The Bone & Joint Journal

Journal Club: 14 February 2012
Organiser: Mr Livio Di Mascio
The Royal London Hospital, London, UK

Theme: Upper Limb

Presented Papers:

1. **Miller BS, Harper WP, Hughes JS, Sonnabend DH, Walsh WR.**
   Regional antibiotic prophylaxis in elbow surgery.
   J Shoulder Elbow Surg 2004;13:57-9.

2. **Canadian Orthopaedic Trauma Society.**
   Nonoperative treatment compared with plate fixation of displaced midshaft clavicular fractures. A multicenter, randomized clinical trial.
   J Bone Joint Surg [Am] 2007;89-A:1-10.

3. **Cazeneuve JF, Cristofari DJ.**
   The reverse shoulder prosthesis in the treatment of fractures of the proximal humerus in the elderly.
   J Bone Joint Surg [Br] 2010;92-B:535-9.

Miller BS, Harper WP, Hughes JS, Sonnabend DH, Walsh WR.
Regional antibiotic prophylaxis in elbow surgery.
J Shoulder Elbow Surg 2004;13:57-9.

Reviewer: Shin Azegami

Background & Purpose

The purpose of this study was to present a technique for the delivery of regional antibiotic prophylaxis in patients undergoing elbow surgery and compare tissue antibiotic concentrations achieved by this technique with those achieved by standard systemic intravenous prophylaxis using the same antibiotic and similar doses.

Methods

Bone and fat samples were collected from patients undergoing elective elbow surgery who had received regional antibiotic prophylaxis and tissue antibiotic concentration was measured. For comparison, antibiotic concentration in bone and fat samples were measured from patients undergoing elective shoulder surgery who had received systemic prophylaxis.

Results

The experimental group included 8 patients undergoing elective surgical procedures to the elbow who had received regional antibiotic prophylaxis (5 men and 3 women; mean age, 40.6 years [range, 19-79 years]). The control group included 7 patients undergoing elective shoulder surgery (4 men and 3 women; mean age, 49.3 years [range 29-77 years]). Mean tissue antibiotic concentrations were significantly higher in the regional antibiotic group (bone, 1484 ug/g vs 35.8 ug/g (41 times higher); fat, 1422.7 ug/g vs 10.7 ug/g (133 times higher); $P < 0.05$). No adverse effects were encountered with regional antibiotic delivery.

Conclusions

The delivery of regional antibiotic prophylaxis in elbow surgery achieves higher tissue antibiotic concentrations than those achieved with standard systemic delivery. This technique may help reduce the risk of perioperative infection in elbow surgery.

Critique – positive points:

- Aim clear
- Prospective design

Critique – negative points:

- Small numbers and some data missing (n=3)
- Control group had shoulder surgery
- Patients within each group not homogenous
- No comment of characteristics of groups
- No mention of length of follow-up of patients in the study

Relevance

- Addressed an important aspect of orthopaedic surgery
- Explored a technique which could be used by any surgeon/anaesthetist
- How do we know that high concentration translates into increased efficacy as numbers too small and no mention of length of follow-up?
- Several studies defined minimum inhibitory concentration (MIC) in bone of methicillin resistant staph aureus as 2 u/g (Yamada et al. 2011. CORR)

Canadian Orthopaedic Trauma Society.
Nonoperative treatment compared with plate fixation of displaced midshaft clavicular fractures. A multicenter, randomized clinical trial.
J Bone Joint Surg [Am] 2007;89-A:1-10.

Reviewer: Farzad Shabani

Background & Purpose

To compare patient-oriented outcome and complication rates following nonoperative treatment versus plate fixation of displaced midshaft clavicular fractures.

Methods

In a multicenter, prospective clinical trial, 132 patients with a displaced midshaft fracture of the clavicle were randomized (by sealed envelope) to either operative treatment with plate fixation (sixty-seven patients) or nonoperative treatment with a sling (sixty-five patients). Outcome analysis included standard clinical follow-up and the Constant shoulder score, the Disability of the Arm, Shoulder and Hand (DASH) score, and plain radiographs. One hundred and eleven patients (sixty-two managed operatively and forty-nine managed nonoperatively) completed one year of follow-up. There were no differences between the two groups with respect to patient demographics, mechanism of injury, associated injuries, Injury Severity Score, or fracture pattern.

Results

Constant shoulder scores and DASH scores were significantly improved in the operative fixation group at all time-points ($p = 0.001$ and $p < 0.01$, respectively). The mean time to radiographic union was 28.4 weeks in the nonoperative group compared with 16.4 weeks in the operative group ($p = 0.001$). There were two nonunions in the operative group compared with seven in the nonoperative group ($p = 0.042$). Symptomatic malunion developed in nine patients in the nonoperative group and in none in the operative group ($p = 0.001$). Most complications in the operative group were hardware-related (five patients had local irritation and/or prominence of the hardware, three had a wound infection, and one had mechanical failure). At one year after the injury, the patients in the operative group were more likely to be satisfied with the appearance of the shoulder ($p = 0.001$) and with the shoulder in general ($p = 0.002$) than were those in the nonoperative group.

Conclusions

Operative fixation of a displaced fracture of the clavicular shaft results in improved functional outcome and a lower rate of malunion and nonunion compared with nonoperative treatment at one year of follow-up. Hardware removal remains the most common reason for repeat intervention in the operative group. This study supports primary plate fixation of completely displaced midshaft clavicular fractures in active adult patients.

Critique – positive points:

- Multicentred randomised controlled trial (Level 1 evidence)
- Clear scientific background and explanation of rationale
- Eligibility criteria for participants (inclusion and exclusion) detailed
- Precise details of the interventions intended for each group and how and when they were actually administered
- Specific objectives and hypotheses
- Clearly defined primary and secondary outcome measures
- Defined how sample size was determined
- Detailed the method used to generate the random allocation sequence
- Defined who generated the allocation sequence, enrolled participants, and who assigned participants to their groups
- Statistical methods used to compare groups for primary outcome (s) detailed
- Baseline demographic and clinical characteristics of each group identified and were comparable
- All important adverse events or side effects in each intervention group detailed
- General interpretation of the results in the context of current evidence

Critique – negative points:

- 21 patients lost to followup
- Intention to treat principles partially used to account for patients lost to followup
- Different implants used for plate fixation
- Only plate fixation used in the operative group: intramedullary fixation is also an option
- No blinding of assessors

Relevance

- A common fracture managed by orthopods on almost a daily basis
- Level 1 evidence provided for management of displaced midshaft fractures consistent with data from recent studies in the literature
- High quality assessment scoring of the study taking into consideration the positive points detailed above which deserve consideration in daily practice of managing such fractures

Cazeneuve JF, Cristofari DJ.
The reverse shoulder prosthesis in the treatment of fractures of the proximal humerus in the elderly.
J Bone Joint Surg [Br] 2010;92-B:535-9

Reviewer: Angelos Assiotis

Background & Purpose

The authors report their mid-term results after publishing their earlier results of reverse shoulder arthroplasty in the treatment of acute complex proximal humeral fractures in the elderly.

Methods

Between February 1993 and October 2009, 36 patients with an acute fracture of the proximal humerus were treated using the Grammont prosthesis. A total of 25 of the patients have been previously reported, with a mean follow-up of six years (1 to 12). In this paper, 11 further patients were included and the mean period of follow-up was extended to 6.6 years (1-16 years).

Results

There were 34 women and two men, with a mean age of 75 years (58 to 92), 26 fractures and 10 fracture-dislocations, 16 on the right and 20 on the left. Previously, the mean Constant score was 58.5; this was reduced to 53 points with the further follow-up. A total of 23 patients (63%) had radiological evidence of loosening of the glenoid component. Nevertheless, only one patient had aseptic loosening of the baseplate at 12 years' follow-up.

Conclusions

The reduction in the mean Constant score with longer follow-up and the further development of scapular notching is worrying. New developments in design, bearing surfaces and surgical technique, and further follow-up, will determine whether reverse shoulder arthroplasty has a place in the management of complex proximal humeral fractures in the elderly.

Critique

- There is no mention of the seniority or level of experience of the surgeons performing this technically challenging procedure.
- There is a clear mention that the tuberosities were excised and yet there were 3 dislocations due to that very cause; this could be linked to the first point.
- No p-values mentioned for statistical significance in decline of Constant score
- There is mention of 19 cases of glenoid notching but no mention of the severity as per Nérot's classification
- This is a paper with their 'mid-term' outcomes and their range starts from 1 year of follow up, mean 6.6 years. Their previous paper presented their short-term outcomes and they reported at a mean of 6 years follow-up
- Small number, no comparison

- Although the small number of cases is not necessarily a point of criticism, the fact is that there is no comparison cohort of patients, in order to compare outcomes at a mean of 6.6 years.
- No reporting on patient-reported satisfaction
- Although they mention that one of their outcomes is patient satisfaction (in methods and patients), they do not report it at all in the results and discussion sections
- In their surgical technique, they mention insertion of 'convergent equatorial screws' when they most probably meant divergent

Relevance

- Relevant and important topic for upper limb surgeons performing reverse shoulder arthroplasty in the treatment of acute complex proximal humeral fractures in the elderly.
- As per conclusion from this study, further follow-up and investigation of newer implants is needed before recommending it for acute complex proximal humeral fractures in the elderly.