ROUNDUP360

Shoulder & Elbow

For other Roundups in this issue that cross-reference with Shoulder & Elbow see: Oncology Roundup 6.

Platelet-rich plasma still lacking evidence

The applications for platelet-rich plasma (PRP) are wide ranging but one wonders if some of the clinical papers are driven by a genuine problem to which platelet-derived stem cells may provide an answer, or if it is a case of a new technology awaiting application? One of the potential applications for PRP is in lateral epicondylitis (tennis elbow). The precise pathogenesis of lateral epicondylitis and other enthesopathies is far from clear. However, theorising that PRP may have an application in curing the chronic inflammatory change seen in tennis elbow, there is no shortage of studies evaluating efficacy. Researchers in **Cambridge (UK)** have attempted to bring together the myriad of studies in a systemic review. Due to the high volume but poor quality data, the research team included studies of level I to III evidence and conducted a thorough review of the literature, including all studies reporting clinical outcomes for the use of PRP in the most commonly used medical indexes (PubMed, Medline, Cochrane, CINAHL and EMBASE). The team were able to identify nine studies that reported clinical outcomes, of which five were randomised controlled trials (RCT), two cohort studies and a single case-controlled study. The cohort and case-controlled studies all showed improved clinical scores in favour of PRP treatment. However, the majority of the RCTs showed no difference in clinical outcomes between PRP and either blood or corticosteroid therapy. The researchers comment that, as the largest study found significant improvements in clinical outcomes at one year of follow-up, there is "limited but evolving evidence" for the use of PRP in tennis elbow treatment. They do, however, note that there is little homogeneity in the studies, and particularly the differences in regime, concentration and timing of PRP application need further investigation.[1] It seems to us that the jury is still firmly out on this one.

Arthroscopic treatment of sternoclavicular joint osteoarthritis

Hot on the heels of their previous reports (and 'technique in focus' in the last edition of 360), investigators in **Cambridge (UK)** have described the outcome of their new technique of arthroscopic sternoclavicular joint excision in a group of patients with medial clavicular osteoarthritis. Their level III evidence case series describes the outcomes of ten patients, all refractory to conservative treatment and managed with arthroscopic sternoclavicular joint resection. The patient cohort had a mean age of 53 (42 to 62), and were assessed both pre- and post-operatively with both the Constant Shoulder Score and Rockwood SCJ score. Patients underwent final follow-up at just over two years (28 months). Arthroscopic excision was performed as a day case without post-operative immobilisation. Recovery took upwards of two weeks with return to pre-operative or improved range of movement by two-week review. Both the Constant and Rockwood scores increased (from 64 to 83 and six to 14 respectively). The results were rated as good or excellent in 90% of patients, with one fair result. The investigators recorded no complications in this small series and specifically found no post-surgical joint instability.[2] While a small series, this paper is important in that it offers a novel treatment for a difficult condition. There are no signs of significant post-operative problems, and these were excellent outcomes in what is, after all, a small series.

Synchronous arthrolysis and cuff repair

Decision making in patients with a synchronous cuff tear and frozen shoulder is difficult. Surgery for the rotator cuff runs the risk of worsening the frozen shoulder, while frozen shoulder itself will inhibit the rehabilitation and outcomes following a cuff tear. Surgeons in **Taipei (Taiwan)** report a comparative retrospective case (Level III evidence), comparing the outcomes of patients with and without stiff shoulders undergoing arthroscopic rotator cuff repair. The patients with stiffness underwent synchronous arthroscopic arthrolysis and rotator cuff repairs, and were compared with those undergoing cuff repairs alone (patients with no pre-operative stiffness). An impressive 211 patients (of whom 43 had concomitant shoulder stiffness) were included in the study and reviewed at a minimum of two years' follow-up. Outcome assessment was with visual analogue scales (for pain), range of movement assessment and standardised outcome measures (Constant Score, American Shoulder and Elbow Surgeons, University of California, Los Angeles). At final (two-year) follow-up there were no differences in any outcome measures aside from pain scores during movement (1.5 in the stiffness group and 1.3 in the non-stiffness group). Range of movement improved significantly post-operatively, and was comparable with the unaffected side.[3] This excellent paper helps to answer a common conundrum in clinic; the authors have effectively demonstrated that synchronous arthrolysis and arthroscopic cuff repair is an effective way of treating patients with both conditions.

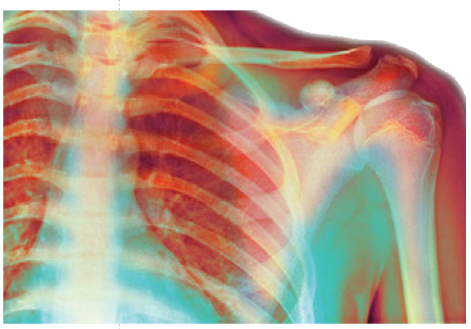
Arthroscopic arthrolysis cost effective

Perhaps one of the most painful and disabling conditions the shoulder surgeon has to face is that of adhesive capsulitis. Patients complain bitterly of acute loss of function and significant pain, particularly when faced with the early phases of frozen shoulder. Although many surgeons offer a range of treatments, there is little known about the economic health impact of frozen shoulder and the potential benefits of its treatment. Researchers in **Reading (UK)** set out to establish the functional and health related quality of life

outcomes following arthroscopic arthrolysis. The researchers recruited 100 patients over a two-year period, all of whom had failed a comprehensive non-operative management regime (anti-inflammatory medication, physiotherapy and glenohumeral injection). Those patients underwent an arthroscopic capsular release and were enrolled in a longitudinal cohort study. A total of 100 patients were recruited into the study, of whom 68 underwent capsular release alone, and 32 had a combined capsular release and subacromial decompression. The researchers noted a significant improvement in all of the outcome scores, including the Oxford Shoulder Score and EuroQol EQ-5D. The cost-effectiveness analysis suggested that capsular release alone cost £2563/QALY, while adding in a subacromial decompression increased this cost to £3189. The authors have effectively also established that capsular release can restore relatively normal function and shoulder performance scores in the majority of patients within six months of surgery. The benefit was not found to be related to the duration of symptoms prior to surgery.[4] Given the usual thresholds for cost effectiveness, both procedures do meet requirements, however, given the increased cost/QALY we would use the subacromial decompression with caution. One must always remember when interpreting this kind of study that the inherent selection bias, where patients are allocated to treatment at surgical discretion, makes direct comparison tricky.

Regional blockade safer in the beach chair

Perhaps the worst complications from surgery are not directly related to the surgery at all, but rather the anaesthetic or positioning. In shoulder surgery, the most devastating of such complications is the advent of neurological complications from the beach chair position. Complications such as ischaemic stroke and deafness have all been described in patients undergoing shoulder surgery. The winners of the Neer prize this year from **Chicago (USA)** hypothesised that cerebral ischaemic incidents would be rarer with regional, rather than general, anaesthetic and the beach chair position. The research team devised an ingenious study where 60 patients undergoing shoulder surgery had cerebral oxygenation saturation ($SctO_2$) measured intra-operatively. Thirty patients were managed with general anaesthesia (GA) and 30 with interscalene block and sedation. Patients undergoing general anaesthesia had lower baseline mean arterial pressure and $SctO_2$ values than the regional group, and in addition there was a higher incidence of cerebral desaturation events (56.7% *versus* 0%). The safe threshold of 55% $SctO_2$ was maintained in 76.7% in the GA group but in over 96% of the 'awake' group. This pattern was also reflected in the documentation of 89 combined desaturation events in the GA group.[5] The authors were awarded the Neer prize in shoulder surgery for what must be one of the most important papers of the year. These catastrophic events can be all but averted through the use of regional anaesthesia and sedation.



Recurrent instability: risk factors and aetiology

Recurrent instability following either arthroscopic or open stabilisation can be one of the most recalcitrant problems in soft-tissue shoulder surgery. Despite the spectre of recurrent dislocation and the complexity of management, studies on the subject are relatively scarce. Researchers in **Ontario (Canada)** have reviewed their experience on a population level over a five-year period to establish the rate of ipsilateral revision stabilisation, contralateral primary stabilisation and complications on a population level. They further aimed to refine our current understanding of the risk factors for these outcomes on a surgeon, patient and institutional level. Patients were identified across the whole of Ontario using the population level healthcare billing databases, and demographic and other details were then collated for nearly 6000 patients. Outcomes and risk factors were explored using a Cox proportional hazards model for both revision stabilisation and shoulder relocation. The study team investigated the effect of patient demographics (age, gender, previous dislocations), institutional variables (surgical volume and institution type), and finally surgical variables (open and arthroscopic variables), on both failure and contralateral stabilisation. The study encompassed a whopping 5904 patients who were overwhelmingly young males (80.6% male, median age 29 years). The use of arthroscopic stabilisation increased from 60% at the start of the study period to 80% by 2008. The incidence of post-operative dislocation was 6.9%, with 4% undergoing revision stabilisation and 3.9% requiring contralateral primary stabilisation. Patients aged under 20 years had a higher rate of surgical failure than those over 29 with a higher revision rate (7.7% hazard ratio [HR 2.7% *versus* 2.8%) and dislocation rate (12.6% *versus* 5.5%). There was a higher risk of surgical failure in patients with three or more dislocations (risk of revision HR 2.1 and dislocation HR 10.6). Surgical revision was also more common after arthroscopic, than open, surgery (4.3% *versus* 3.5%, HR 1.4). There was no association with surgeon volume or institution and recurrent instability.[6] This is the largest study of its type and shows the power of health registry data. While better data could be obtained through a prospective study with a wider range of risk factors that can be characterised, it would be impossible to recruit so many patients to such a study.

Avoiding iatrogenic nerve injury in elbow arthroscopy

Elbow arthroscopy has not taken off to quite the extent that arthroscopy of other joints has. This may be related to the risk of neurovascular injury, a problem that is particularly acute when undertaking arthroscopic arthrolysis. Realising there was a potential problem, researchers from **Turin (Italy)** undertook a safety-driven approach to arthroscopic capsular release. The study team present the results of over 500 arthroscopic capsular releases performed in 464 patients in a single-surgeon series. The authors used a safety-driven stepwise strategy revolving around four key steps. Although nothing particularly revolutionary, the authors recommend a stepwise approach initially establishing portals and ensuring adequate view; then creating space to work; subsequent bone removal; and finally capsulectomy. Patients were assessed post-operatively for neurological injury and then followed up until resolution. The authors identified neurological symptoms post-operatively in around one in 20 patients, and established a causal link with prolonged tourniquets, open incisions, simultaneous ulnar nerve transposition and retractor use. However, they were able to report complete resolution of all nerve injuries by two years following surgery.[7] While more an observational series than a true research paper, the take-home message, that performed safely in a stepwise logical manner arthroscopic arthrolysis is safe and effective in the elbow, is a worthwhile one.

Complex reconstruction of total elbow revisions

The godfather of elbow replacement, Morrey, has yet again stepped into the spotlight with a paper from the Mayo Clinic, **Rochester (USA)**, turning his attention to the salvage elbow revision arthroplasty in the presence of very poor bone stock. Obtaining primary stability and addressing bone stock is tricky, and previous studies have highlighted high failure rates when allograft-prosthetic composite grafts have been used. There are, however, multiple methods for reconstruction with allograft. The over-reduction method results in intussusception of the allograft prosthesis composite in the host bone; alternatively, strut-like augmentation can be used, as can side-to-side apposition. The study team report an unselected series of 25 patients undergoing revision elbow arthroplasty and bone grafting over a five-year period. The majority (n = 18) of patients required ulnar augmentation, six humeral augmentation and a single patient required constitution of both bones. The most common indications for revision were fracture and infection, accounting for over 70% of cases between them. Outcomes were assessed using the Mayo Elbow Performance Score, as well as measures of complications and radiographic union. Functional outcomes were excellent, with a mean improvement of 54 points in the Mayo score (30 to 84) post-operatively. During the follow-up period the authors report a 92% incorporation rate of the allograft-prosthesis composites. Things were not, however, quite so rosy as far as complications went. There were 12 complications in nine (36%) patients. Of these, eight were classified as major and they consisted of infection (three cases); fracture (three cases); non-union (one case); malunions (one case); skin necrosis (one case); triceps palsy (two cases) and a single case of ulnar nerve paraesthesia. These complications necessitated re-operation in six patients (25%). Two of the revision procedures resulted in a usable elbow, giving an overall success rate of 84% (n = 21) for allograft-prosthesis composites. The authors at a world-leading centre were only able to report successful results in four out of five patients, highlighting the difficulty of these reconstructions. However, their newer techniques of larger bone contact surface area have yielded much higher union rates than those previously reported. As the authors conclude, "allograft-prosthetic composites can be a safe, reliable option with an acceptable complication rate for revision total elbow arthroplasty".[8] Perhaps, however, with a 36% complication rate they are not for the faint of heart – surgeon or patient!

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