

Technical Note

Medial Rotator Cuff Failure After Arthroscopic Double-Row Rotator Cuff Repair

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Abstract: Persistent tendon defects after rotator cuff repair are not uncommon. Recently, the senior author has identified a subset of 5 patients (mean age, 52 years; range, 42 to 59 years) after arthroscopic double-row rotator cuff repair who showed an unusual mechanism of tendon failure. In these patients the tendon footprint appears well fixed to the greater tuberosity with normal thickness. However, medial to the intact footprint, the tendon is torn with full-thickness defects through the rotator cuff. All patients were involved in Workers' Compensation claims. Magnetic resonance arthrography showed an intact cuff footprint but dye leakage in all patients. Revision surgery was performed at a mean of 8.6 months after the index procedure and showed an intact rotator cuff footprint but cuff failure medial to the footprint. Four patients had repair of the defects by tendon-to-tendon side-to-side sutures, whereas one did not undergo repair. Medial-row failure of the rotator cuff is a previously unreported mechanism of failure after double-row rotator cuff repair. Given the small number of patients in this study, it is unclear whether these defects are symptomatic. However, repair of these defects resulted in improvement in pain in 4 of 5 patients. **Key Words:** Rotator cuff—Repair—Arthroscopy—Complication—Revision—Double row.

Numerous studies have reported excellent clinical outcomes after arthroscopic rotator cuff repair.¹⁻⁵ However, some reports in the literature have questioned the healing and long-term integrity of arthroscopic rotator cuff repairs. In 2004, Galatz et al.⁶ reported that 17 of 18 arthroscopic repairs of rotator cuff tears greater than 2 cm had return.

Furthermore, Bishop et al.⁷ reported that the retear rate, after repair of rotator cuff tears greater than 3 cm, was 76% for arthroscopic repairs but only 38% for open repairs.

In an effort to improve the biomechanics of rotator cuff repair constructs, double-row rotator cuff repair has been proposed. Some studies have shown superior biomechanical characteristics with a double-row repair when compared with a single-row repair.⁸⁻¹⁰ In addition, a double-row repair reconstructs the footprint of the rotator cuff better than a single-row repair.^{9,10} Successful clinical outcomes have been reported after arthroscopic repair of rotator cuff tears by use of a double-row technique.^{11,12} In addition, Sugaya et al.¹¹ reported superior structural outcomes (i.e., postoperative cuff integrity) after double-row repairs in comparison to single-row repairs.

Postoperative rotator cuff integrity has been investigated in the past, with reports showing a highly variable “retear” rate (25% to 90%). In general,

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there has been a lack of correlation between the postoperative imaging appearance and clinical outcomes.¹³ Most reports have detailed residual or recurrent rotator cuff defects at the repair site (i.e., bone-tendon interface). Recently, the senior author has identified a subset of patients after arthroscopic double-row rotator cuff repair who show an unusual mechanism of tendon failure. In these patients the footprint of the tendon appears well fixed to the greater tuberosity with normal thickness. However, the medial portion of the tendon is torn with full-thickness defects through the tendon medial to an intact footprint of the rotator cuff. We report on this mode of failure and detail its preliminary treatment and outcomes.

CASE SERIES

From March 2003 to March 2006, the senior author noted medial rotator cuff failure in 5 patients who had previously had an arthroscopic double-row rotator cuff repair. The medial rotator cuff failure was ultimately diagnosed at repeat arthroscopy in all 5 cases. The mean age of this group of patients was 52 years (range, 42 to 59 years). Two were men and three were women. The dominant limb was involved in all cases. All of these patients were Workers' Compensation patients. All had previously undergone a rotator cuff repair performed by use of a medial and lateral row of 5.0-mm Bio-Corkscrew suture anchors (Arthrex, Naples, FL). At the index procedure, the mean size of the tear was 2.1×2.1 cm. All tears were crescent-shaped tears, and 1 or 2 anchors were used for the medial and lateral rows depending on tear size. Medial-row sutures were passed as a mattress construct, with the suture limbs being passed in a retrograde direction by use of a Penetrator suture passer (Arthrex) through a modified Neviaser or posterior portal. Lateral-row sutures were passed as simple sutures by use of Scorpion or Viper suture-passing instruments (Arthrex). After passing of all sutures, the lateral row of simple sutures was tied first to restore length to the rotator cuff, and then the medial-row mattress sutures were tied to restore the footprint. All patients underwent a standardized rehabilitation program.

Of the 5 patients, 4 had a reinjury after an initial improvement in symptoms whereas 1 had ongoing pain after the index operation. With symptoms failing to be alleviated after a standardized rehabilitation program, patients were investigated by magnetic resonance arthrography (MRA) in all cases. MRA performed after the index procedure showed dye leakage

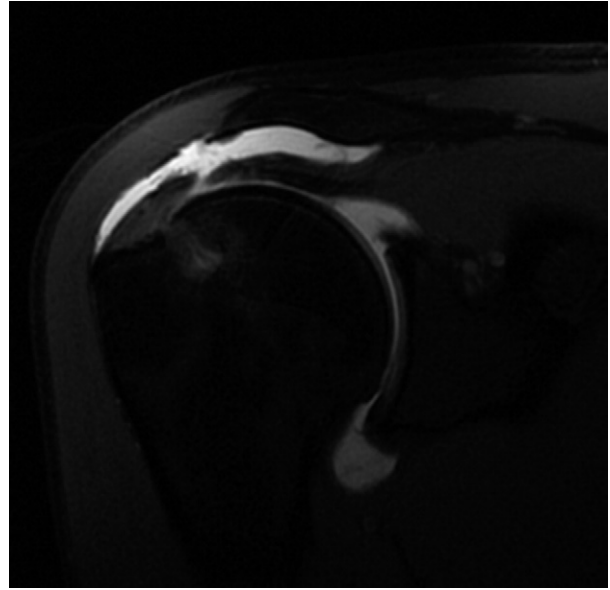


FIGURE 1. Oblique coronal T2-weighted MRA image after arthroscopic double-row rotator cuff repair showing leakage of dye into subacromial space and intact rotator cuff footprint but full-thickness linear defect in rotator cuff medial to intact rotator cuff footprint.

into the subacromial space in all cases (Fig 1). Rotator cuff defects, however, were reported in only 2 of 5 cases.

Because of ongoing symptoms, diagnostic arthroscopy with or without revision rotator cuff repair was offered to patients. Revision surgery was performed at a mean of 8.6 months (range, 3 to 16 months) after the index procedure. Repeat arthroscopy showed a linear defect in the rotator cuff, oriented in a medial-to-lateral direction, with the lateral edge of the defect marked by the medial-row mattress sutures placed at the index operation (Fig 2). After debridement of the loose suture strands, the rotator cuff footprint was inspected and probed and was shown to be intact. Side-to-side repair of the longitudinal defect with an absorbable monofilament (No. 2 polydioxanone) by use of a simple suture construct was then carried out in 4 of 5 cases (Fig 3). All patients underwent a standardized rehabilitation program postoperatively. Follow-up averaged 26.4 months. Four of five patients had some improvement in symptoms. Two of five returned to their preinjury duties.

DISCUSSION

To our knowledge, the pattern of medial cuff failure of arthroscopic double-row rotator cuff repair ob-

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