

## Original Research Article

# Two-year results of double row repair for medium sized rotator cuff tear in elderly patients

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### ABSTRACT

**Background:** Rotator cuff tears are treated surgically when conservative treatment methods fail. Since osteoporosis is common and the cuff is degenerative in nature, it may be a challenge to treat the tears surgically in the elderly. The objective of this study was to evaluate the results rotator cuff repair with double row two anchors (one medial and one lateral) for middle sized tears in patients over 65years old.

**Methods:** 18 patients who are over 65years old treated arthroscopically for medium sized rotator cuff tear were included in the study. Inclusion criteria were patients with MR findings and physical findings consistent with medium sized (1-3cm) rotator cuff tears, patients with follow up period of at least 2years. All of the patients were repaired using (two anchors, one medially and one laterally placed) double row technique arthroscopically. The patients were evaluated with constant Murley score and ASES scores. All these measurements (both ROM and functional tests) were performed preoperatively and at postoperative third sixth months, first year and after second year.

**Results:** Mean age of the patients was 69.3 ( $\pm 2.6$ ). The mean follows up period was 34months ( $\pm 4.1$ ). Preoperative mean forward flexion and external rotation were  $127.3 \pm 25.3^\circ$  and  $48.9 \pm 14.6^\circ$  respectively. The preoperative mean internal rotation was  $9.1 \pm 6.9^\circ$ . Preoperative mean ASES score was  $59.1^\circ$  ( $\pm 9.6$ ) and mean constant score was  $53.7^\circ$  ( $\pm 11.2$ ). At the last follow up mean forward flexion was  $158.3^\circ$  ( $\pm 17.9$ ), external rotation was  $63.2^\circ$  ( $\pm 11.4$ ) and internal rotation was  $9.3^\circ$  ( $\pm 7.3$ ). Mean ASES score and constant score of the patients were  $84.3$  ( $\pm 9.1$ ) and  $77.3$  ( $\pm 10.8$ ) in the last follow up.

**Conclusions:** It is possible to obtain good results in medium sized rotator cuff tears in patients over 65years old particularly if fatty degeneration over grade II has not prevailed.

**Keywords:** Cuff repair, Double-row, Elderly

### INTRODUCTION

Rotator cuff tears are treated surgically when conservative methods like activity modification, subacromial injections and physical therapy fail. The incidence of rotator cuff tears is found to increase in correlation with age as it is a part of the degenerative process.<sup>1,2</sup> Studies have reported the prevalence of full thickness rotator cuff tears as 28% in patients over 60years old, this rate increases to 50% in those over 70years and 80% in those over 80years.<sup>3,4</sup> Fifty percent of

the patients who are asymptomatic become symptomatic at a mean of 2.8years following diagnosis.<sup>5</sup> There are studies that report that untreated tears may increase in size and retract.<sup>6,7</sup> However, it has also been reported that most of the patients that are asymptomatic after nonoperative treatment remain symptom free for a long period time and nonoperative treatment may result in comparable results with surgical repair.<sup>8</sup>

Nevertheless, patients who are still symptomatic after six months of conservative treatment which should include

activity modification, physical therapy or local injections are treated surgically. This study aims to evaluate the functional results of medium sized rotator cuff tears after double row repair in patients who are 65years and older. The hypothesis was that double row repair could overcome negative prognostic factors encountered in the elderly like lesser tendon healing capacity, osteoporosis and yield good results clinically.

## METHODS

After going through the medical records retrospectively, thirty-two patients who were 65years and older were found to be admitted with the diagnosis of rotator cuff tears between 2010 and 2015 to the orthopedics department. All of these patients had received physical therapy + home exercise program for six months and local injections. After the exclusion of small, large and massive tears, 20 patients with medium sized tears were determined. It was not possible to reach two of the patients. Thus, 18 patients were included in the study. The tears were classified as medium sized according to DeOrio classification on the preoperative MRI studies and intraoperative measurements.<sup>9</sup> Inclusion criteria were patients with MR findings and physical findings consistent with medium sized (1-3cm) rotator cuff tears, patients with follow up period of at least 2years. Exclusion criteria were history of previous surgery on the same shoulder, presence of loss of passive range of motion in at least two planes (i.e. adhesive capsulitis), presence of subscapularis tear, presence of arthritic changes as can be seen on direct radiographs and presence of fatty infiltration of supraspinatus over grade II according to Goutallier classification on MRI

studies.<sup>10,11</sup> All of the patients underwent arthroscopic cuff repair under general anesthesia in beach chair position. Standard posterior anterior and lateral portals were used for double-row repair technique. Two anchors were used for repair as the medial anchor (5.0mm TWINFIX Titanium with #2 Ultra braid sutures, Smith and Nephew) was placed just lateral to the humeral head cartilage and the lateral anchor (Footprint Ultra PK 5.5mm, Smith and Nephew) was placed just lateral to native supraspinatus footprint. All of the patients used arm slings that restricted external rotation for six weeks and received physical therapy for three months. They were allowed to participate in strength exercises after third month postoperatively. The patients were evaluated with constant Murley score and ASES scores. The range of motion was measured with the help of a goniometer for forward flexion (FF) and external rotation (ER) and abduction (ABD). Internal rotation (IR) was measured as the highest spinous process the patient could reach with his thumb. T1-T12 was accepted as 1 to 12, L1-L5 as 13-17 and any point below L5 as 18.<sup>12</sup> Range of motion and the functional tests were performed preoperatively and at postoperative third, sixth months, first year and after the second year.

## RESULTS

Mean age of the patients was 69.3 ( $\pm 2.6$ ). Twelve of the patients (67%) were male and six were female (34%). The mean follows up period was 34 ( $\pm 4.1$ ) months. The number of fatty infiltrations of supraspinatus or infraspinatus as seen on the preoperative MRI studies was five- as three of these patients were grade II and two were grade I according to Goutallier classification.

**Table 1: Range of motion of the patients.**

Postoperative	Baseline	3 months	6 months	1 yr	Last follow-up
FF	127.3 $\pm$ 25.3	132 $\pm$ 17.2	135 $\pm$ 12.4	145 $\pm$ 19.7	158.3 $\pm$ 17.9
ER	48.9 $\pm$ 14.6	54.3 $\pm$ 9.1	56.7 $\pm$ 9.6	58 $\pm$ 8.4	63.2 $\pm$ 11.4
IR	14.1 $\pm$ 8.9	8.9 $\pm$ 7.4	9.5 $\pm$ 6.9	9.2 $\pm$ 7.4	9.3 $\pm$ 7.3
ABD	135.2 $\pm$ 8.7	129.4 $\pm$ 7.2	140.4 $\pm$ 10.2	145.7 $\pm$ 7.9	145.5 $\pm$ 10.2

Range of motion as measured preoperatively and at 3 and 6 month and at 1 year postoperatively and last follow-up.

FF: forward flexion ER: external rotation IR: internal rotation ABD: abduction.

Internal rotation was measured as the spinous process that could be reached with the thumb. T1-T12 was recorded as 1-12, L1-L5 as 13-17 and any point below L5 as 18.

**Table 2: ASES and Constant-Murley Scores of the patients.**

Postoperative	Baseline	3 months	6 months	1 yr	Last follow up
ASES	59.1 $\pm$ 9.6	68.3 $\pm$ 10.2	76.6 $\pm$ 7.4	81.3 $\pm$ 9.3	84.3 $\pm$ 9.1
Constant-Murley	53.7 $\pm$ 6.2	57.4 $\pm$ 7.3	70.1 $\pm$ 9.3	75.7 $\pm$ 8.2	77.3 $\pm$ 10.1

Mean ASES and Constant-Murley scores of the patients preoperatively and 3 and 6 months, 1 year postoperatively and last follow-up  
ASES:(American Shoulder and Elbow Society)

Preoperative mean FF and ER were 127.3 $\pm$ 25.3 $^\circ$  and 48.9 $\pm$ 14.6 $^\circ$  respectively. The preoperative mean IR and

ABD were 14.1 $\pm$ 8.9 $^\circ$  and 135.2 $\pm$ 8.7 $^\circ$ . At the third month, mean FF and ER were 132 $\pm$ 17.2 $^\circ$  and 54.3 $\pm$ 9.1 $^\circ$ , the mean IR and ABD 8.9 $\pm$ 7.4 $^\circ$  and 129.4 $\pm$ 7.2 $^\circ$  respectively.

At the sixth month, the mean FF and ER were  $135^{\circ} \pm 12.4$  and  $56.7^{\circ} \pm 9.6$ , IR and ABD were  $9.5^{\circ} \pm 6.9$  and  $140.4^{\circ} \pm 10.2$  respectively. The mean FF and ER were  $145^{\circ} \pm 19.7$  and  $58^{\circ} \pm 8.4$  as the mean IR and ABD were  $9.2^{\circ} \pm 7.4$  and  $145.7^{\circ} \pm 7.9$  respectively at the first-year follow-up. At the last follow up mean FF was  $158.3^{\circ} (\pm 17.9)$ , external rotation (ER) was  $63.2^{\circ} (\pm 11.4)$  and IR was  $9.3^{\circ} (\pm 7.3)$  as ABD was  $145.5^{\circ} (\pm 10.2)$ . Preoperative mean ASES score was  $59.1^{\circ} (\pm 9.6)$  and mean Constant score was  $53.7^{\circ} (\pm 6.2)$  as these scores were  $84.3 (\pm 9.1)$  and  $77.3 (\pm 10.1)$  respectively in the last follow up (Table 1 and 2).

No intraoperative or postoperative complication was encountered. All of the patients showed compliance with the physical therapy program and the immobilization in a sling. Statistical analyses were performed using IBM SPSS Statistics Software v23. Mann-Whitney-U test was used for comparison of the values obtained from range of motion measurements and functional tests at the last follow-up interval with the baseline values.  $p < 0.05$  was considered to indicate statistical significance. Increase in mean range of motion excluding internal rotation was statistically significant ( $p < 0.05$ ). The mean functional scores of the patients regarding ASES and Constant-Murray scores have improved significantly ( $p < 0.05$ ). Seventeen of the patients (94%) were satisfied with the result.

## DISCUSSION

Conservative treatment methods like activity modification, local injections and physical therapy are the first choice of treatment for patients with rotator cuff tears. Low expectations about physical therapy, a high activity level, smoking habit are strong predictors for failure of conservative treatment.<sup>13</sup> When the patients are not satisfied with the results after 3-6 months of nonsurgical treatment, rotator cuff repair is recommended.

Earlier studies showed that the healing rate was inferior in the elderly patients particularly over 65 years old.<sup>14</sup> However, some later studies yielded findings contrary to this. A study that evaluated the results of arthroscopic cuff repair of a group of 159 patients who were younger than 70 years and another group of 53 patients who were older than 70 years concluded that results were comparable between the two groups for similar type of rotator cuff tears.<sup>15</sup> A study was consisted to compare the results of cuff repair in two groups of patients- younger and older than 65 years. For patients younger than 65 years results were excellent in 88.6%, satisfactory in 8.6% and unsatisfactory 2.9% of the patients. For those patients older than 65 years results were excellent in 77.4%, satisfactory in 13.2%, and unsatisfactory in 9.4% of the patients. Excellent results decreased from 89.2% in small or medium tears to 80.4% in large or massive tears. The authors stated that although more challenging tears and fewer excellent results could be expected in the older

patient, a gratifying outcome could usually be anticipated.<sup>16</sup>

The retear rate was reported to be similar after small and medium sized tears in various studies and it increases for large and massive tears. Small tears are usually treated with a single anchor whereas double-row repairs using four or five anchors was suitable for large and massive tears.<sup>17,18</sup> In a study involving small tears repaired arthroscopically, intratendinous cleavage was determined as the only independent factor related to healing of the cuff. Small tears usually heal without any problems.<sup>19</sup>

In a study, that included 693 rotator cuff tear patients treated with arthroscopic repair the retear rate was 7.7% and advanced age was among the negative prognostic factors as fatty infiltration and size of the tear were.<sup>20</sup> Several studies have shown that tear retraction and fatty infiltration of the muscle are the independent factors that play a role in healing of the repair some authors have stated that osteoporosis is also an independent prognostic factor.<sup>21,22</sup>

Some biomechanical studies have shown that double row repairs yield increased load to failure improved contact areas and pressures, decreased gap formation as compared to single row repairs.<sup>23,24</sup> However, several studies which have been carried out to evaluate the functional outcomes have failed to prove the existence of significant difference despite the fact that double row repair results in better structural outcomes as can be verified with MRI studies.<sup>25,26</sup>

A study that compared modified tension banding using lateral knotless anchors with double row suture bridging technique for cuff repairs concluded that suture bridge technique yielded superior results in large and massive tear group but the results were comparable for the small and medium sized tear groups.<sup>27</sup>

Since it is proven that double-row repair with suture bridge technique is safer for the challenging tears that are large or massive in size, it may also be used for medium sized tears in the elderly patients who are osteoporotic and having degenerative tears. The results of this study showed that double row repair using two anchors may yield satisfactory results in the elderly group of patients. The group of patients included in this study are over 65 years old and 94% of them were happy about the procedure.

## CONCLUSION

Rotator cuff tear patients who do not benefit from conservative treatment are candidates for arthroscopic repair. Although the tears in the elderly group may be a challenge for the surgeon, satisfactory results may be obtained with double-row repair using two anchors.

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