Rotator Cuff Repair Outcomes: Arthroscopy vs Open Surgery

Walton, J R; Murrell, G A C
Orthopaedic Research Institute, University of New South Wales, St George Hospital Campus, Sydney NSW 2217
j.walton@unsw.edu.au; murrell.g@ori.org.au

Rotator cuff tears are a common cause of shoulder pain and dysfunction that affect all kinds of people, from sedentary individuals to elite athletes. Surgical repair of rotator cuff tears aims to re-establish the shoulder’s normal anatomical structure with restoration of pain-free motion, strength, and function. Rotator cuff repair (RCR) has evolved from an all-open procedure to an arthroscopically assisted mini-open method and, more recently, to an all-arthroscopic procedure. The all-open RCR procedure remains as the gold standard (Ellman et al., 1986). Arthroscopic surgery is less invasive but this procedure is technically difficult and has been thought to require a longer operative time and to result in less secure repairs more prone to re-tear. However, there is little scientific evidence to support these suppositions. The present study was carried out to confirm or refute the hypothesis that open RCR gives superior clinical outcomes, shorter operative times, and more secure repairs.

Methods:
Under ethics approval, we analyzed 2-years of outcomes data from more than 400 RCR patients repaired by a single surgeon: 213 with open RCR and 206 with arthroscopic RCR. The patients attended clinics pre-operatively and at 6 weeks, 3 months, 6 months, and 2 years post-surgery. The instruments consisted of a modified L’Insalata et al. (1997) questionnaire which addressed pain and perceived function and an examiner’s form to record data from a systematic shoulder examination comprising 23 tests to assess shoulder range-of-motion, strength, impingement and other signs. At the 2-year visit the patients’ shoulder were examined by ultrasound to determine whether their rotator cuff tendon had torn. Results were statistically analyzed using SigmaStat/SigmaPlot (Systat Software, Inc., Point Richmond CA). Significance is indicated as: * = p<0.05; ** = p<0.01; *** = p<0.001 with power at 0.80. The results are presented as mean ± SEM.

Results:
The median operative times for open RCR and arthroscopic RCR were 60 and 40 minutes, respectively (p< 0.001). Ultrasound-determined re-tear rates at 2 years post-surgery were 37% for open RCR and 24% for arthroscopic RCR (p<0.001).

Night pain, activity pain and resting pain showed a significant decline from pre-operative values without significant difference between the two groups. The main difference in pain revealed by the questionnaire was frequency of extreme pain. This type of pain was significantly more frequent in patients repaired with open RCR than with arthroscopic RCR between 6 weeks and 6 months. By two years the two groups’ results were similar.

In addition, the patients’ assessment of their overall shoulder condition was significantly better at the 6 week, 3 month, and 6 month visits for the arthroscopic group. By the time of the 2 year visit, both groups assessed their condition similarly.

Range of motion measurements for external rotation, flexion and abduction were significantly better for the arthroscopy group at the 3 and 6 month visits. Internal rotation was greater for the arthroscopy group at the 2 year visits, at which time both groups appeared to be still improving. Forward flexion remained significantly greater for the arthroscopic group at 2 years post-surgery.

Discussion and Conclusions:
To date there have been about 12 studies comparing arthroscopic RCR with other procedures: eight with mini-open RCR, three with open RCR, and one with a combination of mini-open and open procedures. The largest group size in any of these studies is 66 for arthroscopy, 63 for mini-open and 50 for open RCR. Hence, the present study is considerably larger. Our findings that some forms of strength and range-of-motion are greater in arthroscopy patients is consistent with results reported by these studies (Warner et al., 2005; Severud et al., 2003). We also examined our data with regard to the three potential disadvantages of arthroscopy mentioned above. We concur that arthroscopic RCR is technically more difficult than open RCR but, according to Bues et al. (2005), it yields equal or better results than open repair, even at the beginning of the learning curve. As for whether arthroscopy gives less secure repairs with higher re-tear rates, we found the opposite: arthroscopic repairs had significantly lower re-tear rates than those repaired by open surgery. Other investigators have also found that arthroscopic RCR produces repairs as secure as open and mini-open RCRs. With regard to the operative time, our records indicate the median operation times were significantly shorter for arthroscopy than for open surgery.

On balance, our study has shown that arthroscopy is as good as, or better, than open surgery for RCR. Thus, the present findings refute the hypothesis that open RCR gives superior clinical outcomes, shorter operative times, and more secure repairs.

References: