sample size.We recommend comparative studies of larger sample size on this subject so that our results are verified.

CONCLUSION

Massive rotator cuff tears treated with tensor fascia lata autograft produced complete healing and excellent functional results without any retear. Fascia lata autograft should be the technique of choice for massive irreparable rotator cuff tear.

Conflict of Interest: None
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