Your Patient has an Irreparable RC Tear: What Now?

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Consultant:
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Options for the Irreparable RCT
- Nonoperative
  - Anterior Deltoid Strengthening (Ofer-Levy)
- Debridement + LHBT Tenotomy
  - Boileau (JBJS), Tuberoplasty (Fenlin)
- Partial Repair
- Tendon Transfer
- Preservation of Force Couple
  - SCR, “Balloon”/Orthospace
- CTA Hemiarthroplasty
- Reverse Shoulder Arthroplasty
PARTIAL REPAIR

- Prospective review of functional outcomes and healing rates of large and massive RCTs repaired with a load-sharing rip-stop (LSRS) technique
- 17 patients with 2 yr f/u

The LSRS construct showed satisfactory functional outcomes with reasonable healing rates. This construct may be an alternative for tears not amenable to double-row repair.

US evaluation 6 months after surgery showed complete healing in 53%, partial healing in 29%, and no healing in 18%.

Partial rotator cuff repair and biceps tenotomy for the treatment of patients with massive cuff tears and retained overhead elevation: midterm outcomes with a minimum 5 years of follow-up.

- Aim was to evaluate the outcomes of partial arthroscopic RCR w/ biceps tenotomy and to report the failure rate of the procedure for patients with >5 years of follow-up
- 28 patients

Partial RCR+LBHT for patients with massive irreparable RC tears with retained overhead elevation and pain as the primary complaint produced reasonable outcomes at follow-up of at least 5 years.
Arthroscopic Partial Repair of Irreparable Rotator Cuff Tears: Preoperative Factors Associated With Outcome Deterioration Over 2 Years.

(MS Shon et al. AJSM. 2015)

- To report the clinical and radiographic results of arthroscopic partial repairs in patients with irreparable large-to-massive RCTs
  - 31 patients

Arthroscopic partial repair may produce initial improvement in selected outcomes at 2-year follow-up

About half of the patients in the study were not satisfied with their repair results, which had deteriorated over time

Should massive rotator cuff tears be reconstructed even when only partially repairable?

(A Godenèche et al. KSSTA. 2017)

- Purpose was to evaluate midterm functional outcomes of arthroscopic repair of massive RCTs and to determine the prognostic factors that could influence outcomes
  - 73 patients included

Both partial and complete repairs of massive RCTs produce equivalent improvements of Constant scores

The clinical relevance of these observations is that even if repairs of two-tendon tears result in superior functional outcomes, repairs of three-tendon tears produce equivalent relative improvements that generate sufficient patient satisfaction and autonomy

Arthroscopic repair of massive contracted rotator cuff tears: aggressive release with anterior and posterior interval slides do not improve cuff healing and integrity.

(SJ Kim et al. JBJSA. 2013)

- 41 patients with large-to-massive contracted RCTs
  - Not amenable to complete repair with margin convergence alone

- Underwent either arthroscopic complete repair with a posterior interval slide and side-to-side repair of the interval slide edge or partial repair with margin convergence

The complete repair group with an aggressive release had no better clinical or structural outcomes compared with the partial repair group with margin convergence alone for large-to-massive contracted RCTs

The complete repair group had a 91% retear rate and a greater defect on follow-up MRA images
Arthroscopic partial repair of irreparable large to massive rotator cuff tears.
(SJ Kim et al. Arthroscopy. 2012)

- Aim was to evaluate the outcome of arthroscopic partial repair and margin convergence of irreparable large to massive RCTs
- 27 patients

Arthroscopic partial repair and margin convergence showed satisfactory short-term outcomes in irreparable large to massive RCTs.

Arthroscopic surgery of irreparable large or massive rotator cuff tears with low-grade fatty degeneration of the infraspinatus: patch autograft procedure versus partial repair procedure.
(D Mori et al. Arthroscopy. 2013)

- Aimed to compare the arthroscopic patch graft procedure and partial repair for irreparable large or massive RCTs in shoulders with low-grade fatty degeneration of the infraspinatus in terms of the functional and structural outcomes
- 48 patients

The patch graft procedure showed an 8.3% re-tear rate for the repaired ISP with both improved clinical scores and recovery of muscle strength, whereas the partial repair had a re-tear rate of 41.7% (P = .015).

Outcome of partial repair of massive rotator cuff tears with and without human tissue allograft bridging repair.
(R Pandey et al. Shoulder Elbow. 2017)

- Prospectively reviewed outcome scores in 13 patients who underwent partial repair alone for massive irreparable RCTs and compared them to 13 patients who had partial repairs bridged with allograft

Human tissue matrix allograft provides a better outcome for open bridging of irreparable RCTs than partial repair alone.
Graft Utilization in the Bridging Reconstruction of Irreparable Rotator Cuff Tears: A Systematic Review.
(MR Lewington et al. AJSM. 2017)

- Reviewed the literature and analyze reported outcomes to evaluate the effectiveness of using a bridging graft reconstruction technique to treat large to massive irreparable RTCs
- 15 Studies included

Using a graft for an anatomic bridging RCR results in improved function on objective testing and may be functionally better than partial repair of large to massive RCTs

“SPACER” AND SCR

When are these and tendon transfers an option?

Hamada-Fukuda classification

- This study was designed to confirm the long-term safety and efficacy of the biodegradable inflatable InSpace™ system in patients with massive reparable or irreparable RCTs.
- 24 patients included

Arthroscopic implantation of InSpace™ system represented an effective alternative to the existing arthroscopic procedures in patients with painful massive RCT refractory to conservative management.

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Preliminary Results of Arthroscopic Superior Capsule Reconstruction with Dermal Allograft. (PJ Denard et al. Arthroscopy. 2018)

- Purpose was to evaluate the short-term outcomes of arthroscopic superior capsule reconstruction with dermal allograft for the treatment of irreparable massive RCTs.
- 59 patients

Arthroscopic SCR using dermal allograft provides a successful outcome in approximately 70% of cases in an initial experience.

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Clinical Results of Arthroscopic Superior Capsule Reconstruction for Irreparable Rotator Cuff Tears

SCR: Clinical Data

• 24 shoulders (fascia lata autograft)
  • 34 months follow up, 65 years old
  • Increase FF (84 → 148), ER (26 → 40)
  • Improved ASES (23.5 → 92.9)
  • No progression of OA or atrophy
  • Acromiohumeral distance 4.6mm → 8.7mm
  • 83.3% with no graft tear

TENDON TRANSFER

Functional status and failed rotator cuff repair predict outcomes after arthroscopic-assisted latissimus dorsi transfer for irreparable massive rotator cuff tears.

(R Castricini et al. JSES. 2016)

- Evaluate the functional outcomes of this technique and to check for possible outcome predictors
  - 86 patients included

Effectiveness of arthroscopic-assisted LDTT in the treatment of patients with an irreparable PS RCT in pain relief, functional recovery, and postoperative satisfaction
Does the latissimus dorsi tendon transfer for massive rotator cuff tears remain active postoperatively and restore active external rotation?
(JF Henseler et al. JSES. 2014)

- Evaluated the muscle activity with surface EMG and the clinical outcome of the latissimus dorsi transfer for massive posteriorsuperior RCTs
- The latissimus dorsi has synergistic muscle activity after transfer.
- Apart from a tenodesis effect, directional muscle activity seems relevant for improved clinical outcome and pain relief.

Teres minor integrity predicts outcome of latissimus dorsi tendon transfer for irreparable rotator cuff tears.
(JG Costouros et al. JSES. 2007)

- Investigated whether the integrity of the teres minor musculotendinous unit is predictive of outcome following LDTT
- 22 patients
- When performing LDTT for massive irreparable posteriorsuperior RCTs, fatty infiltration of the teres minor should be considered prior to surgery, as it is predictive of outcome.

Latissimus dorsi tendon transfer for irreparable rotator cuff tears: a systematic review.
(S Namdari et al. JBJS. 2012)

- Purpose of this systematic review was to critically examine the outcomes of latissimus dorsi tendon transfers for the treatment of irreparable RCTs
- 10 studies included
- Patients and physicians should not expect an outcome of "normal" function or complete pain relief.
Pectoralis major transfer for treatment of irreparable subscapularis tear: a systematic review. (JJ Shin et al. KSSTA. 2016)

- This systematic review examined the outcomes of pectoralis major transfers for the treatment of irreparable subscapularis tears.
- 8 studies with 195 shoulders
- Demonstrated improvement in shoulder function, strength and pain relief after pectoralis major transfer for irreparable subscapularis tear.

Reverse Total Shoulder Arthroplasty for Massive, Irreparable Rotator Cuff Tears Before the Age of 60 Years: Long-Term Results. (L Ernstbrunner et al. JBJS. 2017)

- Purpose was to analyze long-term outcomes and complications of RTSA for irreparable RCTs in patients younger than 60 years.
- 23 Shoulders included
- RTSA in patients younger than 60 years leads to substantial subjective and functional improvement without clinical deterioration beyond 10 years.
Reverse shoulder arthroplasty for massive rotator cuff tear: risk factors for poor functional improvement. (RU Hartzler et al. JSES. 2015)

- Aim was to identify risk factors for patients that have an RSA for massive RCT without glenohumeral arthritis.
- Assessed the value of RSA for cases with poor functional improvement vs. controls.
- Young age, high preoperative function, and neurologic dysfunction were associated with poor functional improvement.

Early follow-up of reverse total shoulder arthroplasty in patients sixty years of age or younger. (SJ Muhl et al. JBJS. 2013)

- Reported on the early outcomes of RSA in a group of patients who were sixty years or younger and who were followed for a minimum of two years.
- 67 patients.
- RSA improved function at the time of short-term follow-up.
- Overall satisfaction lower (81%) compared with that in the older patient population (90% to 96%).

Reverse shoulder arthroplasty for the treatment of irreparable rotator cuff tear without glenohumeral arthritis. (P Mulieri et al. JBJS. 2010)

- Purpose was to evaluate the indications for, and outcomes of, reverse shoulder arthroplasty in patients with massive RCTs but without glenohumeral arthritis.
- 72 shoulders.
- When non-arthroplasty options either have failed or have a low likelihood of success, RSA provides reliable pain relief and return of shoulder function in patients with massive RCTs without arthritis.
Reverse total shoulder arthroplasty: a review of results according to etiology.
(B Wall et al. JBJS. 2007)

Purpose was to evaluate the effects of etiology on the results of RTA.
- 240 RTSA included.

The RTSA prosthesis can produce good results when used for the treatment of a number of other complex shoulder problems in addition to RC arthropathy.

Patients with posttraumatic arthritis and those undergoing revision arthroplasty may have less improvement and higher complication rates.

Massive rotator cuff tears in patients younger than 65 years.
What treatment options are available?
(L Favard et al. Orthop Traumatol Surg Res. 2009)

- Retrospective, multicenter study of a series of 296 patients younger than 65 years with extensive or massive RCTs.
- Four types of management of massive RCTs:
  - Anatomical watertight repairs
  - Palliative treatments and partial repairs
  - Watertight repairs using flaps or cuff prostheses
  - Reverse shoulder prostheses

An approach to treatment is suggested related to the functional capacity of patients, the AHI and the degree of fatty infiltration of the infraspinatus and subscapularis muscles.

Conclusions

- Many ways to skin this cat!
- However, patient selection and indications are paramount to a successful outcome.
- Age, expectations, functional status of the RC, associated arthritis, preoperative baseline function are all critical considerations.
- Be comfortable with all approaches, as single hammer is not appropriate!
Thank You