ROUNDUP360

Shoulder & Elbow

Distal clavicular resection not indicated in cuff repair?

It is not that uncommon for patients with degenerative rotator cuff tears to present simultaneously with distal clavicular arthrosis. There is a reasonable argument that with established distal clavicular arthrosis, a simultaneous cuff repair and distal clavicular resection would be a superior surgical option to arthroscopic cuff repair alone. However, like many things in medicine, there simply isn't any evidence to support one method over the other. Surgeons in **Seoul (South Korea)** set out to evaluate the best treatment for patients with symptomatic acromioclavicular joint degeneration and rotator cuff tears. They designed a prospective randomised controlled trial involving 56 patients who consented to be randomised to either cuff repair alone or in combination with lateral clavicular excision. All the patients included in this study had a high grade rotator cuff tear and radiographic changes suggestive of acromioclavicular joint (ACJ) arthropathy. The ACJ pathology was further confirmed with a local anaesthetic injection into the joint. Follow-up was to 24 months and patients were assessed using a combination of VAS pain scores, examination, Constant Score, PROMS (patient reported outcome measures) and ASESS (American Shoulder and Elbow Surgeons Score). Results at the final, two-year follow-up were suggestive of a significant improvement over baseline in both groups, but there were no differences to be seen in outcomes between the two treatment strategies.[1] While the authors conclude that 'Arthroscopic distal clavicle resection should be carefully considered in patients who have symptomatic ACJ arthritis with rotator cuff tears', they haven't really presented any data to suggest an advantage. Even examination findings for ACJ tenderness were not suggestive of any significant differences. It would be equally valid to conclude that there is no evidence, based on the results of this study, to support the use of distal clavicular resection over and above simple rotator cuff repair in this group of patients.

Platelet-rich plasma in rotator cuff repair

x-ref Research

It seems that the enthusiasts for platelet-rich plasma (PRP) are completely unable to step away from the centrifuge, despite multiple studies suggesting that there is no added efficacy over standard treatments in a range of potential applications. Despite this, researchers in **Hamilton (Canada)** decided to have another go with yet another pilot study of PRP. In this case, the research team aimed to look at the potential application of PRP in arthroscopic cuff repair. The team designed a randomised study with internal pilot with the intention of answering the question, 'Is PRP, compared with placebo (saline), more effective in reducing pain at the site of a rotator cuff injury that has undergone arthroscopic repair?'. They designed a two-centre blinded randomised controlled trial involving 25 patients, randomised to either PRP or saline injections in addition to an arthroscopic rotator cuff repair. Injections were performed under ultrasound guidance both intra-operatively, and again at four weeks post-operatively. Outcomes were assessed using VAS for pain, and secondary outcomes of the EQ-5D, DASH score and complications. Patients were assessed clinically between two and six weeks following surgery. The study team pre-specified an interim analysis which led to the early termination of the study. The interim analysis did not yield any differences (significant or not) between the two groups.[2] The authors concluded that in the case of rotator cuff injury there does not appear to be any benefit conveyed by the use of PRP. We suspect this will not be the end of the PRP saga but there doesn't appear to be an application in rotator cuff repair.

Radial head geometry: time to change?

Radial head arthroplasty is perhaps one of the least developed areas of joint arthroplasty. With very little evolution of prosthesis designs, and high failure rates associated with a number of implants which are still available (including silastic and pyrocarbon designs), many prostheses are little more than a circular spacer on a stem. Although the relevance of radial head arthroplasty in arthritis is perhaps debatable, there is no getting away from the requirement for radial head arthroplasty in terrible triad injuries of the elbow. These necessitate rebuilding of the bony anatomy in order to achieve a stable reconstruction. This is an almost unique situation in orthopaedics, where a non-anatomic hemiarthroplasty is often used in a non-arthritic joint. Researchers in **Rochester (USA)**, recognising the longer-term issues some patients have had with secondary degenerative change, set out to establish if more anatomical radial head designs would have a lower risk of secondary degeneration. Their cadaveric study was designed to establish radiocapitellar contact pressures in cadaveric specimens with a range of radial head prostheses (three circular designs and two anatomical prototype designs). Their study involved ten different cadaveric specimens, each tested with each prosthesis and contact area and pressures were measured using thin film sensors. All of the circular designs of radial head had lower contact areas and higher contact pressures than the native joint, whilst one of the anatomical prototypes had similar to native pressures. Cartilage is known to suffer damage at contact pressures greater than 5MPa, and pressures above this threshold were seen with the circular designs.[3] The authors of this interesting biomechanical paper successfully

make the point that a decrease in these contact pressures would likely reduce longer-term complications of increased contact pressures and radiocapitellar degenerative change. More complex prostheses run the risk of mechanical failure and increasing surgical complexity, which in itself can lead to increased pain and degenerative changes.

Heterotopic ossification in elbow trauma

x-ref Trauma

Heterotopic ossification is a problem in a range of joints and conditions, none more so than the elbow. With a tendency to stiffen (thought to be due to a propensity to produce myofibroblasts rather than fibroblasts) following both fracture and dislocation, elbow soft-tissue injury and stiffness are often also compounded by heterotopic ossification (HO). Despite being a widely accepted complication, little is known about the risk factors for, incidence of, and natural history of, HO following fracture dislocation of the elbow – partly due to the relative rarity of these injuries. Clinicians in **New York (USA)** have undertaken a retrospective review of their cases over a period of eight years. During that time, the surgical team treated 28 patients (just 3.5 cases a year) and the study was designed to identify potential risk factors for and complications of HO. Follow-up was via notes review to a mean of 14 months and the investigators extracted data pertaining to demographics, comorbidities, surgical time interval, reduction attempts, surgical details and treatment of capsule and radial head. A whopping 43% (n = 12) of elbows were found to have developed HO during follow-up. Within the limitations of this being a small study, the research team identified the only risk factor for HO development to be multiple closed reductions prior to surgery (occurring in seven of nine patients who underwent closed reduction prior to theatre).[4] While the authors suggest in their discussion that there is no relationship between time to surgery, demographic, surgical or injury factors, this is a hard assertion to make with any measure of certainty given the small size of the cohort.

Another look at heterotopic ossification in the humerus

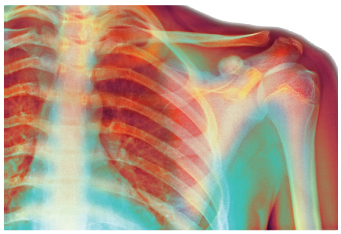
Sticking with the theme of heterotopic ossification (HO) around the distal humerus, collaborators from Europe led by researchers in **Madrid (Spain)** added a further piece to the jigsaw of HO in and around the humerus. The research team set out to establish the causative factors of heterotopic ossification in patients with distal humeral fractures who had undergone external fixation prior to definitive internal fixation. The study team were able to report on the results of 89 patients in their retrospective review. While it is important to remember that the inclusion criteria (fractures requiring temporary external fixation) suggest that the study population represents the severe end of the injury spectrum, it is still surprising that the authors report an incidence rate of HO of 42% (n = 37 elbows). This is most commonly located around the humerus and seen, in particular, infiltrating the course of the medial collateral ligament. During the observation period of this study, the HO was graded as immature and hazy (13.5%), mature discrete (54%), and extensive mature (27%), with complete bone bridges seen in two elbows (5.5%). Clinical outcomes suggestive of functional impairment (remembering this is also a measure of the injury, not just the HO) were indicative of mild impairment in eight patients, moderate impairment in 27, and severe in two patients. The authors also explored the association between HO and functional deficit. As would be expected for a predominantly distal humerus and medial collateral ligament-based infiltration, loss of extension and flexion to extension arc was significantly greater in the HO group. In terms of risk factors, the study team were able to suggest that head injury, bone graft use, delay to internal fixation and method of fixation were all significantly associated with the development of HO in this study population.[5] Taken together, these two papers emphasise the ongoing problems with significant heterotopic ossification seen in severe fractures and dislocations of the elbow joint. The incidence rate is at least a third, and in both papers risk factors have been identified that are potentially modifiable to reduce the long-term risks of HO formation and associated stiffness.

Triceps on for total elbow arthroplasty?

Elbow arthroplasty has a somewhat chequered history. Like ankle replacement, it is far from a 'solved' arthroplasty. Complications abound, longevity is somewhat compromised and patients are less satisfied than following other large joint arthroplasties. Surgeons seeking improved outcomes have experimented with different prostheses and also different approaches. Although the surgical approach in other joints can have a profound effect on the outcome, there is surprisingly little data to support one particular approach over another. Surgeons in **Cape Town (South Africa)** have published one of the few comparative studies evaluating different outcomes from 'triceps on' and 'triceps off' approaches to elbow replacement. The triceps on approach offers an intact extensor mechanism and should in theory reduce the risk of triceps-related post-operative complications, however, potentially at the expense of exposure which might affect cement mantle and the incidence of other intra-operative complications such as fracture or malalignment. They report the outcomes of 83 patients undergoing primary total elbow replacement with a mixture of triceps on (37 cases) and triceps off (46 cases) over a nine-year period. The research team report intra-operative and post-operative complications and outcomes, including cement mantle assessment and the Mayo Elbow Performance Score. There were no differences in baseline characteristics between the two groups with regard to demographics, pre-operative Mayo scores or ranges of motion. There was, however, a difference in post-operative results between patients with an inflammatory arthropathy and those without. The triceps on approach was found to be superior in almost every way in this report. Cement mantles were superior (92% adequate triceps on vs 70% adequate in triceps off), as were complication rates, with a 32.6% complication rate in the triceps off group *versus* an 8.1% in the triceps on group. This disparity was mostly accounted for by post-operative triceps tendon ruptures (n = 7).[6] The conclusion to be drawn from this paper is fairly clear: in an operation with high complication rates, these can be minimised by selection of the 'triceps on' approach. Although the focus on difficult arthroplasties (elbow, ankle, fingers for example) has been in improving implant designs, this paper underlines for us here at *360* how operative technique can have a large role to play in minimising side effects and complications.

Predicting outcomes in rotator cuff repair

In an impressive multinational study, 365 patients took part in an outcomes study which aimed to assess factors predictive of return to work and activity following arthroscopic rotator cuff repair (ARCR). Led by investigators in **Saint-Grégoire (France)** and **Serdang (Malaysia)**, this paper aims to assess factors associated with return to work and activity following surgery. The study team divided the cohort into two, based on outcomes at six months – those with a satisfactory return to work and activity, and those without. The overwhelming majority had returned to activities (n = 305), with just 60 patients not making an acceptable recovery. A range of injury, operative and pre-operative characteristics were evaluated using a multivariant analysis method to explore potential predictors of poor outcomes. There were three factors predictive of difficulties in returning to work and social activities at the six-month point; female gender, manual



employment and persistent bursitis. Although the failure of tendons to heal was associated with a higher rate of pain post-operatively, this did not have a negative impact on the patients' ability to return to work or activity in this study.[7] The overall results presented here are realistic, with the suggestion that around four out of five cases make a complete functional recovery. The identification that manual workers, females and those with post-operative persistent bursitis are likely to have an enduring limitation is important in surgical decision-making, consent and pre-operative expectation setting.

Deltoid fatty infiltration and reverse shoulder arthroplasty

x-ref Research

■ One of the beauties of the reverse shoulder as a concept is the advantageous lever arm due to altered biomechanics in the shoulder. The advantages of these designs are so marked that they are routinely implanted into arthropathic patients with no real cuff function – in these cases the reverse polarity shoulder makes use of the deltoid (and in particular the anterior deltoid) to drive the prosthesis. Researchers at **Royal Oak (USA)**, reasoning that little is known about muscle parameters and their effects on clinical outcome in reverse arthroplasty, set out to establish if there was any association between post-operative results and muscle function. They examined specifically the function of the deltoid muscle (quantified in terms of both size and fatty infiltration) and the rotator cuff (quantified in terms of fatty infiltration). The research team used a previously established local prospective registry to explore any relationship between results. They were able to include 30 patients (from a population of 222) who were followed up successfully to the two-year point following their reverse total shoulder arthroplasty (RTSA) and had undergone a pre-operative MRI scan. The research team collated data on the deltoid area (anterior, middle and posterior) along with fatty infiltration (quantitatively assessed) in the deltoid and individual rotator cuff muscles. Clinical outcomes were assessed with the Constant Score and the American Shoulder and Elbow Surgeons Score. At final follow-up there were positive correlations between deltoid size and clinical outcomes, and a negative correlation between deltoid fatty infiltration and outcomes. The only association between cuff function and outcomes was for external rotation where fatty infiltration of the infraspinatus was associated with decreased post-operative external rotation).[8] In this large clinical study, the authors were able to establish that the reverse shoulder arthroplasty does depend almost entirely on the deltoid and that a combination of deltoid size and quality relates directly to post-operative outcomes with almost no contribution from the rotator cuff.

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