Can Scapular Function Recover after Rotator Cuff Repair with Cuff Muscle Advancement for Massive Rotator Cuff Tears?

The Department of Orthopaedic Surgery, Hiroshima University

Shin Yokoya, Hiroshi Negi, Ryosuke Matsushita, Norimasa Matsubara, Nobuo Adachi
Hiroshima University

Mitsuo Ochi
COI Disclosure

Presenter: Shin Yokoya, MD.

I have no financial conflicts to disclose.

2019 ISAKOS Congress
Introduction

A/S rotator cuff repair (ARCR) for massive rotator cuff tear (mRCT) higher failure rate and lower clinical outcomes than smaller tear Galatz et al JBJS Am 2004, Sugaya et al JBJS Am 2007

We perform ARCR with muscle advancement (MARCR) for such mRCT Yokoya et al. JSES 2019

There are the possibility…

- suprascapular nerve (SSN) palsy may occur by excessive cuff extraction after muscle advancement Warner JP et al. JBJS-A 1992

We therefore add A/S SSN release to the MARCR Lafosse et al. JSES 2011

- scapular dysfunction may occur due to the invasion to the periscapular muscles
Purpose

To evaluate the postoperative scapular conditions after MARCR neurologically, radiographically, and clinically.
Materials and Methods

Fifty-two patients

- Had undergone MARCR with A/S SSN release under the diagnosis of mRCTs
- repaired tendons were completely healed through an postoperative MRI

were included in the current study. All patients were f/u for over 2 years.

Demographic data

- Female: 27 cases, Male: 25 cases
- Rt: 40 cases, Lt: 12 cases
- Average age: 67.0±7.6 y. o.
- SSP retraction (Boileau classification)
  - Stage 3: 30 cases, Stage 4: 22 cases
- SSC repair: 29 cases
- LHB tenotomy or tenodesis: 34 cases
Evaluations

- MRI taken at 3, 6, 12, and 24 months after surgery
  Postoperative SSP and ISP muscle edematous change by T1 and T2 sagittal Y-view

- EMG conducted preoperatively and more than 6 months after surgery
  SSP and ISP innervated by SSN, and deltoid as control
  positive denervation: spontaneous potential (SP) at rest such as positive sharp wave, fibrillation potential
  decrease of interference wave (DIW) in maximum voluntary contraction

- Isometric muscle strength by hand-held dynamometer measured preoperatively and at the final f/u period
  abduction, E/R, I/R, upper, middle, lower trapezius, serratus anterior

- Clinical outcomes
  Constant score, UCLA score
Results

- MRI for muscle edematous change

<table>
<thead>
<tr>
<th></th>
<th>p. o. 3M</th>
<th>p. o. 6M</th>
<th>p. o. 1Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>SSP</td>
<td>41/52</td>
<td>22/52</td>
<td>0/52</td>
</tr>
<tr>
<td>ISP</td>
<td>38/52</td>
<td>20/52</td>
<td>0/52</td>
</tr>
</tbody>
</table>

- EMG finding

  Preoperative SSN neuropathy: 17/52 (32.7%)
  Postoperative SSN neuropathy: 10/52 (19.2%)

  Eight cases were healed, and 9 cases were remained positive after MARCR.

  Only 1 SSN neuropathy (1.9%) was newly occurred after surgery.

MRI with denervation potential by EMG after MARCR
**Results**

- **Isometric muscle strengths**

- **Clinical scores**
  - Constant score: **pre op.** 45.9  ➔  **post op.** 77.4*
  - UCLA score: **pre op.** 14.6  ➔  **post op.** 31.7*

* : p<.05
Discussions

Muscle advancement

- Open RCR with SSP lateral advancement after acromial osteotomy
- Debeyre method is at risk of SSN motor branch palsy due to increase of SSN excessive tension by SSP lateralization.
- We performed MARCR with A/S SSN release without remaining the medial fascial continuity. Failure rate was 17.4% with MARCR + PGA augmentation for mRCT

Postoperative SSN neuropathy for mRCTs

- No SSN neuropathy after open SSP lateral advancement
- Only 1 patient regarded as ISP denervation in 10 patients after SSP lateral advancement
- No SSN neuropathy among 9 patients after average 2.5 cm SSP advancement.

We found the postoperative denervation potential in only 1 case of 52 cases (1.9%) in the current study.
Discussions

SSN neuropathy occurred in 2 to 27% of patients who have mRCTs.

- Vad VB et al. JSES 2003
- Mallon WJ et al. JSES 2006
- Costouros JG et al. Arthroscopy 2007
- Collin P et al. JSES 2013

In the current study,

- 17 of 52 cases (32.7%) were diagnosed with preoperative SSN neuropathy, and 8 of 17 (47.1%) were completely healed after MARCR.
- Muscle edematous changes after MA were completely disappeared within one year after surgery.
- Periscapular muscle strengths were recovered significantly to the same level of non-affected shoulders at final f/u period.

We concluded that postoperative SSN neuropathy was rare and that no disorder around scapula when the mRCTs were completely healed after MARCR with A/S SSN release.
Conclusions

- We evaluated radiographical, neurological and clinical outcomes for 52 cases of mRCTs completely healed by MARCR with A/S SSN release.
- Muscle edematous changes found in SSP and ISP muscles after MARCR were disappeared within one year after surgery.
- We found preoperative SSN neuropathy in 17 cases (32.7%), and 8 of 17 (47.1%) were completely healed after MARCR.
- Only 1 case (1.9%) was diagnosed with postoperative SSN neuropathy after MARCR with A/S SSN release.
- The MARCR with A/S SSN release for mRCTs can achieve good clinical outcomes without any scapular dysfunction.