



BRITISH ELBOW & SHOULDER SOCIETY

2018 ANNUAL SCIENTIFIC MEETING

Scottish Event Campus, Glasgow
20 June – 22 June

Wednesday, 20 June 2018

08:00 REGISTRATION

09:00 12:00 AHP SYMPOSIUM

SHOULDER AND UPPER LIMB PAIN, FROM THE ROTATOR CUFF AND BEYOND

09:00	09:05	Welcome address	
09:05	09:10	New RCT trial looking at rehabilitation following shoulder dislocation	R Kearney
09:10	09:50	Neurogenic thoracic outlet syndrome: dilemmas, diagnoses and decision	R Patterson
09:50	10:20	Clinical and translational research in tendinopathy: what's new, what works?	N Millar
10:20	10:40	Coffee break	
10:40	11:10	Lateral elbow pain: a simple clinical presentation, a complex clinical entity...	A Cuff
11:10	11:40	Pain clinics: rationale for chronic pain management	A Crockett
11:40	12:00	Panel questions and answers/discussions	

10:30 12:00 RESEARCH SYMPOSIUM

PERIPROSTHETIC JOINT INFECTIONS (PJI) OF SHOULDER AND ELBOW

		Introduction to periprosthetic joint infections	A Rangan
		Diagnosis of periprosthetic joint infections	S Corbett
		Management of periprosthetic joint infections	M Falworth
		Case study	A Majed

12:00 13:30 LUNCH AND TRADE EXHIBITION

13:30 13:45 WELCOME ADDRESS AND LORD PROVOST OF GLASGOW

13:30	13:35	Lord Provost of Glasgow opening address	
13:35	13:40	Welcome by local organising committee	
13:40	13:45	Useful information and reminders	

13:45 14:50 SESSION 1: ROTATOR CUFF, CHONDRAL AND CAPSULAR DISORDERS CHAIRS: D TENNENT/S HAY

13:45 13:53 OUTCOMES AND PATIENT EXPERIENCE FROM HYDRODILATATION FOR FROZEN SHOULDER

Author: R Tweddle; JA Cruickshank; B Pass; CE Davies; S Boyle
Institution: York Hospital

Purpose:

To evaluate our outcomes as well as patient experience with hydrodilatation for primary frozen shoulder.

Background:

Hydrodilatation is an alternative to manipulation under anaesthesia (MUA) or arthroscopic capsular release (ACR) for frozen shoulder refractory to conservative treatment. It is a well-tolerated procedure and has considerable cost savings compared to surgery. Published results are generally supportive, but it is not uniformly used throughout the UK.

Methods:

Data was collected prospectively from September 2016 to September 2017. All patients received ?1 steroid injections and physiotherapy before they were offered hydrodilatation. Information and post procedure physiotherapy were

standardised. We did not aim for capsular rupture. Visual Analogue Score (VAS) and Oxford Shoulder Scores (OSS) were recorded pre-procedure, at 4 weeks and 6 months post procedure. Data on satisfaction, being informed and whether they would recommend hydrodilatation were recorded on a Likert scale at the same time points.

Results:

41 patients underwent hydrodilatation. Eight were diabetic. The average age was 56.4 (42-77). Mean OSS increased from 21.2 pre-procedure to 39.3 at 4 weeks and 42.1 at 6 months. Mean VAS decreased from 6.7 pre-procedure to 2.1 at 4 weeks and 1.6 at 6 months. Both improvements were statistically significant ($p < 0.05$) at 4 weeks and 6 months (2 tailed paired t-test). There was no significant difference between diabetic and non-diabetic groups ($p < 0.05$). No complications occurred. 6 patients went on to require surgery. Scores of satisfaction, information and recommendation were all 95%.

Conclusion:

We found a significant reduction in pain and improvement in shoulder function by 4 weeks with continued improvement up to 6 months. This benefit was also found in diabetic patients. Patient satisfaction and opinion were very high. We believe hydrodilatation is a safe and effective treatment for frozen shoulder and is a first line alternative to MUA or ACR in appropriate patients.

13:53 14:01 EARLY HISTOLOGICAL AND IMMUNOHISTOCHEMICAL EVALUATION OF TWO COMMERCIALY AVAILABLE BIOLOGICAL AUGMENTATION PATCHES AFTER ROTATOR CUFF REPAIR

Author: M Rashid; R Smith; N Nagra; K Wheway; B Watkins; S Snelling; S Dakin; A Carr

Institution: Nuffield Department of Orthopaedics, Rheumatology, and Musculoskeletal Sciences, University of Oxford

Purpose:

The primary aim of this study was to assess the early (4 week) tissue response of the native tendon after augmentation with cadaveric dermal allograft or a porcine dermal xenograft in comparison to a control (no patch augmentation).

Methods:

Patients underwent a conventional rotator cuff repair via a mini-open approach. Patients had either a human dermal allograft or porcine dermal xenograft patch applied in an onlay technique. A control group of patients that did not receive any patch augmentation was used for comparison. A sample of the supraspinatus tendon was excised at the time of surgery. At 4 weeks after surgery an ultrasound-guided biopsy of the repair was performed. Histology and immunohistochemistry was performed on all samples. Patch augmentation groups were compared to the control group using a Mann Whitney U test was performed where appropriate.

Results:

The allograft group ($n=4$) demonstrated significant extracellular matrix (ECM) disruption compared to the control group. The xenograft group ($n=3$) demonstrated more ECM disruption than the allograft group. There was no difference in foreign body giant cell count or vascularity. Cellularity decreased in the allograft and xenograft groups compared to control. One patient in the xenograft group had a dramatic increase in cellularity, characterised by extensive infiltration of cells immunopositive for IRF5, CD68, and CD206 markers, suggesting the tissue response involved pro-inflammatory phagocytic macrophages. No significant differences in the expression of CD4, CD45, CD68, CD206, BMP7, IRF5, and TGF β were seen between the groups.

Conclusion:

This is the first study in humans to assess early tissue response to augmentation with human and porcine derived ECM patches. Significant tissue disruption was observed on histological evaluation demonstrating a potentially deleterious effect of xenograft and allograft patches on the underlying supraspinatus tendon. One patient had a significant and adverse immune response.

14:01 14:09 THE OUTCOME OF CHONDRAL TUMOURS AS INCIDENTAL FINDINGS ON INVESTIGATION OF SHOULDER PATHOLOGY

Author: S Jassim; T Hilton; R Pollock

Institution: Royal National Orthopaedic Hospital

Incidental chondral tumours found in the investigation of shoulder symptoms are commonly referred to our Bone Tumour Unit (BTU). The aim of this study is to describe the outcomes of chondral tumours in the shoulder girdle managed in our unit.

Methods:

Our hospital radiology database was searched using the filtered terms "Enchondroma", "Low grade chondral tumour", "Chondrosarcoma" and paired with "Humerus", "Arm", "Shoulder", "Scapula" and "Clavicle" was made. The results were reviewed and refined to exclude incorrect body parts or diagnoses. The remaining patients had case note review to

assess primary reasons for referral to the BTU, radiological diagnosis, the recommended management and subsequent reviews and outcomes, either in clinic or reports from surveillance scans.

Results:

99 patients had full case note review (30 male, 69 female; mean age 54.5 years (range 18-84 years). Mean follow-up from initial diagnosis was 41.7 months (range 1-265 months).

50% of patients were referred for unspecified shoulder pain.

21 patients required biopsies, three of which had high-grade chondrosarcoma. 43 patients had interval scans, none of which showed any growth or transformation in the lesion. 35 patients had curettage for their lesions and were symptom-free at their most recent follow-up.

44 had alternative diagnoses made on clinical and radiological examination; the most common being rotator cuff/subacromial pathology. At most recent follow-up, 70% of these patients were asymptomatic after physiotherapy/surgical attention to their alternative diagnoses, with the remainder having ongoing treatment.

Conclusions:

Chondral lesions in the shoulder girdle are uncommon but have a low risk of malignant transformation and are rarely a cause of shoulder pain. We would recommend that any incidental finding of them in the shoulder should be referred to a dedicated BTU for surveillance if there are any concerning features, but to proceed with management for an alternative diagnosis.

14:09 14:17 RETURN TO SPORTS AFTER ARTHROSCOPIC ROTATOR CUFF REPAIR IN PATIENTS YOUNGER THAN FORTY-FIVE YEARS

Author: B Altintas; J Pogorzelsk; EM Fritz; ZB Hussain; MP Horan; JA Godin; PJ Millett

Institution: The Steadman Philippon Research Institute, Vail, CO, USA

Purpose:

To report clinical outcomes and the return to sport rate at minimum two-year follow-up after rotator cuff repair for supraspinatus tears in patients equal to or younger than 45 years of age. We hypothesized that patients in this age group would demonstrate significant improvements in patient-reported outcomes following rotator cuff repair with a high rate of return to sport.

Study design:

Case series, Level IV

Methods:

Patients were included in this study if they were (1) between 18 and 45 years of age at the time of surgery, (2) had a full-thickness tear of the supraspinatus tendon, (3) underwent arthroscopic double-row rotator cuff repair and (4) were at least two years out from surgery. Pre- and postoperative patient-reported outcomes scores were prospectively collected and retrospectively reviewed. These included the American Shoulder and Elbow Surgeons (ASES) score, Short Form 12 Physical Component Summary (SF-12 PCS) score and postoperative patient satisfaction. Return-to-sport was investigated with a postoperative questionnaire. Failure was defined as progression to revision rotator cuff surgery.

Results:

Results: Between 2005 and 2015, 37 patients were eligible for inclusion in this study with a mean follow-up of 5.1 years (range, 2.0–10.7 years) at a mean age of 40.5 years (range, 21-45 years). A total of three shoulders (9.7%) failed and underwent revision rotator cuff repair before final follow-up. For the whole group, all reported scores significantly improved compared to preoperative baselines (ASES 52.7 to 87.8; $P<0.001$; SF-12 PCS 41.8 to 50.6; $P=0.001$). Moreover, 63.0% of patients returned to sport at a similar level compared to the pre-injury level.

Conclusion:

Even though arthroscopic repair of full-thickness supraspinatus tears in young patients results in improved clinical outcomes and a low revision rate, the rate of return to sport to the same level as preoperatively remains limited.

14:17 14:25 THE EFFECT OF SODIUM HYALURONATE ON PAIN AND FUNCTION FOLLOWING ARTHROSCOPIC SUB-ACROMIAL DECOMPRESSION - A RANDOMISED CONTROLLED TRIAL

Author: P Sarda; C Fitzgerald; S Elnikety; D Butt; S Corbett

Institution: Guy's and St Thomas Hospital, London; Manchester Royal Infirmary, Manchester

Background

Sodium hyaluronate (Hyaluronan) is designed as a synovial fluid substitute for use following arthroscopic surgery. In this study we examined the effect of intraoperative subacromial instillation following ASAD, on pain and function.

Methods:

A prospective, randomised, single blinded design was used (Riverside REC: 13/LO0427) to compare the effect of a single post-procedure subacromial instillation of 10ml Hyaluronan, against 10ml saline control. Adult patients were recruited as per eligibility criteria defined in the protocol. All patients had interscalene block along with general anaesthesia, and followed standard postoperative rehabilitation protocol.

A power calculation for a 6-point difference in OSS indicated a minimum sample size of 44. Participants were blinded to the intervention, and assessed using outcome measures; OSS, VAS, EUROQOL and DASH scores, preoperatively and at 12 weeks. Range of movement (ROM) was recorded at 2,6 and 12 weeks. Complications and adverse events were recorded.

Results:

50 participants were recruited, out of which 4 were excluded. This left a cohort of 46 patients for analysis (23M,23F; 24 test, 22 placebo). Both groups showed a mean improvement in OSS of 9 points ($p=0.0001$), DASH (10 points, $p<0.05$), and EUROQOL (0.13, $p<0.05$) and VAS (1.1, $p=0.27$). ROM showed early improvement of forward flexion in the test group; however this was not statistically significant. No significant difference was observed between groups in any of the recorded outcomes. Apart from one case of frozen shoulder in each group, no other complications were noted.

Conclusion:

Whilst both groups showed improved pain and function scores after ASAD, no significant difference was seen between groups receiving placebo or Hyaluronan. No increase in adverse events was recorded suggesting the intervention is safe but, in this study, has not been shown to improve post-operative pain or function over ASAD alone.

14:25 14:33 ELECTROSPUN POLYDIOXANONE (PDO) SUTURES SAFELY INDUCE TENDON HEALING, CELLULAR INFILTRATION, AND NEOVASCULARISATION IN AN IN VIVO LARGE ANIMAL MODEL

Author: M Rashid; S Dakin; S Snelling; R De Godoy; P Alexis-Mouthuy; O Hakimi; N Zargar; J Dudhia; R Smith; A Carr
Institution: Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences (NDORMS), University of Oxford; Royal Veterinary College, University of London

Purpose:

We aimed to evaluate the safety and efficacy of a multifilament electrospun polydioxanone (PDO) suture compared to a traditional monofilament PDO suture for repairing a tendon defect in a non-healing ovine injury model.

Methods:

Longitudinal lesions of the lateral branch of the deep digital flexor tendon of 8 female adult English Mule sheep were repaired by electrospun PDO suture and a traditional PDO monofilament suture (control). All sheep were euthanased at 3 months and tendon tissue was harvested. Haematology and serum inflammatory markers were used to assess a systemic response. Local response was recorded by circumferential limb measurements around the repair site, and by detailed inspection during harvest. Histology was used to assess cellular response to the electrospun and monofilament sutures by comparing fibroblast cell count, foreign body giant cell (FBGC) count, and vascularity grade (0-3). Statistical analysis was used to compare the cellular response of the electrospun and monofilament sutures.

Results:

No tumours or infections were seen at necropsy. All tendon repairs healed. No gross swelling was recorded. We observed a mild local inflammatory reaction around the healed tendons, that were not adherent to the sheath, and surrounded by minimal normal synovial fluid. Electrospun sutures were more densely infiltrated with fibroblasts (89 CI 78-108 vs 16 CI 9-22, $p=0.0002$), and accompanied by new blood vessel formation (2 CI 1.6-2.7 vs 0, $p=0.0002$) compared to the monofilament sutures, which did not demonstrate any cellular infiltration or neovascularisation. FBGCs were rarely seen in all specimens.

Conclusions

We successfully applied electrospun bioactive sutures in an ovine tendon repair model that promoted cellular infiltration and neovascularisation, with no systemic or adverse local inflammatory response at 3 months. This study demonstrated the safety and efficacy of electrospun sutures to repair tendon defects and provides necessary evidence to proceed to a first-in-human clinical trial.

14:33 14:41 DIABETIC PATIENTS HAVE GREATER THAN FOURFOLD RISK OF COMPLICATIONS FROM ARTHROSCOPIC ROTATOR CUFF SURGERY THAN NON-DIABETIC PATIENTS

Author: Z Borton; F Shivji; S Simeen; R Williams; A Tambe; M Espag; T Cresswell; D Clark
Institution: Royal Derby Hospital

Background:

Large population-based studies have demonstrated increased prevalence of rotator cuff disease and arthroscopic cuff repair amongst diabetics. However, there is a paucity of data regarding the impact of diabetes on the outcomes of rotator cuff repair surgery.

Purpose of Study:

To investigate the impact of diabetes mellitus on the complication rate of arthroscopic rotator cuff repair.

Methods:

We undertook retrospective notes review of a consecutive series of arthroscopic rotator cuff repairs performed at a single centre during 2013-2014. Data regarding demographics, diabetes status, and complications defined as infection requiring antibiotics or return to theatre, frozen shoulder, re-tear of the repaired tendon, or repeated/revision surgery were collected and analysed as the primary outcome.

Results:

The search yielded 212 arthroscopic cuff repairs at a mean follow-up of 46.7 months (range 34-67 months) of which 27 (12.7%) were diabetic. Diabetic patients were significantly more likely to suffer complications including infection (11% vs 0.5%, $p=0.007$), frozen shoulder (18.5% vs 5.4%, $p=0.02$), re-tear (33% vs 1.9%, $p=0.003$), and reoperation (29% vs 13.5%, $p=0.02$). These equated to statistically significant odds ratios of 23, 3.97, 2.82, and 3.7 respectively. The proportion of diabetic patients experiencing at least one complication was markedly greater (51.9% vs 20%, $p<0.001$, odds ratio 4.3).

Conclusions:

This study suggests that diabetic patients are over 4 times more likely to experience complications from arthroscopic rotator cuff repair, including greater than threefold risk of frozen shoulder and reoperation/revision surgery and more than double the risk of rotator cuff re-tear.

14:41 14:49 EVALUATION OF A BIODEGRADABLE SUBACROMIAL BALLOON SPACER ON GLENOHUMERAL JOINT BIOMECHANICS IN THE SETTING OF IRREPARABLE SUPERIOR ROTATOR CUFF TEARS

Author: B Canham; R Melvani; M Lobo; B Parks; R Cox; J Abboud; A Murthi

Institution: MedStar Union Memorial Hospital; The Rothman Institute

Purpose:

The purpose of this study was to investigate the biomechanical effects of the biodegradable subacromial balloon spacer on the glenohumeral joint in the setting of irreparable superior rotator cuff tears.

Methods and Results:

Seven fresh-frozen cadaveric shoulders were tested. Each specimen was tested with: intact rotator cuff, simulated supraspinatus (SS) tear, repaired SS tear, repaired SS tear with balloon spacer augmentation, irreparable SS rotator cuff tear simulation, and irreparable SS rotator cuff tear with balloon spacer. Measurements were recorded in 30° external rotation, at 0°, 30°, and 60°. Glenohumeral joint and subacromial space contact pressures and position were measured using a dynamic pressure sensor.

The deltoid force significantly increased by placing the balloon compared to the irreparable supraspinatus tear model. At 0° it increased from 38.6 N to 41.25 N, at 30° from 33.8 N to 37.8 N and at 60° from 25.6 N to 28.5 N. In the balanced load condition: testing irreparable SS rotator cuff tear with balloon spacer significantly inferiorized the center of contact pressure of the glenohumeral joint at 0°, 30° and 60° abduction compared to the irreparable SS tear by 10.6 mm, 8.6 mm and 5.9 mm respectively. At 0° it also increased glenohumeral contact pressure to 105.3 kPa from 49 kPa in the irreparable SS model. The intact glenohumeral contact pressure was 60.7 kPa, which was lower than the balloon plus SS tear. There were no statistically significant differences between total glenohumeral contact pressures at 30° and 60° abduction.

Conclusion:

With irreparable supraspinatus rotator cuff tears, the balloon spacer inferiorizes the center of glenohumeral pressure and increases the overall glenohumeral pressure compared to an irreparable rotator cuff state, re-establishing similar glenohumeral contact pressures and position of the normal intact rotator cuff.

14:50 15:30 LOCAL ORGANISERS GUEST LECTURE
Improving Outcomes in Reverse Shoulder Arthroplasty
Mark Frankle introduced by Andrew Brooksbank

15:30 16:10 COFFEE AND TRADE EXHIBITION

16:10 17:30 SESSION 2: ARTHROPLASTY

CHAIRS: A RANGAN/M FALWORTH

16:10 16:18 RESULTS OF GLENOID BONE GRAFTING TECHNIQUES IN REVERSE SHOULDER ARTHROPLASTY

Author: A Leonidou; C Whitney-Lagen; G Panagopoulos; L Natera; G Sforza; E Atoun; J Bruguera; O Levy

Institution: The Reading Shoulder Unit

Introduction:

Secure fixation of the glenoid component in reverse shoulder arthroplasty (rTSA) with glenoid bone deficiency may be a challenge. Purpose: This study aims to present the clinical and radiological results of bone grafting glenoid defects in reverse shoulder arthroplasty (rTSA)

Methods:

Demographics, radiographs, and surgery data were prospectively collected and analysed. At the final follow up range of motion, subjective shoulder value (SSV) and the Constant Score were recorded. Radiographic analysis was performed in every follow-up.

Results:

Between 2005 and 2017, 34 patients had glenoid bone grafting during RSA. 29 female and 5 male. Average age was 72 years (range 46-88). Indications were: cuff tear arthropathy 6; revision of failed other prosthesis 20; primary osteoarthritis 4; rheumatoid arthritis 3; second stage revision for infection 1. The glenoid defect was contained in 24 patients and therefore impaction graft with a combination of bone graft substitute and / or humeral head allograft or autograft was performed. In 10 patients the glenoid defect was severe and uncontainable and therefore a graft-implant composite glenoid was implanted using humeral head autograft or allograft. Average follow up was 3.6 years (range 1-10). Mean Constant score improved from 34 before surgery to 63 after surgery. Mean SSV score improved from 0.9 to 8.3. Active movements improved significantly with forward elevation increased from 54o to 123o; abduction from 48o to 123o; external rotation from 24o to 38o; internal rotation from 57o to 70o. Radiographs at final follow up showed no lucencies around the glenoid component and no evidence of loosening. In 2 cases there was a grade I notching.

Conclusion:

Impaction grafting of the glenoid or graft-implant composite insertion when needed results in good clinical and radiological outcomes.

16:18 16:26 THE INFLUENCE OF FATTY INFILTRATION AND MUSCLE ATROPHY OF THE ROTATOR CUFF MUSCLES ON MID-TERM FUNCTIONAL OUTCOMES IN TOTAL SHOULDER ARTHROPLASTY AT 6 YEARS FOLLOW UP

Author: GAD Edwards; PAS McCann; PP Sarangi

Institution: Bristol Royal Infirmary

This study reports the functional outcomes at six years follow up in patients with varying degrees of fatty infiltration of the supraspinatus muscle and rotator cuff muscle atrophy who have undergone anatomic total shoulder replacement (TSR).

Retrospective analysis of case notes and magnetic resonance imaging (MRI) scans of patients undergoing TSR for primary gleno-humeral arthritis was performed. Patients were divided based upon their pre-operative MRI findings for fatty infiltration, muscle atrophy and the presence of tendinopathy. Post-operative functional outcomes were assessed using the Oxford Shoulder Score (OSS) and quick disabilities of the arm, shoulder and hand score (Quick DASH). Post-operative measurements were made for active shoulder movements as well as general demographic data.

Thirty-two patients had a complete set of data available for analysis at a mean of 67 months following surgery (mean age 69.9 years). All 32 patients demonstrated fatty infiltration on their pre-operative MRI scan with the majority showing mild changes. Muscle atrophy was also very common with 69 percent of patients demonstrating mild to moderate atrophy of their rotator cuff. Thirty eight percent of patients had tendinopathy and 22% had a partial rotator cuff tear on pre-operative MRI scan.

The median forward flexion was 150 degrees (IQR 127.5-170), external rotation 55 degrees (IQR 45-60), abduction 100 degrees (IQR 90-130) and median internal rotation 90 degrees (IQR 90-100).

Multiple regression analysis performed showed no correlation between the OSS (p=0.443), the Quick DASH (p=0.419), forward flexion (p=0.170), external rotation (p=0.755), abduction (p=0.058), internal rotation (p=0.523) and any of the preoperative independent variables including Fuchs fatty infiltration, Warner atrophy grade, tendinopathy, age and sex.

Fatty infiltration, muscle atrophy and tendinopathy of the rotator cuff muscle on pre-operative MRI scanning have no effect on functional outcome score or functional movement at medium term follow up following anatomic total shoulder arthroplasty.

16:26 16:34 COMPARISON OF CLINICAL OUTCOMES WITH POSTERIORLY AUGMENTED GLENOID COMPONENTS WITH ANATOMIC AND REVERSE TOTAL SHOULDER ARTHROPLASTY

Author: KW Farmer (1); PH Flurin (2); T Wright (1); J Zuckerman (3); S Grey (4); CP Roche (5)

Institution: (1) Univ of Florida, Gainesville, FL; (2) Bordeaux-Merignac Clinic, FR; (3) Hosp Joint Dis, NY; (4) Ortho Center of the Rockies, Fort Collins, CO; (5) Exactech, Gainesville, FL, USA

Introduction:

This study quantifies outcomes achieved using posteriorly augmented aTSA and rTSA glenoid implants in patients with severe posterior wear.

Methods:

168 patients (mean 69.0yrs) with 2 yrs min followup were treated by 8 surgeons using either 8Å° posteriorly augmented aTSA/rTSA glenoid components in patients with severe posterior wear. 83 aTSA patients received 8Å° posteriorly augmented glenoids (mean 66.1 yrs; 33F/50M) for OA and 85 rTSA patients received 8Å° posteriorly augmented glenoids (mean 71.8 yrs; 37F/48M) for treatment of CTA. Outcomes were scored using SST, UCLA, ASES, Constant, and SPADI metrics; abduction, forward flexion, internal rotation score, and external rotation were also measured. Average follow-up was 35.3 months (aTSA 37.4; rTSA 33.2). A two-tailed, unpaired t-test identified differences ($p < 0.05$) in pre-operative, post-operative, and improvements.

Results:

Posterior augment aTSA and rTSA reliably provided pain relief and function with 96.3% of aTSA and 94.0% of rTSA patients rating themselves as being "much better" or "better" prior to treatment. Postoperatively, aTSA patients had significantly better average SST ($p = 0.0111$) and SPADI ($p = 0.0146$) scores and significantly more IR ($p < 0.0001$), active external rotation ($p < 0.0001$), and passive external rotation ($p < 0.0001$) than rTSA patients with posterior glenoid wear. 27.8% of augmented aTSA patients had radiolucent glenoid lines (11 grade 1, 1 grade 2, 1 grade 3, and 1 grade 5). 4.6% of rTSA patients had scapular notching (3 grade 1). 8 complications (0 glenoid loosening) occurred for both cohorts with a similar rate ($p = 0.9727$): aTSA patients had 4 complications (4.8%) and rTSA patients had 4 complications (4.7%).

Conclusions:

These results demonstrate good short term outcomes can be achieved in patients with severe posterior wear using posteriorly augmented aTSA/rTSA glenoid implants. Longer-term follow-up is needed to confirm these positive outcomes.

16:34 16:42 CLINICAL AND RADIOLOGICAL SURVIVORSHIP OF A STEMLESS SHOULDER REPLACEMENT

Author: T McMillan; D Neilly; D Cairns; S Barker; K Kumar

Institution: Aberdeen Shoulder Unit

Background:

Stemless shoulder replacement is an emerging trend in shoulder arthroplasty. The proposed advantages of the stemless humeral component is to allow anatomical positioning of the humeral head prosthesis on the proximal humerus avoiding stem related complications, preserving humeral bone stock and providing good access to the glenoid during implantation.

Objective:

To assess the clinical and radiological outcomes with stemless shoulder arthroplasty.

Design and Methods:

All patients who underwent a stemless Total Shoulder Arthroplasty between 2010-2016 were included in the study. All patients had an uncemented stemless humeral component with a ceramic head and a pegged cemented glenoid prosthesis. Patients were assessed for Range of Motion, Oxford Shoulder Score and overall patient satisfaction. AP and Axillary radiographs were Lazarus scored by two reviewers to assess for radio-lucencies.

Results:

71 (16M:55F) patients, with a mean age 69 (55-82) years, were included. The mean inpatient stay was 3 days. Mean follow-up is 3 years with a maximum follow-up of 6.2 years. At final follow-up the mean active ROMs were 166o(80-180) forward flexion, 134o(60-180) abduction, and 39o(20-60) external rotation. The mean Oxford Shoulder score was 45(18-48). Lucency has been observed in 16 glenoids (Grade; 1(10), 2(5) & 3(1)), with a kappa coefficient of 0.893. There have been no cases of humeral component loosening or failure. Two patients have had revision surgery; one for deep infection, and in one patient with heterotopic ossification.

Conclusion:

We present one of the largest cohorts of stemless shoulder replacements including mid-term clinical and radiological follow-up. The stemless implant appears to provide excellent clinical outcomes, with excellent restoration of range of

motion and function. No humeral components have shown evidence of clinical or radiological lucencies. Although radiological lucencies have been observed in a number of glenoid prostheses, these are non-progressive and have not led to clinical failure or revision.

16:42 16:50 THE STAGED MANAGEMENT OF GLENOHUMERAL JOINT AVASCULAR NECROSIS IN PATIENTS WITH HAEMATOLOGICAL INDUCED DISEASE- A COHORT REVIEW

Author: T Colegate-Stone; I Reichert; K Karuppaiah; A Tavakkolizadeh; J Sinha

Institution: King's College Hospital, London

Purpose:

A formalised or universally accepted radiological classification of glenohumeral joint avascular necrosis (AVN) is not widespread. A sequelae of this is the absence of a staged standardised management of glenohumeral joint AVN. The aim was to propose a simple radiological classification of glenohumeral joint AVN based upon the Association of Research Circulation Osseous (ARCO) principles and use that to stratify treatment.

Methods:

A retrospective review of 45 patients with haematological induced glenohumeral AVN was performed. All patients had AVN secondary to known haematological conditions. Radiographs were used to classify glenohumeral AVN based upon the ARCO principles. Three consultant shoulder surgeons independently assessed these images and inter-observer variation was recorded. The related management plans of these patients were analysed and categorised.

Results:

Analysis demonstrated no patients had stage 0 disease. The percentage of patients with stages 1,2,3 and 4 was 4%, 49%, 18 % and 29% respectively. The inter-observer correlation regarding classification was 0.9. Non-interventional management was the first line treatment in stages 1 and 2. If this failed then an arthroscopic core decompression was used in combination with subacromial decompression. In patients with stages 3 and 4 conservative therapies were initial treatments. If this failed in younger patients arthroscopic joint debridement and capsular release was trialled. However, if patients were older or in those where this approach failed to alleviate symptoms shoulder arthroplasty was advised. There was variation in the type of arthroplasty performed, this was dependant on the individual circumstance.

Conclusions:

The simple radiological classification assessed is useful to the provision of a standardised staged management strategy of glenohumeral AVN. Patients were more likely to seek a surgical opinion if their disease was more progressive. In the earlier stages arthroscopic core decompression should be considered. Arthroplasty should be considered for those with advanced arthritic collapse.

16:50 16:58 EARLY TERM CLINICAL AND RADIOLOGICAL EVALUATION OF THE POROUS TITANIUM PERFORM+ REVERSED GLENOID SYSTEM

Author: K Chin; S Javed; M Imam; P Monga; M Walton; I Trail

Institution: Wrightington, Wigan and Leigh NHS Foundation Trust

Introduction:

The PerFORM+ system (Wright Medical) was developed to address posterior glenoid deficiencies and conserve bone stock with augmented baseplates which were available in standard, lateralised and eccentric positions. The porous titanium baseplate encourages bone in-growth and may reduce the risk of prosthetic loosening with augment.

Purpose:

We aim to report the early term clinical and radiological outcomes of the PerFORM+ reversed glenoid system. Methods Over an 18-month period, 75 reversed shoulder arthroplasties were implanted. Prospective pre and post-operative data were collected. Pre-operative CT scans were carried out to assess glenoid bone stock in 60 patients while post-operative CT scans were performed at 3 to 6 months to evaluate early loosening in 23 patients at the initial stage of the study. The main indication for surgery was cuff tear arthropathy. Thirty-seven patients had a 3mm offset, six patients a 6mm offset and 22 patients a standard offset baseplate. Of these, seven patients also had a posterior augment and two patients had humeral head autografts. A1 (24%), A2 (20%) and B1(16%) were the commonest glenoid deficiencies noted.

Results:

The range of motion improved significantly post-operatively with average abduction of 98 degrees, external rotation of 20 degrees and internal rotation to buttock. All post-operative CT scans showed no sign of early failure or loosening whilst all radiographs showed no loosening at final follow-up. Lateralisation, humeral autograft or augment did not result in early loosening. There was no dislocation or notching in our series. We report three complications, of which two cases were an acromial fracture and one a medial cord plexus injury.

Conclusion:

The PERFORM+ reversed glenoid system provides a versatile platform for addressing glenoid wear and early results are promising with longer term follow-up currently in process.

16:58 17:06 SURGICAL NAVIGATION IN REVERSE TOTAL SHOULDER ARTHROPLASTY: INITIAL EXPERIENCE OF THE FIRST 25 CASES USING THE EXACTECH EQUINOXE GUIDED PERSONALISED SURGERY (GPS) SYSTEM

Author: SD Brookes-Fazakerley; MLT Jayatilaka; Z Hakim; R Parmar; IG Guisasola; M Kent; MG Smith; P Brownson
Institution: Royal Liverpool & Broadgreen University Hospitals NHS Trust

CT navigated Total Shoulder Arthroplasty (TSA) improves accuracy of glenoid implant positioning and screw placement. We report on the largest UK series to date, using the Exactech Equinox Guided Personalised Surgery (GPS) system. Over 12-months, 22 primary and 3 revision cases were performed (16 females, 9 males; average age 65.6 years [range 38-82 years]). Nine patients underwent anatomical TSA, whilst 16 had reverse TSA (3 revision). Pre-operative CT scans demonstrated 3 Walch A1, 8 A2, 7 B1, 6 B2 and 1 type C glenoid. Average glenoid retroversion was 11-degrees (range 2 to 33) with 2 patients being anteverted. Average superior inclination in 16 patients was 12-degrees (range 2 to 30), whilst average inferior inclination was 5-degrees in 8 patients (range 1 to 7). Sixteen patients required augmented implants (9 using the 8-degree posterior, 6 a 10-degree superior and 1 had a 16-degree posterior augment). All reverse TSA base plates achieved insertion of 4 screws with an average length of 30.64mm (range 18 to 42mm). No screws penetrated the scapular notch and the scapular vault was never penetrated by the metaglene cage. Post-operative CT scanning of a cohort of patients demonstrated accurate implantation of the glenoid baseplate to the surgeons desired version and tilt with full bony integration of the baseplate and cage.

Operative duration for primary cases was on average 174 minutes (range 105 to 231). A learning curve demonstrated a slight trend for reducing duration over 12-months. Mean follow-up duration was 7.1 months (range 2 to 14). All cases (primary and revision) mean post-operative scores improved with QuickDASH decreasing by 25 (69.09 to 44.09) and Oxford Shoulder Score increasing by 12 (18 to 30).

We have demonstrated in a complex cohort of patients, reproducible excellent radiological outcomes and good early clinical outcomes using a CT navigated TSA.

17:06 17:14 IMPLEMENTATION OF GIRFT REPORT RECOMMENDATIONS: RESULTS FROM A DISTRICT GENERAL HOSPITAL SHOULDER AND ELBOW UNIT

Author: H Parwaiz; R Whitham; M Flintoft-Burt; A Tasker; D Woods
Institution: Great Western Hospital NHS Foundation Trust

Aims:

We firstly outline how we implemented the "Getting It Right First Time" (GIRFT) recommendations through introduction of an MDT, dual consultant operating, tertiary referral of elbow arthroplasty and renegotiation of shoulder implant procurement. We secondly analyse how these changes influenced patient management, operative complications, numbers referred to tertiary centre, and costs.

Method:

- 1) Implementation of changes
 - a. Pre-admission clinic was replaced by an MDT meeting with two consultant upper limb surgeons, extended scope physiotherapists and a nurse. All non-consultant listed or complex patients were discussed
 - b. We introduced fortnightly dual-surgeon operating for reverse total shoulder replacements (RTSR)
 - c. Total elbow replacements (TER) were referred to our regional tertiary centre d. We actively tendered the contract for shoulder prostheses
- 2) We performed a retrospective electronic casenote review of patients seen within the MDT, recording listing clinician, change to management and its impact on scheduled operating times. Theatre data were obtained from theatre computer records, surgical logbooks and electronic patient records. Patients requiring tertiary referral were prospectively gathered. Hospital costs were assessed using implant costs as provided by our hospital procurement department.

Results:

148 patients attended the MDT, of which 118 provisionally had an operative plan pre-MDT. 24/118 (20%) had their plan changed to non-operative management, 13/118 (11%) had a change of operation, and 6/118 (5%) had further investigation or tertiary referral. This reduced theatre time required by 47 hours; an estimated £55,000 saving. Complications rates for RTSR more than halved following the introduction of dual surgeon operating. Only three TER tertiary referrals were required. Renegotiation of our shoulder implant for a four year deal saved 36% on the previous contract, equating to £43,000 savings.

Conclusion:

Implemented GIRFT recommendations have benefitted patient management, reduced operative complications and lowered implant costs.

17:14 17:22 INTERNATIONAL CONSENSUS FOR MINIMUM RADIOLOGICAL MONITORING AND COMPLICATION REPORTING IN SHOULDER ARTHROPLASTY: COMPLETION OF A DELPHI PROCESS

Author: S Lambert; L Audige; B Salomonsson; P Moroder; J Sperling; R Page; H-K Schwyzer; H Durchholz
Institution: Research and Development, Schulthess Clinic, Zurich, Switzerland

Introduction:

Shoulder arthroplasty (SA) complications require standardisation of definitions: we aimed to reach international consensus on 1) a minimum set of imaging parameters and 2) a core set of adverse events of SA.

Materials and Methods:

We implemented a Delphi process with an international panel of 181 experienced shoulder surgeons. An on-line survey with open questions consisted of two parts: one concerned imaging parameters for SA monitoring and the other covered adverse events. The panel was invited to complete a second survey focusing on imaging parameter definitions, specifications and time points. For closed questions consensus was considered to have been reached when there was at least two-thirds agreement.

Results:

Ninety-six surgeons (53% of invitees) participated. After the first survey, consensus with 91-93% agreement was reached for a core list of local events including 3 intra-operative event groups (device, osteochondral, soft tissue) and 8 post-operative event groups (device, osteochondral, pain, surgical site infection, peripheral neurological, vascular, superficial soft tissue, deep soft tissue). At the second survey, consensus with 91-99% agreement was reached regarding definitions and specifications of 6 radiographic features (implant migration, radiolucency around the implant / implant loosening, signs of shoulder instability, bone resorption / bone formation / osteolysis, implant wear, and scapular notching); 75% agreed for a minimum set of radiographs within one week of implantation as well as at three and 12 months after implantation.

Conclusion:

A structured core set of adverse events of SA and radiographic parameters was developed by international consensus. It will support the standardization of SA monitoring and complication reporting.

17:22 17:30 VIRTUAL ORTHOPAEDIC CLINIC FOR UPPER LIMB ARTHROPLASTY FOLLOW-UP IN A TERTIARY REFERRAL CENTRE

Author: D Butt; A Denton; D Higgs; M Falworth; A Majed; W Rudge
Institution: Royal National Orthopaedic Hospital

Our department is a busy tertiary referral shoulder and elbow unit where annual arthroplasty follow-up often requires costly and long-distance travel for patients. This pilot study outlines the process of implementing a virtual clinic (VC), and assesses patient satisfaction, safety and costs.

Methods:

Trust ethics approval was sought prior to the first-year pilot. A pathway and protocol were developed, and patients were invited to participate in the VC during their routine outpatient review. The format for the VC is a locally performed X-ray requested by the GP followed by a proforma-based telephone review with a clinical nurse specialist (CNS).

Following the VC appointment, a telephone satisfaction survey was performed, which included overall satisfaction, a friends and family test, and time for positive and negative feedback. Conversion back to traditional clinic and adverse events were recorded.

Results:

63 patients were invited to participate. 3 declined, 2 GPs refused to request the x-rays citing workload and governance concerns, and 1 attended the outpatients department in error. 10 patients failed to complete the satisfaction survey. A total of 47 patients were reviewed.

Of those, 87% reported the VC was the same or better than standard follow up and 96% would recommend the VC to friends or family. We are aware of no adverse events or missed diagnoses as a result of the VC. A VC appointment is classed as a telephone review and the cost to GPs was £36 compared to £82 for a standard appointment

Discussion:

This pilot study supports the introduction of a VC model as we found a high satisfaction level, reduced cost to the GP and no adverse events. Some teething problems were encountered but easily rectified by communication with patients and GPs and we are now rolling out the model to a larger proportion of our patients.

Thursday, 21 June 2018

08:00 09:00 MASTERCLASSES (PARALLEL SESSIONS)

MASTERCLASS

Reverse TSR: lateralise or medialise

End-stage shoulder instability

Shoulder stiffness: the role of infection

Peripheral nerve injuries in trauma and arthroplasty

SPEAKERS

M Franke; J Willems

P Millett; J Gibson

L Funk; J Kitson; C Smith

T Hems; M Fox

CHAIRS

K Kumar

A Brooksbank

J McBirnie

CY Ng

09:00 10:00 SESSION 3: ELBOW

CHAIRS: M THOMAS/D CLARK

09:00 09:08 THE CONTRIBUTION OF THE POSTERO-LATERAL CAPSULE TO ELBOW JOINT STABILITY: A CADAVERIC BIOMECHANICAL INVESTIGATION

Author: DS Edwards; MS Arshad; T Luukkala; AE Kedgley; AC Watts

Institution: Wrightington Hospital, Wrightington, Wigan and Leigh NHS Trust

Elbow postero-lateral rotatory instability occurs following an injury to the lateral collateral ligament complex (LCLC) in isolation or in association with an osteochondral fracture of the postero-lateral margin of the capitellum (Osborne Cotterill lesion). The contribution of the posterolateral capsule of the capitellum to elbow stability is unknown.

This study quantifies the displacement of the radial head on simulated posterior draw with sectioning of the posterior capsule (OCL) or LCLC.

Biomechanical testing of the elbow was performed in 8 upper limb cadavers. With the elbow in varying degrees of flexion (0, 30, 60 and 90) posterior displacement of the radius was measured at increments of 5N of load up to 50N. Resection of the OCL and LCLC was then performed. Resection of the OCL results in significantly more displacement of the radial head compared to the intact elbow at 30 to 60 of elbow flexion. LCLC resection confers significantly more displacement. Resection of the OCL after LCLC resection does not create further displacement.

The degree of radial head displacement is greater following an isolated sectioning of the OCL at 30 to 60 of flexion compared to the intact elbow with the same load, but not as great as seen with sectioning of the LCLC. This study suggests that the posterior capsule attaching to the back of the capitellum is important to elbow stability and should be identified as the Osborne-Cotterill Ligament. Clinical studies are required to determine the importance of these biomechanical findings.

09:08 09:16 OUTCOMES FOLLOWING REVISION OF THE REVISION ELBOW ARTHROPLASTY

Author: P Domos; S Patel; M Papanna; D Stanley; A Ali

Institution: Northern General Hospital, Sheffield

Purpose:

There is very little in the literature on the outcomes of Revision of Revision Elbow Arthroplasty (RREA). Our aim was to report the outcomes of this rarely performed procedure.

Methods:

Retrospective identification of all patients who had undergone RREA between 2010 and 2016. Outcomes were assessed clinically using number of validated systems and radiographs were reviewed for prosthesis alignment, cementation by Morrey grading and heterotrophic ossification (HO).

Results:

Twenty-four patients were identified as having RREA. Sixteen patients were available for assessment (4 died from unrelated causes, 2 were uncontactable, 2 declined due to travel difficulties). Mean age was 73 (57-83) years with a mean follow up of 54 (24-92) months. Mean number of previous revision arthroplasty procedures per patient was 2.2 (1-5). The average survival of previous revision implants was 48 months (13-149). Indications for RREA: aseptic loosening (60%), bushing wear (16%), fracture (14%) and infection (10%). 30% required extra-long or custom-made implants and 50% needed allograft augmentation.

At clinical assessment 56% had triceps insufficiency, mean flexion-extension arc was 110 degrees, mean pronosupination of 90 degrees. The functional elbow scores revealed good outcomes in the majority (mean scores: VAS 4, OES 30, MEPS 66, QuickDash 42). 80% were satisfied with their RREA. Complications included infection in 2 (1 superficial, 1 deep), sensory ulna nerve symptoms in 2, radial nerve injury in 1, bushing wear in 1. No RREA in this series has required further revision. One patient required ulna nerve release. Radiological review revealed overall prosthesis alignment and cementation was adequate in 80%, asymptomatic loosening in 2 patients (humeral component). HO was present in 38% of cases.

Conclusions:

RREA is a satisfactory treatment option in these complex cases with good short to mid-term survival rates but with a relatively high complication rate.

09:16 09:24 THE EFFECT OF OBESITY ON IMPLANT SURVIVAL RATES IN PRIMARY TOTAL ELBOW ARTHROPLASTY

Author: V Jones; D Potter; D Thyagarajan; D Stanley; A Ali

Institution: Sheffield Shoulder and Elbow Unit

Purpose:

The prevalence of adult obesity in the United Kingdom has increased in recent years (15% in 1993 to 27% in 2015). The aim of this study was to evaluate the effect of obesity on implant survival rates in patients undergoing primary Total Elbow Arthroplasty (TEA).

Methods:

A retrospective review of all patients undergoing primary or revision Elbow Arthroplasty in our unit from 1993 to 2016. Survivorship of the original TEA was calculated using the Kaplan-Meier method, with revision surgery classed as the end-point for implant failure. The results were analysed to assess whether obesity affected the survivorship of primary TEA.

Results:

Data on 194 primary TEAs performed in 167 patients was analysed. Mean patient age at the time of surgery was 61.57 years (28-93). Mean Body Mass Index (B.M.I.) was 21.56 (17.5-50).

The majority of TEAs (72%) were performed in women. Indications for TEA included: inflammatory arthritis in 121 (62%), trauma and trauma sequelae in 58 (30%) and the remaining 8% were performed for osteoarthritis, haemophilic arthropathy or neurological disorders.

133 patients (68.5%) had a B.M.I. of <30 kg/m² (non-obese) and 61 patients had a B.M.I. of ≥30 kg/m² (obese). Mean time to review was 8.5 years with a minimum of 2 years and longest being 25 years.

At the time of this review 102 (52.5%) of the primary TEAs had undergone revision. Overall 5, 10 and 15 year implant survival rates for TEA was 75%, 53% and 40.5% respectively. Sub-group analysis showed 5, 10 and 15 year implant survival rates in non-obese patients were 82%, 64% and 48% compared with 61%, 27% and 25% in obese patients (p < 0.01).

Conclusion:

This study shows that obesity adversely affects TEA survival rates and should be given serious consideration when discussing treatment options with the patient.

09:24 09:32 ARE ULTRASOUND GUIDED PLATELET RICH PLASMA (PRP) INJECTIONS A VIABLE ALTERNATIVE TO OPEN RELEASE FOR LATERAL EPICONDYLITIS?

Author: D Neilly; T Mcmillan; K Hamlin; T Gardner; D Cairns; K Kumar; S Barker

Institution: Aberdeen Upper Limb Unit, Woodend Hospital

Objective:

To assess the outcomes of lateral epicondylitis treated with ultrasound guided Platelet Rich Plasma (PRP) injection compared to open release.

Background:

Open release is reserved for patients who have failed conservative management, including physiotherapy and historically corticosteroid injection. The role of PRP injections have recently been explored, with encouraging results.

Design and Methods:

This was a single centre cohort study. All patients had recalcitrant lateral epicondylitis. PRP was injected into and around the common extensor origin under ultrasound guidance. A standard open tennis elbow release was performed elevating the common extensor origin from the lateral epicondyle. Patients were assessed with the Disabilities of the Arm, Shoulder and Hand (DASH) Score. The primary outcome measure was DASH score at 1 year.

Results:

36 (17F:19M) patients were recruited, with 18 in each treatment group. The mean age was 50 years (range 34 to 69). The mean pre-treatment DASH score was 42.0 (11.7-80.8) in the PRP group and 45.8 (28.3-81.6) in the open release group. At 1 year the PRP mean DASH score was 25.3(range 2.5-75), an improvement of 16.7. The open release group mean DASH score was 17.5(range 0-67.3), an improvement of 28.3. Both groups showed a significant improvement in DASH scores at 1 year (p<0.001). Although the improvement in DASH score was greater in the open release group, this was not statistically significant (p=0.37). None of the open release patients went on to have a further procedure, however 5 patients in the PRP group went on to have open release. No complications were noted in either group.

Conclusion:

Both PRP injections and open surgical release are effective in the treatment of lateral epicondylitis. PRP injection offers a cheaper and less invasive approach that should be considered as an alternative to open release.

09:32 09:40 COMPLICATIONS OF OLECRANON FRACTURE FIXATION: TENSION BAND WIRES VS OLECRANON PLATES

Author: M Hampton; S Vollans; A Ali

Institution: Sheffield Teaching Hospitals NHS Foundation Trust

Purpose:

To report on the complications of the surgical treatment of displaced Olecranon fractures comparing Tension Band Wiring (TBW) and internal fixation using a locking plate (Plating).

Methods:

Retrospective analysis of 216 olecranon fractures requiring operative intervention. Data collected included patient demographics, classification of the fracture using AO, Mayo and Schatzker and all complications.

Results:

Of the 216 fractures analysed the most common fractures encountered were Mayo 2A in 97 (45%) and Mayo 2B in 63 (23%). 145 fractures were treated with Plating and 71 with TBW. Complications requiring re-operation in the Plating group included: removal of metal work in 21 (14%), deep infection/wound breakdown in 7 (4.8%), failed fixation requiring revision in 6 (4.1%) and 1 peri-implant fracture. Other complications in this group included superficial infection and olecranon 'cut-out' which did not require re-operation. Complications requiring re-operation in the TBW group included: removal of metal work in 15 (21%) and deep infection 2 (2.8%). Comminuted fractures treated with TBW had a 59% rate of wire migration. No difference in wire migration rate was observed whether longitudinal wires were placed down the intramedullary canal of the ulna or engaged in to the anterior cortex. Both the plating and TBW groups were associated with the same total re-operation rate of 24%.

Conclusion:

Re-operation rates for TBW and plate fixation were identical within our case series. We found higher rates of the more significant complications with plate fixation including deep infection, wound breakdown and olecranon 'cut-out'. In comminuted fractures, TBW leads to high rates of wire migration. From this case series we advocate the use of TBW over plate fixation in non-comminuted olecranon fractures. Care must be taken when choosing Plating over TBW, as the complications encountered are often more significant.

09:40 09:48 MEDIUM-TERM OUTCOMES OF DISTAL HUMERUS HEMIARTHROPLASTY FOR TRAUMA

Author: AB Scrimshire; LJP Mcentee; JR Williams

Institution: Royal Victoria Infirmary, Newcastle upon Tyne

Introduction:

The management of complex intra-articular distal humerus fractures remains controversial. The total elbow replacement offers a solution for unreconstructable fractures, but there remains concern over implant longevity. The distal humerus hemiarthroplasty is emerging as a possible alternative.

We aim to review the outcomes of distal humerus hemiarthroplasties for trauma in our English level 1 trauma centre.

Methods:

Case notes were reviewed and outcomes scores obtained prospectively for all patients receiving a distal humerus hemiarthroplasty for trauma, between December 2011 and February 2017.

Results:

In total 8 patients, 6 female, with a mean age of 73.5 years, had their osteoporotic distal humerus fractures treated with a distal humerus hemiarthroplasty. 7 were available for follow up, the mean follow up period was 13.5 months. The mean flexion of the affected elbow was 130° (range 110-140°), the extension deficit was 21.3° (range 10-30°), the pronation was 85° (range 80-90°) and the supination was 85° (range 80-90). No intra-operative or post-operative complications

were seen. No re-operations have occurred. There was no obvious loosening or osteolysis at follow up. Mean DASH and Oxford elbow scores were 37.3 (21.7-75) and 32.3 (12-44) respectively.

Conclusions:

Distal humerus hemiarthroplasty seems to give good short to mid-term outcomes for the management of complex osteoporotic distal humerus fractures. This offers a potential alternative to total elbow arthroplasty in the elderly, but more active patients for whom a total elbow may not be appropriate in the first instance. Later conversion to a total elbow may be possible but has not yet been required in our cohort.

09:48 09:56 MANAGEMENT OF TENNIS ELBOW: A SURVEY OF UK CLINICAL PRACTICE

Author: M Bateman; AG Titchener; DI Clark; AA Tambe

Institution: Derby Shoulder Unit

Background:

Tennis elbow is a common condition in the UK but there are no guidelines on how best to manage the condition. The purpose of this study was to establish the current UK practice in managing patients with chronic tennis elbow (symptoms over six months).

Methods:

A cross sectional online survey of UK surgeons and therapists was conducted in June 2017, remaining active for one month. This was comprised of 17 questions and was hosted by Google Forms. The questionnaire was distributed to professional contacts and was sent directly to members of the British Society for Surgery of the Hand following review by their research committee. In addition it was advertised via social media and the Chartered Society of Physiotherapy online message board.

Results:

275 responses were received from a wide geographical area, the majority from consultant surgeons and experienced physiotherapists. 81% recommended exercise-based physiotherapy as the first line intervention, with 9% recommending corticosteroid injection. Second line treatments varied widely with corticosteroid injections the most popular (27%) followed by shockwave therapy, Platelet-Rich Plasma injection, surgery, acupuncture and a wait-and-see policy. Surgery was advised by 1% as a first line option and 10% as second line.

Discussion:

There is wide variability of treatments offered when physiotherapy fails patients with tennis elbow. The majority of second line interventions lack evidence to support their use and in the case of corticosteroid injections may even be harmful in the long term. There is a clear need for national guidance based on best evidence to aid clinicians in their treatment approach.

10:00 10:30 COFFEE AND TRADE EXHIBITION

10:30 11:25 HOT TOPIC SESSION

10:30 10:40	NJR and GIRFT update	J Rees
10:40 10:45	BESS Clinical trials update	A Rangan
10:45 10:50	Professional practice update	M Thomas
10:50 11:00	Tariff update	R Kulkarni
11:00 11:10	BESS Past	WA Wallace
11:10 11:20	BESS Present	R Kulkarni
11:20 11:25	BESS Future	P Brownson

11:25 12:00 CSAW SESSION

11:25 11:45	Results	A Carr
11:45 11:50	BESS report and CCGs	P Brownson
11:50 11:55	Further guidelines and CCG issues	R Kulkarni
11:55 12:00	Questions and answers/discussion	

12:00 12:40 PRESIDENTIAL GUEST LECTURE
RC repair - state of the art in 2018
Peter Millett introduced by Peter Brownson

12:40 14:00 LUNCH AND TRADE EXHIBITION

14:00 15:05 SESSION 4: INSTABILITY

CHAIRS: J REES/M HOLT

14:00 14:08 PSYCHOLOGICAL CO-MORBIDITIES ASSOCIATED WITH TYPE II/III SHOULDER INSTABILITY

Author: S Burns; M Lebe; W Rudge; D Higgs; M Falworth; A Majed

Institution: The Royal National Orthopaedic Hospital

The aim of this study was to determine the prevalence and severity of mental health issues in patients with atraumatic shoulder instability (Stanmore II/III) and hence the burden of psychological problems, contributing to problematic recurrent instability presentations.

Patients treated at the study institution from 2014 onwards for type II/III shoulder instability were identified from consultant log books, admissions and physiotherapy databases. A self assessment questionnaire was completed including medical history, the Stanmore percentage of normal shoulder assessment (SPONSA), Disability of the Arm, Shoulder and Hand (DASH), The Self Harm Inventory (SHI) and Becks Depression Inventory II (BDI-II). Simple T tests and linear regression were performed to determine the relationship between depression and DASH/SPONSA scores.

Depression and anxiety were reported by 35.9% and 23.4% of the 64 patients included respectively. Deliberate self harm was reported by 15.6% of patients yet 100% of respondents confirmed at least one behavior in the SHI. These included alcohol abuse (34%), cutting themselves (30%) and preventing wound healing (22%). Concerningly, 17% reported having attempted suicide. There was a significant association between depressive symptoms and shoulder instability $p < .004$. A linear regression equation found significant correlation between severity of depressive symptoms and degree of shoulder disability $p < .001$.

Public Health England estimated UK prevalence of depression in 2012 to be 2.48%, markedly lower than reported by our cohort. Furthermore 6.7% of the UK population have attempted suicide compared to 17% of our patient set. The degree of shoulder instability quantified by DASH and SPONSA correlated significantly with degree of depression. We propose mental health screening should be performed during initial assessment of patients with atraumatic shoulder instability and treatment provided in an MDT setting, including psychology and psychiatric services.

14:08 14:16 A DOUBLE DOG BONE AC RECONSTRUCTION WITH RETURN TO CONTACT SPORT

Author: G Hoy; M Yalozis; M Smith

Institution: Melbourne Orthopaedic Group, Monash University

We aimed to test the hypothesis that a commercial double armed coraco-clavicular stabilisation technique is strong enough to withstand early return to contact sport without the need for a second operation as required by a hook plate.

We have developed and utilized a technique of using a single sub-coracoid dog bone device with 2 Fibretape loops leading to a medial and lateral dog bone respectively over the clavicle. These are covered with a double-breasted flap of trapezius over deltoid to bury the knots.

Out of a group of 45 patients we singled out 12 Australian Rules Football professional players in a single surgeon group, returning to high impact contact sport at an average of 7 weeks post-surgery. As well as testing using a specific score for the AC joint (SACS), we measured performance during 1st Grade professional games to assess involvement in the game and found ratings were similar to pre-operative player ratings per game, despite an accelerated return to sport program.

We recommend this double armed coraco-clavicular stabilisation for acute high grade AC joint instability as a technique for high level contact athletes wanting an early return to elite sport.

14:16 14:24 MEDIUM-TERM OUTCOME OF SHOULDER STABILISATION IN ADOLESCENT MALES

Author: WM Oliver; P Hindle; D MacDonald; J McBirnie

Institution: Royal Infirmary of Edinburgh

Background:

Adolescent males are considered to be at increased risk of recurrent instability following shoulder stabilisation surgery, however there are minimal data regarding their longer-term outcome. The aim of this study was to determine outcome and revision rate in males aged 18 years and under.

Methods:

A retrospective review was conducted to include all males aged 18 and under that had undergone shoulder stabilisation under the care of the senior author; professional athletes were excluded. Data were collected on mechanism of initial injury, pre-operative symptoms and technical details of surgery. Patients were contacted by telephone to complete a standardised shoulder survey, including details of post-operative symptoms and sporting participation.

Results:

Between 2000 and 2017, 34 males aged 18 years and under underwent shoulder stabilisation. 33 patients (97.1%) sustained a definite traumatic injury, the majority (72.7%) occurred playing rugby. 31 patients (91.2%) underwent arthroscopic stabilisation and three (8.8%) underwent open stabilisation. Median age at surgery was 17.4 years (14.0 to 18.9). 32 patients (94.1%) were contacted by telephone, and median follow-up was 79.2 months (10.1 to 209.7). 23 (71.9%) of these had on-going symptoms: pain, n=10 (31.3%); stiffness, n=17 (53.1%); instability, n=7 (21.9%). Three (9.4%) had a re-dislocation following surgery, at a median of 9.7 months (8.1 to 79.6); one required open revision stabilisation, at 14.2 months post-operatively. Two additional patients required revision surgery for other reasons, at 38.7 and 63.0 months post-operatively; the overall revision rate was 9.4%. Although 27/34 (79.4%) returned to their pre-injury sport, only 17 (50%) returned to the same level of participation.

Conclusions:

The majority of adolescent male patients undergoing shoulder stabilisation obtained shoulder stability, and the majority returned to their pre-injury sport, albeit some at a less competitive level. This study suggests undertaking shoulder stabilisation in adolescent males is both safe and effective.

14:24 14:32 MANAGEMENT OF ATRAUMATIC SHOULDER INSTABILITY - UPDATED RESULTS OF A STRUCTURED PHYSIOTHERAPY PROGRAMME.

Author: M Bateman; S Osborne; BE Smith

Institution: Derby Shoulder Unit

Background:

There is limited published evidence to guide physiotherapists when treating patients with atraumatic shoulder instability. The aim of this study was to update the results of a previous small service evaluation investigating the outcomes for patients following a specific structured physiotherapy programme.

Method:

A service evaluation was conducted at our unit from August 2013, when the programme was introduced, up until December 2017. Patient reported outcome data was compared from final follow up to baseline using the Western Ontario Shoulder Index (WOSI) and the Oxford Instability Shoulder Score (OISS) analysed using the Wilcoxon Signed Rank Test.

Results:

51 patients were treated during this period. There were 16 males and 35 females with mean age 21.6 years. Mean symptom duration was 29 months prior to treatment. One patient had a congenital hand deformity so could not perform the exercises and another likewise due to multiple joint pathologies. Both were excluded from the analysis. 9 failed to complete treatment but their OISS data could be included in analysis. The 40 patients who completed treatment attended on average 6 times (3-16) over 26 weeks (6-80). Mean WOSI score improved from 42.04 to 82.91 ($p<0.001$). Mean OISS improved from 39.27 to 23.47 ($p<0.001$). For the 9 patients that failed to complete treatment mean OISS improved from 41.89 to 33.86 ($p<0.05$) with 6/9 showing improvement. 2/9 failed to attend after the first session. Only one patient who attended 3 times over 11 weeks failed to improve on the OISS.

Conclusion:

For patients with atraumatic shoulder instability this structured physiotherapy programme results in improved levels of pain, stability and function but does require adherence from patients. Long term outcomes for this treatment regime still need to be investigated.

14:32 14:40 THE IMPORTANCE OF HORIZONTAL STABILITY IN THE TREATMENT OF ACROMIOCLAVICULAR INSTABILITY - A SYSTEMATIC REVIEW

Author: RW Jordan; S Malik; A Saithna

Institution: University Hospitals Coventry & Warwickshire; Royal Orthopaedic Hospital, Birmingham; Nottingham Trent University and Renacres Hospital

Introduction:

Acromioclavicular joint reconstruction is a well-established and frequently performed procedure. Recent scientific and commercial interest has led to a drive to develop and perform surgical techniques that more reliably restore horizontal stability in order to improve patient outcomes. The aim of this systematic review was to evaluate the biomechanical

evidence for procedures directed at restoring horizontal stability and determine whether they are associated with superior clinical results when compared to well-established procedures.

Methods:

A review of the online databases Medline and EMBASE was conducted in accordance with the PRISMA guidelines on the 23rd December 2017. Biomechanical and clinical studies reporting either static or dynamic horizontal displacement following any AC joint reconstruction were included. In addition, biomechanical and clinical studies reporting outcomes after augmentation of the AC joint were included. The studies were appraised using the Methodological index for non-randomised studies tool.

Results:

The search strategy identified 20 studies eligible for inclusion; six biomechanical and 14 clinical studies. Comparative biomechanical studies demonstrated that AC augmentation provided increased horizontal stability compared to CC reconstruction, Weaver Dunn procedure or the native joint. Comparative clinical studies demonstrated improved stability in terms of the TAFT score ($p=0.018$) and ACJI score ($p=0.0001$) after AC augmentation compared to CC reconstruction. In addition, one study demonstrated radiological dynamic instability to be significantly lower after AC augmentation (25% versus 71%, $p=0.011$) However no significant differences were demonstrated in terms of functional outcomes, complication rates or revision rates between the groups.

Conclusion:

Augmentation of the AC joint has been shown to provide improved horizontal stability in both biomechanical and clinical studies compared to isolated CC reconstruction. However, a significant advantage with respect to clinical outcomes has not been demonstrated.

14:40 14:48 MANAGEMENT OF FUNCTIONAL THORACIC OUTLET SYNDROME USING BOTULINUM TOXIN AND OPEN RELEASE OF PECTORALIS MINOR. A CASE SERIES

Author: MD Jones; OW Donaldson

Institution: Yeovil District Hospital

Aim: To explore whether patients with functional thoracic outlet syndrome, who had been unsuccessfully managed conservatively can experience improvement of symptoms from surgical release of the pectoralis minor tendon.

Method:

Three patients attended our institution with symptoms indicative of functional thoracic outlet syndrome. Two had previously been assessed by a vascular surgeon with expertise in treatment of Thoracic outlet syndrome. One had undergone bilateral surgical excision of cervical ribs, which had been successful on one side but not the other, the second who had bilateral symptoms had not undergone surgery due to insufficient evidence of structural cause for her symptoms. The third patient developed functional thoracic outlet syndrome following greater tuberosity fracture.

All three patients had undergone significant periods of rehabilitation with experienced physiotherapists and had only experienced temporary improvement of symptoms. It was considered in all three cases that overactivity of pectoralis minor was the main limiting factor to resolution of symptoms and hypothesised that preventing this muscle from acting would improve symptoms. Pectoralis minor is frequently released during Laterjet procedures without adverse consequence, however to ensure that surgical release would have the intended effect we carried out ultrasound guided injection of Botulinum toxin to the pectoralis minor muscle as an improvement test. All three patients had short term improvement in symptoms following injection, we therefore carried out surgical release to four pectoralis minor tendons with a period of rehabilitation afterwards. Pre and post-operative Oxford shoulder scores were carried out to assess the effectiveness of intervention. All three patients reported significant symptom improvement post procedure.

Conclusion:

Physiotherapists need to consider pec minor overactivity as a potential cause for Functional thoracic outlet syndrome. In recalcitrant cases surgical release could be appropriate. We recommend ultrasound guided injection of botulinum toxin prior to surgical release to ensure surgery is appropriate.

14:48 14:56 INSTANT IMPROVEMENT OF SCAPULAR WINGING FOLLOWING NEUROLYSIS OF LONG THORACIC NERVE FOR CHRONIC SERRATUS ANTERIOR PALSY

Author: CY Ng

Institution: Wrightington Hospital, Wrightington, Wigan and Leigh NHS Foundation Trust

Purpose:

To present videographic outcome of scapular winging following neurolysis of long thoracic nerve (LTN) for chronic serratus anterior (SA) palsy.

Methods:

This was a retrospective review of a single surgeon's experience in exploration of LTN. Patients with scapular winging secondary to isolated LTN palsy (minimum 6 months duration) were offered decompression of the thoracic LTN if they failed to improve with physiotherapy, deemed the disability unacceptable and declined further observation. Video recordings of scapular motions were performed pre- and post-operatively. Improvement was considered instant if there was noticeable reduction of scapular dyskinesia and/or 50% increase in active forward flexion/abduction within 24 hours of surgery.

Results:

Between December 2014 and January 2018, 25 patients underwent neurolysis of the thoracic part of the LTN. There were 13 females and 12 males with a mean age of 36 years (range 15-66). Two were postsurgical. 11 saw a neurologist. At the latest review, 12 (48%) had complete resolution of scapular winging, 10 (40%) had partial improvement, 2 (8%) had no change, 1 (4%) had recurred after initial complete recovery. Apart from one patient who complained of numbness around the scar, no major complication had occurred.

A unique group of 11 (44%) patients experienced instant improvement of scapular movement and/or shoulder motion postoperatively. Their duration of scapular winging ranged from 6 months to 10 years, with 9 of them over 2 years. 9 recalled a traumatic onset. Preoperative EMG of SA was abnormal in all patients, except one.

Conclusion:

LTN palsy does not always recover spontaneously. In patients with LTN palsy who have failed conservative treatment, neurolysis of the thoracic LTN can be an effective treatment. It is a safe procedure with minimal morbidity. Some patients, particularly those with a traumatic onset, may experience instantaneous improvement despite a chronic history.

14:56 15:04 DOES ACHIEVING BESS GUIDELINES FOR THE MANAGEMENT OF FIRST TIME ANTERIOR SHOULDER DISLOCATION RESULT IN BETTER MANAGEMENT FOR ALL PATIENTS?

Author: M Argyropoulos; MLT Jayatilaka; R Parmar; I Guisasaola ; M Kent; MG Smith; J Gibson; P Brownson

Institution: Royal Liverpool and Broadgreen University Hospitals NHS Trust

Our aim was to improve our unit's adherence to the BESS Traumatic Anterior Shoulder Instability Pathway through Virtual Fracture Clinic (VFC) and the creation of a shoulder instability clinic.

An audit of management of 36 consecutive first time anterior shoulder dislocation patients, prior to the creation of a shoulder instability clinic, was performed from February to October 2016. A patient pathway was created based on the BESS guidelines. This was administered through the VFC and a weekly shoulder instability clinic was set up. This clinic was staffed with shoulder consultants and had immediate access to ultrasound scans (USS) and specialist physiotherapists. The audit cycle was repeated from March to September 2017 yielding 22 patients.

The results showed improvement in adherence to the BESS guidelines. Early referral for physiotherapy occurred in 91% of patients. 100% of patients had an appointment to see an upper limb consultant within 6 weeks (mean 16 days). 100% of patients undergoing arthroscopic stabilization had this within 6 months. 78% of patients over 40 years of age had an USS at their first clinic appointment and cuff repair surgery was performed at a mean of 7.7 weeks when required. However, there was a very high non-attendance rate in those aged below 40. 100% of patients aged 25-40 did not attend follow up and 83% of the sub 25 age group did not attend follow up.

We conclude that the combination of VFC and an instability clinic has resulted in significant improvements in terms of recommended early management of the first time anterior shoulder dislocation. However, this has resulted in a waste of resource particularly in the 25-40 age group and would indicate that this age group should be managed primarily with physiotherapy and referral into a specialist clinic only if required.

15:05 15:35

COFFEE AND TRADE EXHIBITION

15:35 17:30

BESS ANNUAL GENERAL MEETING (MEMBERS ONLY)

18:00 19:00

DRINKS RECEPTION – SCOTTISH EVENT CAMPUS

19:00 23:00

BESS PRESIDENTS DINNER (INVITED GUESTS ONLY) – ROYAL COLLEGE OF PHYSICIANS AND SURGEONS OF GLASGOW

Friday, 22 June 2018

08:00 09:00 MASTERCLASSES (PARALLEL SESSIONS)

MASTERCLASS

Tennis elbow: evidence based management
Optimising outcomes in proximal humeral fractures
Cuff tendinopathy: cure versus surgery
AC Joint reconstruction and failure

SPEAKERS

A Watts; S Barker; J Thomas
CM Robinson; A Brooksbank
A Cools; A Carr; R Townsend
J Geoghegan; M Falworth

CHAIR

L Rymaszewski
M Robinson
N Millar
C Elias-Jones

09:00 10:20 SESSION 5: PHYSIOTHERAPY

CHAIRS: C CONNOR/P JENKINS

09:00 09:08 THE ROLE OF THE KINETIC CHAIN IN SHOULDER REHABILITATION: DOES INCORPORATING THE TRUNK AND LOWER LIMB INTO SHOULDER EXERCISE REGIMES IMPROVE SHOULDER MUSCLE RECRUITMENT PATTERNS? - A REVIEW OF EMG STUDIES

Author: E Richardson; J Gibson; J Lewis; K Ginn; C Morgan; G Yeowell
Institution: Manchester Metropolitan University

This systematic review investigates the addition of lower limb and trunk motion into shoulder rehabilitation exercises on EMG muscle activity around the shoulder complex. The research question was informed by the PICOS criteria and conducted in accordance with the PRISMA guidelines. EMG studies investigating both kinetic chain (KC) and non-kinetic chain (nKC) exercises under the same experimental conditions in healthy adults were included. Studies conducted on wheelchair users or solely investigating KC shoulder exercises without a nKC exercise variant were excluded.

Application of the inclusion/exclusion criteria generated 12 studies for final analysis. 204 subjects and 85 exercises were evaluated, including 45 KC and 40 nKC exercise variants. The muscle groups investigated included LT (n=11), SA (n=11), UT (n=10), MT (n=4), AD (n=5), IS (n=4), PD (n=3), SS (n=2), LD (n=2), Subscap (n=1), MD (n=1), PM (n=1), BB (n=1), External Oblique (n=1), Glute Max (n=1) and the Femoral Adductors (n=1). Methodological quality of studies was evaluated using the Modified Downs and Black Assessment, the ROBINS-1 tool and a novel peer reviewed EMG methodological quality evaluation tool developed by the authors of this review. Moderate to high evidence supports the notion that incorporating the KC into shoulder rehabilitation exercises enhances Axioscapula muscle recruitment and yields more favourable UT/LT and UT/MT muscle ratios when compared to nKC exercise variants. Low level evidence suggests that incorporating the KC reduces the demands on the rotator cuff muscles when compared to nKC exercise variants. Lower quadrant weight transference appears to be the most important KC variant and surface EMG values for SA, LD and IS must be interpreted with caution.

The results of this systematic review suggest that the KC - when incorporated into shoulder rehabilitation exercises - assists in the manipulation of Axioscapula muscle recruitment, trapezius muscle ratios and the demands on the rotator cuff.

09:08 09:16 PATIENTS SATISFACTION WITH AWAKE SHOULDER SURGERY

Author: R Taranu; Jenner L; R Dhanancheyan; A Mathews; R Jeavons
Institution: North Tees and Hartlepool NHS Trust

The purpose of this study is to assess the experience and overall satisfaction of patients who underwent shoulder surgery under regional anaesthesia alone, where the perceived advantages are quick recovery, early patient discharge and avoidance of side effects related to general anaesthesia.

We prospectively identified consecutive patients who met the inclusion criteria (adults undergoing awake shoulder surgery) and invited them to fill in a satisfaction questionnaire immediately following their surgical intervention. The main components of the questionnaire were anxiety level, satisfaction with block insertion, pain level during surgery and overall experience measured on a Likert scale between 0-10.

42 consecutive patients completed the survey postoperatively with an equal distribution between males and females. A large spectrum of operations was performed under regional anaesthesia including total shoulder replacement, arthroscopic rotator cuff repair, capsular release or excision of distal clavicle. 4 patients (10%) were extremely anxious prior to surgery, but all were completely satisfied with being awake during the procedure. 6 patients (14%) experienced some pain but 5 of them did not consider this as being significant and were extremely satisfied with being awake during surgery. 26 patients (62%) stated that neither the block insertion nor the surgery caused them any anxiety. Overall satisfaction was 9.90 and all patients (100%) would recommend regional anaesthesia.

We conclude that awake shoulder surgery is positively accepted by all patients and our results strongly support it as an effective form of anaesthesia for all shoulder procedures.

09:16 09:24 A CONSULTANT LED AND DELIVERED SHOULDER AND ELBOW COMMUNITY TRIAGE, ASSESSMENT AND TREATMENT SERVICE DELIVERS EFFICIENT PATIENT PATHWAYS AND IMPROVES PRIMARY CARE REFERRAL QUALITY

Author: V Patel; B Gooding

Institution: Nottingham NHS Treatment Centre Circle

Purpose:

To assess the impact of a consultant led integrated community triage, assessment and treatment service (ICATS) 14 months after inception on referral quality, cost efficiency, patient pathways and satisfaction.

Method:

Under a capitated budget a specialist shoulder and elbow ICATS service was instituted for all primary care referrals requesting secondary care opinion for a CCG. The service is consultant led and delivered in conjunction with a specialist physiotherapist. Referrals were triaged during clinic time and onward referral options included; community assessment and treatment clinic, direct to secondary care, physiotherapy or return to GP. Investigations felt appropriate were requested from triage prior to clinic appointment.

Results:

During the period of July 2016 to September 2017 a total of 458 GP referrals were triaged 95 % within 14 days.

Initial Triage Outcomes:

0.76% rejected, 31.5% directly referred to diagnostics, 9.35 % referred directly to secondary care. From months 1-3 to months 12-14 of the service GP referrals rejected improved from 2% to 0% and there was a reduction from 37.7% to 4.7% of patients needing to be sent directly for imaging from triage as GP's had already arranged this prior to referral.

Community Clinic Patient Outcomes:

21% sent for physiotherapy, 12.6% for further diagnostic imaging, 18.8% received a cortisone injection, 4.2% had a clinic/ telephone follow up, 12.9% were discharged back to the GP and surgical conversion rate was 33.6%. DNA rate: 3.5%. Patient satisfaction was 99%.

Conclusion:

Consultant led triage and assessment provides streamlined shoulder and elbow pathways ensuring rapid direction of patients to appropriate surgical or conservative pathways. Direct community assessment with ability to assure appropriate investigations prior to attendance allows one stop treatment and definitive management decisions thereby minimising secondary care outpatient burden and cost. Patient satisfaction was outstanding at 99% with a low DNA rate of 3.5%.

09:24 09:32 SPECIALIST SHOULDER AND ELBOW PHYSIOTHERAPY LED ARTHROPLASTY SURVEILLANCE - MAKING A DIFFERENCE

Author: M Morgan; M Bateman; D Clark; A Tambe; M Espag; T Cresswell

Institution: Derby Shoulder Unit, Derby Teaching Hospitals NHS Foundation Trust

Purpose:

To review the impact of the introduction of specialist physiotherapy led arthroplasty clinics within an upper limb unit.

Background:

The number of shoulder arthroplasties is increasing. Follow-up of these patients within our upper limb unit, was variable and recording of outcomes limited. A physiotherapy specialist/arthroplasty practitioner was appointed in 2013 to develop a consistent pathway for follow-up of upper limb arthroplasty patients.

Method:

Changes in patient follow-up procedures and data from the physiotherapy upper limb database were reviewed. Patient numbers seen were estimated from clinic lists.

Results:

Since introduction of the specialist arthroplasty physiotherapy post a consistent pathway for the follow-up of upper limb arthroplasties has been developed. This involves clinical and radiographic review of all patients at 3 months, 1,2,5 and 10 years as a minimum. All patients have post-operative Oxford Shoulder Scores and Constant Scores recorded at each visit. Pre-operative scores are recorded at the point of listing for arthroplasty. All scoring is done independently, reducing bias. As of January 2018, 420 reverse total shoulder replacements, 135 anatomical total shoulder replacements, 54 stemless total shoulder replacements, 206 Copeland hemiarthroplasties and 189 total elbow

replacements are logged on the upper limb database. Approximately 1000 arthroplasty reviews are provided each year, creating greater capacity within the main elective clinics. An enhanced recovery package, in accordance with the principles of GIRFT, has been developed in the last 12 months within the specialist physiotherapist role.

Conclusions:

The arthroplasty specialist physiotherapy clinic has created a consistent and streamlined service for our arthroplasty patients, allowing ongoing surveillance clinically and radiographically and early identification of any problems. Collection of PROMs and objective data allows local monitoring of our arthroplasty outcomes, within the wider aims of the NJR. The arthroplasty clinic has created improved capacity within the existing elective upper limb clinics.

09:32 09:40 MIRA: A USEFUL CLINICAL TOOL IN PAEDIATRIC SHOULDER REHABILITATION?

Author: S Hashim; N Sau; T Trickett; A Jaggi; D Eastwood;

Institution: University College London & Royal National Orthopaedic Hospital

Purpose:

This pilot study determined the clinical applicability of MIRA, an Xbox Kinect gaming software, in atraumatic shoulder instability.

Methods:

Over 6 months, MIRA was used in our intensive therapy programme for adolescents with atraumatic shoulder instability. The primary cohort were inpatients: all participants received standard daily physiotherapy and occupational therapy alongside six 30-minute sessions of MIRA for 2 weeks. An outpatient cohort received one 30-minute session of MIRA. Postoperative patients and those with learning difficulties were excluded.

Participants completed Pain and Fatigue questionnaires following each session, functional assessments on the first and last days of admission, and a MIRA Evaluation questionnaire. Pain, fatigue and functional ability were analysed using descriptive statistics. A framework analysis was conducted using participants textual and verbal comments.

Results:

Twelve female participants (seven inpatients and five outpatients), mean age 14.8 years (range 10-16) were included. Eight had unilateral and four bilateral pathology. SPONSA scores of inpatients affected shoulders improved by a mean 20.9%. Initial Oxford Shoulder Instability Scores varied between 11-39; three inpatients had not improved at 2 weeks. After using MIRA, 83% of patients were not in significant pain, 91% were not overly tired and 83% liked or really liked the technology. Despite factors such as previous therapy and hunger shortening session length, participant involvement remained between 65-100%, break length between games varied from 30-120 seconds.

Qualitative analysis highlighted positive themes of pain distraction, competition and increased motivation whilst playing. Participants enjoyed age-appropriate games; younger patients required simple instructions, whereas older participants preferred cognitive memory games. 33% of participants stated they did not prefer MIRA to usual therapy due to calibration errors and lack of physiotherapist interaction.

Conclusion:

MIRA could be integrated within our rehabilitation programme. Larger studies may define a link between software use, game choice and improved function.

09:40 09:48 PLATELET-RICH-PLASMA INJECTION IN LATERAL ELBOW TENDINOPATHY: EXPLORING INTERNATIONAL EXPERT CONSENSUS WITH THE DELPHI METHOD

Author: JP Evans; CD Smith; AC Watts; N Maffulli; VA Goodwin

Institution: University of Exeter Medical School; Royal Devon and Exeter Hospital

Background:

Platelet-Rich-Plasma (PRP) has become a popular treatment modality for Lateral Elbow Tendinopathy (LET) despite conflicting evidence on its effectiveness. With high levels of user experience, this study aimed to assess the levels of consensus amongst experts on the clinical application of this novel intervention.

Methods:

An international Delphi study was conducted. The development of treatment statements and consensus measurement was developed over three rounds. Round one utilised a ten-person primary working group who answered open questions on their clinical approach, and their answers were subsequently developed into 40 statements. Clinical users and researchers were invited through national society mailing lists and contact lists derived from a systematic review of PRP literature. In rounds two and three, an international group of PRP researchers and clinical users scored their levels of agreement with these statement on a five-point scale. A consensus was defined as an interquartile range of <1.

Results:

Thirty-eight participants completed round two and 28 (74%) completed round three. Overall, a consensus of agreement was reached for 17/40 (42.5%) statements. For statements on PRP formulation, a consensus of agreement was reached in 2/6 statement (33%). No differences were observed between high volume (>20 per annum) or low volume (<20 per annum) users.

Conclusion:

Amongst experts, only limited consensus could be reached on the application of PRP in LET. High levels of user experience does not result in a convergence of opinion on the technical components of PRP formulation and delivery, echoing calls for the further study and improved trial reporting.

09:48 09:56 A COMPARATIVE ASSESSMENT OF PATIENT REPORTED OUTCOME MEASURES FOR LATERAL ELBOW TENDINOPATHY IN A UK POPULATION

Author: JP Evans; CD Smith; VA Goodwin; JM Valderas

Institution: University of Exeter Medical School; Royal Devon and Exeter Hospital

Background:

There is currently no guidance on the validity of Patient Reported Outcome Measures (PROMs) for the assessment of Lateral Elbow Tendinopathy (LET) in a UK population. This study aimed to evaluate the psychometric properties of four candidate instruments, identified as the best performing PROMs in a standardised evaluation of available measures.

Methods:

A prospective validation study was conducted assessing the four candidate PROMs. Recruitment was conducted in primary care, secondary care and physiotherapy clinics. Repeat administration at baseline, 1 and 8 weeks allowed assessment of the psychometric properties (reliability, validity, responsiveness and interpretability) of the Oxford Elbow Score (OES), quick Disabilities of the Arm Shoulder and Hand (qDASH), Patient-Rated Tennis Elbow Evaluation (PRTEE) and Patient Reported Outcome Measures Information System (PROMIS). The EQ-5D-5L, Numeric Pain Scale and Global Change Criteria were also collected.

Results:

Invitations to 738 yielded 77 recruits, of which 38 completed all questionnaires. The psychometric evaluation suggested adequate internal consistency for all instruments (Cronbach's alpha >0.9), adequate reliability (Intraclass Correlation Coefficient >0.84), construct validity was supported by the agreement with hypothesised correlation strengths in all cases, effect sizes were found to be greatest in pain sub-scales (0.50-0.58). Minimal Clinically Important Difference scores were derived using an external anchor (OES pain 17 points, function 8, psychosocial 16, qDASH 12, PRTEE 25, PROMIS pain 6, function 5).

Conclusions:

The OES, qDASH, PRTEE and PROMIS all performed adequately in the assessment of LET. Generic upper limb measures (qDASH and PROMIS) were not found to be inferior to region-specific (OES) or condition-specific (PRTEE) measures. Measures that allow sub-scale assessment of pain (OES, PRTEE and PROMIS) demonstrated superior responsiveness to change. These findings support the use of the candidate PROMs in future LET research.

09:56 10:04 SHOULD PEOPLE WITH NEUROPATHIC PAIN HAVE SHOULDER SURGERY?

Author: S King; V Patel; T Fletcher; M Scott; B Gooding

Institution: Nottingham University Hospitals NHS Trust

Purpose:

To identify the incidence of neuropathic pain (NPain) and its effect on outcomes after shoulder surgery with regional anaesthesia.

Method:

385 consecutive patients undergoing shoulder surgery with regional nerve block at a large teaching hospital were assessed for NPain pre and post-operatively (within 3 months) using the S-LANSS NPain screening questionnaire. Oxford Shoulder scores (OSS) were recorded pre-operatively and 6 months post-operatively.

Results:

297/385 (77.1%) had complete S-LANSS scores. Of these 38.7% presented with NPain at some stage. 31% had a positive S-LANSS pre-operatively. 18.9% had a positive S-LANSS post-operatively. 58/92 (63%) patients who had pre-operative NPain resolved post-operatively. 22/105 (10.7%) patients who were negative pre-operatively, had NPain post-operatively.

Patients with NPain had a significantly lower pre-operative OSS of 17.4 (15.4, 19.4) (mean (95%CI)) compared to no NPain (OSS of 22.1 (20.7, 23.5), $t=3.8$, $df=252$, $p<0.0001$).

Patients who had pre-operative NPain showed significant improvement in their OSS ($t=-8.5$, $df=31$, $p<0.0001$), whether it resolved (14.8 point improvement (10.3, 19.2)), or remained (14.7 point improvement (10.8, 18.7)). There was no significant difference in OSS change between the groups ($t=-0.9$, $df=33$, $p=0.4$).

Patients who had no NPain at any stage showed a comparable, significant, OSS improvement of 13.8 points ((11.3, 16.4), $t=-10.5$, $df=77$, $p<0.0001$).

Conclusion:

These results suggest that surgery does not increase the incidence of NPain. The presence of pre-operative NPain did not have a negative effect on overall outcome; in fact there was a reduction in post-operative NPain. Patients with pre-operative NPain demonstrated significant improvements in outcome.

We therefore suggest that pre-operative NPain is not a barrier to surgery. Further work is required to assess the recovery of new onset NPain following routine shoulder surgery.

10:04 10:12 A POST-OPERATIVE PHYSIOTHERAPY PROTOCOL TO REDUCE ELBOW STIFFNESS FOLLOWING OPEN REDUCTION INTERNAL FIXATION OF ELBOW FRACTURE

Author: JL Thomas; AC Watts; AD Duckworth

Institution: Wrightington Hospital, Wrightington, Wigan and Leigh NHS Foundation Trust

Purpose:

To evaluate the functional outcome of elbow trauma surgery patients before and after introduction of a post-operative physiotherapy protocol.

Methods:

Patients were identified from a database held by the treating surgeon. A consecutive series of patients were identified, who were managed before and after introduction of a post-operative physiotherapy protocol, for rehabilitation following ORIF for elbow fracture. The protocol included early active mobilisation, commenced on the day of surgery, and a comprehensive, outpatient based, goal-led protocol, with consideration to tissue and fracture healing. A standard was set to commence outpatient physiotherapy within 7 days. Prior to the implementation of the protocol patients undertook early mobilisation, but with no defined protocol, exercises, or timescale.

36 patients met the inclusion criteria. These were matched on a 2:1 ratio of 19 pre-protocol patients. Flexion, extension, and total arc of motion were measured with a goniometer at discharge. Pronation and supination were estimated. Number of days post-op to initial physiotherapy appointment was documented.

Results:

The protocol group achieved a statistically superior mean extension of 11 degrees (range 0-35), and a total arc of motion of 128 degrees (range 100-155), compared to 23 degrees (range 10 hyperextension - 70) extension, and 106 degrees (range 40-170) total arc of motion in the pre-protocol group. Both groups achieved functional pronation and supination. All patients in the protocol group achieved a functional 100 degree arc. 21 (58%) in the protocol group achieved a 130 degree functional arc, compared to 5 (26%) in the pre-protocol group. The protocol group attended their outpatient physiotherapy appointment at a mean 10 days post op (range 3-102), compared to 22 days post op (range 2-61).

Conclusion:

The implementation of a post-operative physiotherapy protocol following ORIF of the elbow resulted in an increased range of motion, and established a more efficient physiotherapy pathway.

10:20 11:00 COFFEE AND TRADE EXHIBITION

11:00 12:15 SESSION 6: TRAUMA

CHAIRS: C HATRICK/S DREW

11:00 11:08 THE IMPACT OF PATIENT ACTIVATION ON DISABILITY AND PATIENT EXPERIENCE FOLLOWING UPPER EXTREMITY FRACTURES

Author: Prakash Jayakumar; Teun Teunis; Sarah Lamb; Ana-Maria Vranceanu; Sarah Lamb; David Ring; Stephen Gwilym

Institution: Nuffield Department of Orthopaedics, Rheumatology and Musculoskeletal Sciences, University of Oxford

Purpose:

To assess the relationship between patient activation (propensity to engage with one's health and healthcare system) within a month of shoulder, elbow or wrist fracture, and disability and patient experience at 6 to 9 months.

Methods:

A prospective cohort study involving 775 adult patients sustaining upper extremity fractures attending fracture clinics between 1st January 2016 and 31st August 2016 was conducted. 744 patients completed patient reported outcome measures on an encrypted, web-based program including measures of patient activation [Patient Activation Measure (PAM-13); Effective Consumer Scale (ECS-17)] within a month of injury and disability [Quick Disabilities of the Arm, Shoulder and Hand (QuickDASH); PROMIS Upper Extremity Physical Function Computer Adaptive Test (PROMIS UE PF CAT)] at 6 to 9 months, as well as patient experience [Numerical Rating Scale (NRS) for satisfaction with clinical care (NRS-C) and NRS satisfaction with health services (NRS-S)] at 6 to 9 months, accounting for demographic, clinical and psychosocial factors. Statistical analysis included bivariate analysis, collinearity assessment, factor analysis and multivariable regression.

Results:

In bivariate analysis, PAM-13 and ECS-17 had moderate-high correlations with PROMIS UE PF (PAM-13: $r=0.55$; ECS-17: $r=0.60$) and QuickDASH (PAM-13: $r=-0.65$; ECS-17: $r=-0.67$). PAM-13 and ECS-17 also demonstrated moderate correlations with NRS-C (PAM-13: $r=0.53$; ECS-17: $r=0.57$) and NRS-S (PAM-13: $r=0.55$; ECS-17: $r=0.58$). $p<0.001$ for all displayed correlations. Factor sets included 1) psychosocial factors & patient engagement, 2) socio-demographics & patient engagement, 3) pathophysiology and 4) social support. Factor 1 accounted for most of the variation in disability (PROMIS UE PF, Semi-partial $R^2=0.45$; QuickDASH, Semi-partial $R^2=0.63$) and experience (NRS-C, Semi-partial $R^2=0.56$; NRS-S, Semi-partial $R^2=0.64$).

Conclusion:

Individuals that are more engaged with their health and health care systems achieve better health-related and experiential outcomes following upper extremity fractures. But one should account for psychosocial factors, such as self-efficacy, which may supersede activation in predicting outcomes.

11:08 11:16 CONCURRENT HUMERUS AND HIP FRACTURE IN THE ELDERLY

Author: DLJ Morris; J Nightingale; CG Moran; JM Geoghegan

Institution: Queen's Medical Centre, Nottingham

Aims:

Investigate survivorship in elderly patients sustaining concurrent humerus and hip fracture; comparing outcomes to isolated hip and concurrent wrist and hip fracture.

Methods: Prospective data collection performed for patients admitted with hip fracture. Database analysed for elderly patients (>60 years) presenting with hip fracture from 01/2006 to 11/2015. 365-day mortality data obtained via matching exercise with Office of National Statistics. Cohort subsequently divided into patients with isolated hip fracture and those with concurrent fracture. Data collected included type of hip and concurrent fracture, age, gender, Abbreviated Mental Test (AMT), Nottingham Hip Fracture Score (NHFS), length of stay, complications, residential status, discharge destination and occurrence of inpatient death. 365-day mortality data added to the dataset. Statistical analysis performed using SPSS. Kaplan-Meier survivorship analysis performed with 365-day mortality data with censorship at 365 days post-fracture.

Results:

6887 isolated hip fracture. 95 concurrent humerus and hip fracture; of which 79% involved proximal humerus. Compared to isolated hip fracture, concurrent humerus fracture associated with increased acute hospital length of stay (22.8 vs. 18.8 days, $p=0.035$) and decreased proportion of patients returning to their own home at discharge (31.1% vs. 49.4%, $p=0.001$). Trends towards increased inpatient death (13.7% vs 9.3%, $p=0.152$) and 365-day mortality (34.7% vs 29.2%, $p=0.238$) also noted. Concurrent humerus fracture associated with significantly increased inpatient death (13.7% vs 6.4%, $p=0.046$) and 365-day mortality (34.7% vs 20.9%, $p=0.014$) compared to a concurrent wrist fracture ($n=172$).

Significant difference in Log Rank comparative analysis of 365-day Kaplan-Meier survivorship between concurrent humerus and concurrent wrist fracture (mean survival 313.1 vs 275.2, $p=0.012$). 14% of concurrent humerus fractures were treated operatively; with no significant difference in acute hospital length of stay (21.2 vs 23.0 days, $p=0.624$).

Conclusion:

Increased acute hospital length of stay, rehabilitation requirements and mortality for elderly patients with concurrent humerus and hip fracture.

11:16 11:24 MEDIUM-TERM OUTCOMES OF BLADE PLATE FIXATION FOR PROXIMAL HUMERUS FRACTURE NON-UNION

Author: LPJ Mcentee; AB Scrimshire; JR Williams

Institution: Royal Victoria Infirmary, Newcastle upon Tyne

Introduction:

Proximal humerus fracture non-union is a rare but difficult problem to treat. It may occur in the conservatively or surgically treated fracture, due to a variety of patient, injury or surgical factors. Conventional management options include open reduction and internal fixation with plates and screws or tension band techniques with intramedullary devices. High failure rates with these techniques prompted the development of new approaches such as fixed angle blade plates and bone grafting. There is currently no consensus on the best management.

We aim to review the outcomes of proximal humerus blade plates for non-union in our English level 1 trauma centre.

Methods:

Case notes were reviewed and outcomes scores obtained prospectively for all patients receiving a blade plate for proximal humerus non-union, between 2009 and 2015.

Results:

In total 11 patients, 8 female, with a mean age of 64.8 years, were included in the study. 2 were infected non-unions, 1 of which had undergone previous ORIF, the rest were atrophic, aseptic non-unions. 8 patients were available for follow up, 2 had died during the study period. The mean follow up period was 11.6 months. Mean flexion of the affected shoulder was 92° (range 45-140), abduction 82° (45-140) and external rotation 24° (10-45). 9 went onto radiological and symptomatic union, including 1 patient who subsequently died, at a mean of 7.8 months (3.5-11). One patient who presented with an infected non-union required implant removal due to on going infection. There were no other complications. Mean DASH and Oxford shoulder score were 45.8 (0.83-76.7) and 28.4 (7-48) respectively. When the infected cases are removed these scores improve to 36.2 and 34.3 respectively.

Conclusions:

The blade plate seems to give good short to mid-term outcomes for the management of proximal humerus non-unions. This offers a potential alternative to conventional management strategies.

11:24 11:32 CLINICAL AND RADIOLOGICAL OUTCOMES FOLLOWING INTERNAL FIXATION OF COMPLEX METADIAPHYSEAL FRACTURES OF THE PROXIMAL HUMERUS

Author: E Karam; M Papanna; P Domos; R Chebbout; White A

Institution: Peterborough City Hospital; Northern General Hospital

Background:

Proximal humerus fractures are common and open reduction and internal fixation (ORIF) is a successful treatment option. However, proximal humerus fractures, which also involve the shaft due to distal extension, are much rarer and potentially more difficult to treat. A long plate fixation can provide reliable fixation for the treatment of complex humeral fractures, especially long segment peri-articular fractures, segmental fractures involving proximal humerus and shaft.

Purpose:

The aim of this study was to evaluate the clinical and radiological outcomes of patients with proximal metadiaphyseal humeral fractures treated with internal fixation using a long precontoured plate.

Material and Methods:

Between May 2009 - Nov 2014, 25 five patients were treated with long precontoured plate. The mean age of the patient was 56 years (22-81) and there were 15 females and 10 male in the study group. The clinical outcomes were assessed with Oxford Shoulder scores (OSS), Constant scores (CS), American Shoulder and Elbow Surgeons (ASES) and QuickDASH (QD). The patients' satisfaction was assessed by VAS and Subjective Shoulder Value (SSV) scores. Radiographs were examined to establish initial fracture pattern, fracture union and other complications.

Results:

The mean follow-up time was 37 months (range 24-77). All fracture united at an average 16 weeks (12-52) with 3 delayed unions. The objective and subjective patient scores showed good outcomes (OSS 41, CS 79, ASES 83, QD 17 and VAS 1, SSV 80%). We observed minor and major complications in 12 patients (48%). The reoperation rate was 20% with further surgery for release of adhesive capsulitis in 3 cases, removal of metalwork for AVN in 1 and another subacromial decompression for impingement.

Conclusion:

Internal fixation of these complex proximal humerus fractures with long precontoured plate achieved good functional outcomes. However, all patients should be carefully consented about the higher complication and reoperation rates.

11:32 11:40 THE MANCHESTER ARENA BOMBING: LEARNING POINTS FOR SHOULDER AND ELBOW SURGEONS WHEN DEALING WITH A MASS CASUALTY INCIDENT

Author: AD Ebinesan; A Elseehy; GC Butaliu; M Soufi; P Sarda; KA Shoaib

Institution: Manchester University NHS Foundation Trust

Purpose:

To highlight the role and skill sets required of shoulder and elbow surgeons during a mass casualty incident such as the Manchester Arena bombing and to understand the key learning points from this major incident. **Methods**
The bomb blast on 22nd May 2017 at the Manchester Arena resulted in 143 injured civilians and 22 fatalities. Most hospitals within the Greater Manchester area received victims from the incident. Our unit received a total of 56 casualties with 3 fatalities. Victims were triaged on arrival for a mass casualty incident: 13 required emergency surgical resuscitation within 2 hours (P1); 21 required urgent surgical intervention but would be able to tolerate a delay (P2); 20 were non-urgent (P3). The scale of the incident required the involvement of the entire orthopaedic department in order to manage the victims and cope with the demand. Shoulder and elbow surgeons were involved in not only the treatment of the upper limb injuries but also in the management of other extremity wounds, primarily due to shrapnel from the improvised explosive device. The management of contaminated upper limb injuries from such incidents differs from the approach used for high energy, blunt or penetrating trauma seen on a daily basis.

Conclusion:

The Manchester Arena bombing required shoulder and elbow surgeons to not only provide specialist input for the upper limb injuries sustained by the victims, but also to perform general orthopaedic procedures during the immediate aftermath of the incident. Management of such cases requires a complex multidisciplinary team including orthopaedics, plastics, immunology, psychology, audiology and rehabilitation medicine. Management principles of such events should be shared to allow shoulder and elbow surgeons to provide a broad role in response to mass casualty incidents and to highlight the importance of maintaining trauma skill set when faced with such circumstances.

11:40 11:48 RANDOMISED CONTROL TRIAL COMPARING HEMI ARTHROPLASTY AND REVERSE POLARITY SHOULDER REPLACEMENT FOR THE TREATMENT OF PROXIMAL HUMERUS FRACTURES IN THE ELDERLY- INTERIM ANALYSIS

Author: Z Hakim; R Daw; P Wilkinson; S Brookes- Fazakerley; M Smith; M Kent; I Guisasola; R Parmar; P Brownson
Institution: Royal Liverpool and Broadgreen University Hospitals NHS Trust

Elderly patients may benefit from having a primary reverse arthroplasty as opposed to a hemiarthroplasty for the management of a proximal humerus fracture, to promote more optimal function and prevent the need for further surgery in the event of a hemiarthroplasty prosthetic failure.

Patients were included with an acute radiologically confirmed proximal humerus fracture requiring replacement, age >65 with capacity to consent. Exclusion criteria were pre-existing shoulder pathology, anaesthetic risk precluding surgery, inflammatory arthritis, ipsilateral elbow pathology, open fractures and neurological injuries. Randomisation was performed by a computer generated block technique and the patient blinded to the procedure. A trained blinded therapist collected data on patient demographics and range of motion. Primary outcome measure was the Oxford Shoulder Score. Secondary outcome measure was the DASH (Disability, of Arm, Shoulder, Hand) score.

Due to clinical concerns regarding hemiarthroplasty performance an unblinded interim analysis was performed by a medical statistician of 27 patients at 1 year of complete data collection. There were 12 (0 male, 12 female) in the hemi group and 15 in the reverse group (2 male, 13 female). Mean age was 77 in each group. Mean range of flexion, abduction and external rotation for the hemi group was 70°, 66°, 17° vs 125°, 122°, 35° for the reverse group.

Analysis was performed for 6 weeks, 3 months, 6 months and 1 year post op using the Students t test. Higher Oxford Shoulder Scores and a lower mean DASH scores were seen in the Reverse Polarity Shoulder Replacement Group at all time frames. However, this was not statistically significant.

Clinical results for hemiarthroplasties were felt to be poor however we identified no statistically significant difference between the two groups and caution on the premature use of reverse shoulder arthroplasty in the fracture setting. Definitive results will be provided at study completion.

11:48 11:56 EMERGING TRENDS, PATIENT CHARACTERISTICS AND SUBSEQUENT OUTCOMES OF SHOULDER ARTHROPLASTY FOR ACUTE TRAUMA: AN ANALYSIS OF 1,524 PATIENTS FROM THE NATIONAL JOINT REGISTRY OF ENGLAND, WALES, NORTHERN IRELAND AND THE ISLE OF MAN

Author: RS Craig (1); GS Collins (1); A Sayers (2); LP Hunt (2); A Rangan (1); JL Rees (1)
Institution: (1) University of Oxford, (2) University of Bristol

Purpose:

Procedure selection following proximal humeral fractures remains an area of uncertainty. Our aim was to use NJR data including patient reported outcome scores to describe current practice and identify factors predictive of better outcomes.

Methods:

We analysed observational data for all primary procedures recorded in the NJR for acute trauma between April 2012 and March 2017. Monthly case volumes were estimated using locally weighted regression. OSS and revision risk were estimated using linear regression with penalised maximum likelihood and an elastic net regularised Cox proportional hazards model. Missing data were handled with multiple imputation.

Results:

1,523 acute trauma cases were available for analysis, including 661 hemiarthroplasties (HA) and 820 reverse total shoulder arthroplasties (RTSA). 79% of patients were female and the median age was 74.5 years (IQR: 67.8-80.1). Over the study period, rates of HA increased from 5 per month to a peak of 14 in 2014 before falling to 8. Over the same period the monthly rate of RTSA increased from 2 to 26. 571 cases were available for the OSS analysis. Predictors of a better OSS were use of RTSA, lower ASA grade and male gender. The unadjusted mean OSS for RTSA was 32.7 (95% CI 31.4-34.0) and for HA was 26.9 (95% CI 25.6-28.1). Use of RTSA was associated with a lower revision rate at two years.

Conclusion:

There has been a rapid recent change in UK practice towards reverse arthroplasty for acute proximal humeral fractures. While the results of this analysis need careful interpretation due to potential missing confounding variables, the observed change is currently supported by better patient reported outcomes and lower early revision rates.

11:56 12:04 ARTHROSCOPIC MICROFRACTURE FOR GLENOHUMERAL CHONDRAL DEFECTS

Author: C Witney-Lagen; A Leonidou; G Panagopoulos; G Sforza; E Atoun; O Levy

Institution: Reading Shoulder Unit

Introduction:

Management of chondral defects in the shoulder remains controversial. Microfracture is known to be effective in the knee. However, there is little information about effectiveness and safety of microfracture in the shoulder.

Aim:

To ascertain whether microfracture is effective and safe for treating symptomatic chondral defects of the glenohumeral joint.

Methods:

The study comprised 27 consecutive patients undergoing microfracture for glenohumeral Outerbridge stage 3 or 4 chondral defects. Arthroscopic microfracture was performed between 2005 and 2016. Outcomes collected prospectively were Constant score (CS), pain, satisfaction, range of movement and strength. Data for operative complications and demographics was collected retrospectively. Mean follow-up was 41 months (range 2 to 12 years).

Results:

There were 14 females and 13 males, with a mean age of 56 years. Complete outcome data was available for 25 of 27 patients (93%). Mean CS improved from 47 preoperatively to 71 (adjusted 88) postoperatively ($p < 0.0001$). Clinically and statistically significant improvements also occurred for pain ($p < 0.0001$), satisfaction ($p < 0.0001$), abduction ($p = 0.0001$), forwards flexion ($p = 0.001$), internal rotation ($p = 0.035$) and strength ($p = 0.010$). Postoperative adjusted CS were not significantly different for males and females ($p = 0.211$). However, males reported reduced pain ($p = 0.011$) and improved satisfaction ($p = 0.047$). CS, pain and satisfaction did not differ between patients aged under 55 years versus older patients, or for patients receiving microfracture for both the humerus and glenoid compared with microfracture for only one side of the joint. There were no surgical complications. 3 patients had subsequent total shoulder arthroplasty at a mean of 5 years and 3 months after microfracture. Overall, 25 of 27 patients were satisfied with microfracture and resumed all of their activities including sport.

Conclusion:

Arthroscopic microfracture is safe and effective for treating symptomatic shoulder chondral defects. It can delay arthroplasty, which may be particularly beneficial for younger patients.

12:04 12:12 MORTALITY FOLLOWING COMBINED HIP AND PROXIMAL HUMERUS FRACTURES

Author: A Haque; R Pandey; A Modi; AL Armstrong; HP Singh

Institution: University Hospitals of Leicester

The aim of this study was to describe the 30-day and one year mortality in patients who sustained both a proximal humerus and a hip fracture simultaneously compared to patients with only hip fractures.

Using the national hip fracture database, we identified all hip fracture patients over the age of 60 admitted to a single trauma unit from 2010-2016. Patients sustaining a proximal humerus fracture in addition to their hip fracture were identified using hospital coding data. We calculated the 30-day and one year mortality for both the hip fracture cohort

and the combined hip and proximal humerus fracture cohort. Other variables recorded included age, gender and whether the proximal humerus was treated with or without an operation.

We identified 4131 patients with hip fractures within the study period and out of those 40 had sustained both a hip and a proximal humerus fracture. Mean age in the hip fracture cohort was 80.9 years and in the combined fracture group 80.3 years. Out of the 40 patients in the combined group four were treated operatively. The 30-day mortality for our hip fracture cohort was 7.2% compared to the mortality of our combined cohort of 12.5%. The one year mortality for our hip fracture cohort was 26.4% compared to 40% for the combined fracture cohort.

The 30-day and one year mortality is higher for those patients who have sustained a combined hip and proximal humerus fracture when compared to those with a hip fracture alone.

12:15 12:40	BESS AWARDS
12:40 12:50	BESS 2019
12:50 13:00	CLOSING REMARKS
13:00	LUNCH AND DEPARTURE

Poster presentations

CLINICAL, RADIOGRAPHIC AND SURVIVAL ANALYSIS OF THE HYBRID STEMLESS SIMPLICITI HUMERAL AND AEQUALIS GLENOID ARTHROPLASTY SYSTEM: A SINGLE SURGEON SERIES WITH MINIMUM 2-YEAR FOLLOW-UP

Author: MJ Gandhi; K Chin; G Bhabra; S Drew

Institution: University Hospitals of Coventry & Warwickshire

Over the last 7 years total shoulder arthroplasty (TSA) has seen an expansion in the use of stemless metaphyseal fixing implants. These implants require good metaphyseal fit and integration to prevent failure. There is a paucity of evidence of stemless implants particularly in older patients who have soft osteopenic bone. We present a retrospective analysis of a single-surgeon series using the stemless Simpliciti (humeral) and Aequalis (glenoid) components for TSA with a minimum 2-year follow-up. We used humeral head bone graft and upsized the humeral nucleus for better fixation in soft osteopenic bone. We excluded acute trauma infection large full thickness cuff tears insufficient bone stock non-functioning deltoid or neuromuscular compromise of the shoulder.

A standardised post-operative rehabilitation protocol was followed. Outcomes were measured by clinical (pre- and post-operative Oxford Shoulder Score (OSS) and range of movement) radiological and Kaplan Meier survival analysis. Forty-two prostheses with minimum 2-year follow-up were reviewed by time of abstract submission. All patients received a metaphyseal fixing nucleus and appropriately sized head with an all polyethylene keeled glenoid. Mean age at time of surgery was 66.8 years old (27 - 84 years). Mean follow-up was 39 months (24-68 months). There were significant differences between pre- and post-operative OSS (mean improvement 18 points; $p = 0.001$) abduction (mean improvement 380; $p=0.001$) forward flexion (mean improvement 360; $p=0.001$) external rotation (mean improvement 210; $p=0.001$) and internal rotation (post-op mode: lower lumbar spine; $p=0.011$). There was no radiological evidence of migration subsidence or osteolysis at latest follow-up. Two patients needed revision: one following cuff failure one for glenoid loosening. This series shows the early results in this stemless metaphyseal TSA system are comparable with stemmed systems. Based on our experience we conclude this system has acceptable clinical radiographic and survival outcomes in the short-term across all age ranges.

COMPARISON OF MIDTERM ATSA CLINICAL OUTCOMES WITH KEELED AND PEGGED GLENOIDS OF EQUIVALENT RADIAL MISMATCH

Author: KW Farmer (1); PH Flurin (2); T Wright (1); J Zuckerman (3); CP Roche (4)

Institution: (1) University of Florida, Gainesville, FL; (2) Bordeaux-Merignac Clinic, FR; (3) Hosp Joint Dis, NY; (4) Exactech, Gainesville, FL

Introduction:

aTSA glenoid fixation are generally provided in 2 styles: keels and pegs. To better understand any differences between these prostheses we quantified outcomes of cemented keel and peg glenoids with equivalent radial mismatch at 5 years minimum follow-up.

Methods:

192 patients (age: 66.9) with 5 years minimum follow-up had either cemented keeled or pegged glenoids and the same humeral system (Exactech Equinoxe). As each keel and peg glenoid had the same articular radius options they provide an equivalent radial mismatch with the same size humeral head. 67 aTSA patients received a keeled glenoid (66.5 ± 9.6 yrs; 46F/21M) and 125 aTSA patients received a pegged glenoid (67.1 ± 8.6 yrs; 60F/65M) for OA. Outcomes were scored using SST UCLA ASES Constant and SPADI metrics; active ROM also measured. Average follow-up was 73.9 months (keel: 76.5; peg: 72.6). A Student's 2tailed unpaired t-test identified differences $p < 0.05$.

Results:

Keel and peg patients had equivalent post-op outcome scores though keel patients had significantly more forward flexion. Keels had 5 complications (7.5%; 2 aseptic loosening = 3.0%) and pegs had 6 complications (4.8%; 2 aseptic loosening = 1.6%). Radiolucent line rates (29.6% keel 41.4% peg) and average line scores (0.87 keel 0.88 peg) were similar. Glenoids with radial mismatches >6.5 mm trended toward a lower line rate (24.3% vs. 50.0% $p = 0.097$) and line score (0.54 vs 1.33 $p = 0.073$) had a significantly higher post-op Constant score (77.1 vs 66.1 $p = 0.0257$) abduction (123 vs. 112 $p = 0.015$) forward flexion (143 vs. 131 $p = 0.016$) as compared to radial mismatches ≤ 5 mm.

Discussion and Conclusions:

Positive outcomes can be achieved using either keel or peg glenoids with few differences observed at midterm follow-up. Peg and keel glenoid patients with larger radial mismatches had better outcomes as compared those with smaller radial mismatches.

CURRENT PHYSIOTHERAPY PRACTICE IN THE MANAGEMENT OF TENNIS ELBOW: A SERVICE EVALUATION

Author: M Bateman; E Whitby; S Kacha; E Salt

Institution: Derby Shoulder Unit & Burton Hospital NHS Foundation Trust

Background:

Tennis elbow is a common painful condition that may affect daily function and ability to work. Physiotherapy is the most commonly used primary intervention but there is a wide range of treatment options within the umbrella of physiotherapy. Our aim was to report which treatments are currently used by physiotherapists in a UK National Health Service setting.

Method:

A retrospective service evaluation was conducted at two NHS hospital trusts by reviewing patient attendance records over a one year period. All patients with tennis elbow were included except those referred for post-operative rehabilitation. Patient notes were analysed using a pre-defined assessment template.

Results:

65 patient records were identified with mean age 48 years and mean symptom duration of 5.4 months. Mean treatment duration was 64 days over 3.7 sessions. The most commonly used treatments were education and exercise however the type and dosing of exercise varied greatly. Passive modalities lacking evidence for efficacy such as ice taping manual therapy acupuncture and electrotherapy were still used. It was noted that 10 patients (15%) received corticosteroid injections by their GP or hospital consultant during their physiotherapy treatment period.

Conclusion:

Wide variations in treatment approaches were identified. There was no consistency in either the choice of modality used the type of exercise or the dose of exercise prescribed. The use of passive modalities and corticosteroid injections remains commonplace despite a lack of supportive research evidence. There is a clear need for evidence-based guidance for physiotherapists treating patients with tennis elbow to ensure a consistent approach that is most likely to benefit patients.

EARLY CLINICAL AND RADIOLOGICAL OUTCOMES OF BESPOKE SHOULDER ARTHROPLASTY

Author: MA Imam; K Chin; A Fowler; S Basu; S Javed; L Cunningham; M Walton; P Monga; I Trail; S Bale

Institution: Wrightington Hospital, Wrightington, Wigan and Leigh NHS Foundation Trust

Introduction:

Recently the number of shoulder replacements performed has increased exponentially. Novel technology for complex primary and revision arthroplasty has developed with patient specific instrumentation (PSI) and bespoke arthroplasty expanding.

Purpose:

We report the early clinical and radiological outcomes of one bespoke shoulder replacement system using trabecular titanium manufactured by PROMADE (LIMA).

Methods:

Nineteen consecutive patients with a mean age of 65(39–82) years having a bespoke implant manufactured were assessed at minimum one year follow-up. The planning software uses data from a specific CT protocol to assess bony anatomy and glenoid bone loss. Web discussions connect the engineers and surgeon to optimize design. Bespoke components were implanted in 17 patients. The indications were infection(9) aseptic loosening(5) cuff-arthropathy(2) locked dislocation(1) dysplasia(1) and failed hemiarthroplasty(1). Outcomes were assessed using the Oxford Score and CT evaluation of integration undertaken.

Results:

The Oxford Shoulder score improved from a mean of 13 preoperatively to 33 at one year. The implant was abandoned in two patients. One did not fit and one not required. In both the scans were done more than 6-months prior to surgery. Post-operative CT scans were performed in 14 patients and showed integration in all. Complications included instability in one patient and persistent infection in one of the infected cases but controlled with antibiotic suppression.

Conclusions:

Collaboration between surgeon and engineer has yielded promising outcomes. The technology has extended ability to achieve stable glenoid reconstruction where bone loss precludes use of standard components. Clinical and radiological results are promising considering the severity of the bony defects. Longer-term follow-up is required. Feedback to the manufacturers has led to refinement of the PSI and we recommend a turn round time of less than six months to ensure that the implant produced reflects the anatomy.

FOCAL MYOSITIS OF THE DELTOID MUSCLE: THE ROLE OF MAGNETIC RESONANCE IMAGING FOR DIAGNOSIS

Author: M Ricks; C Hand; A Cole; G Cox

Institution: University Hospital Southampton

Background:

Focal myositis is a rare condition first described by Heffner et al in 1977 as a self-limiting condition of unknown aetiology. It presents as an inflammatory pseudo tumour in skeletal muscle and can present diagnostic difficulty being commonly mistaken for tissue of vascular inflammatory or neoplastic origin. Diagnosis is traditionally confirmed by muscle biopsy. We present a case where magnetic resonance imaging was used to confirm the diagnosis without need for biopsy.

Case Presentation:

A 19 year old female presented with a two-year history of intermittent swelling of the deltoid associated with pain and tenderness to palpation. There was no history of trauma or systemic illness. She was symptomatic with pain swelling and tenderness over the left deltoid with no restriction in range of movement of the shoulder or neck. Plain radiographs were normal and magnetic resonance imaging showed diffuse oedematous signal changes on the proton density weighted sequence within the deltoid muscle and no plexiform neurofibroma. Nerve conduction and electromyography studies were within normal limits excluding an axillary nerve lesion. The patient underwent extensive screening for connective tissue disorders and creatine kinase and lactate dehydrogenase levels were within limits. The patient underwent neuromuscular specialist review confirming that this appeared to be a rare case of focal myositis in the deltoid. The serial MRI scans confirmed resolution of the condition.

Discussion and Conclusion:

We have described the magnetic resonance imagery of focal myositis of the deltoid in acute and refractory stages and shown that sequential MRI scanning can confirm the diagnosis and obviate the need for biopsy. The Authors highlight focal myositis of the deltoid as a rare differential for shoulder pain and the role of sequential magnetic resonance imagery in confirming the diagnosis.

GLENOID RECONSTRUCTION AND BONE GRAFTING IN TOTAL SHOULDER ARTHROPLASTY

Author: R Yap; M Papanna; D Morrell; D Thyagarajan

Institution: Northern General Hospital, Sheffield Teaching Hospital NHS Trust

Introduction:

Glenoid bone defects create a difficult reconstructive problem during shoulder arthroplasty. These typically occur following loosening of glenoid prostheses progressive glenoid erosion following resurfacing arthroplasty and secondary to destructive rheumatoid disease.

Aim:

To evaluate clinical and radiological outcomes in patients following bone grafting for glenoid deficiency during total shoulder arthroplasty.

Material and Methods:

Retrospective review of 27 patients who underwent bone grafting of the glenoid during total shoulder arthroplasty between 2014-2017. A new generation dual platform total shoulder replacement system was used in all cases. Functional assessments were carried out using Oxford Shoulder Score. Radiological assessment was performed to look for graft resorption and scapular notching.

Results:

There were 21 women and 6 men with a mean age of 67.5 (range 43 -87). Standard deltopectoral approach was used in 22 patients and extensile deltopectoral approach with clavicular osteotomy in 5. Indications for surgery included severe glenoid erosion following previous resurfacing hemiarthroplasty glenoid bone loss from previous loose glenoid component and bone loss from rheumatoid disease. Autologous humeral head was used in primary procedures and femoral head allograft was used in revision surgery. 10 patients underwent anatomical total shoulder replacement and 17 patients underwent reverse total shoulder replacement. The average active elevation improved from 43° to 105° following surgery. The average post-operative Oxford Shoulder Score was 37.6 (20 ? 44). There were no postoperative infections or dislocations. One patient developed graft resorption with persistent pain and is awaiting revision surgery. One had acromial fracture which settled with non-surgical treatment. Grade 1 scapular notching was noted in 4/27 patients (14%).

Conclusions:

Bone grafting the glenoid defect during shoulder arthroplasty is successful in relieving pain and improving clinical outcomes. The new generation shoulder replacement systems enable optimal positioning of the glenoid component along with use of bone grafts to facilitate glenoid reconstruction.

HEMIARTHROPLASTY OF THE ELBOW FOR THE TREATMENT OF UN-RECONSTRUCTABLE DISTAL HUMERUS FRACTURES: OUTCOMES AT A MEAN OF 15 MONTHS

Author: GAD Edwards; R Amirfeyz

Institution: Bristol Royal Infirmary

Distal humerus hemiarthroplasty (DHH) is a novel treatment in the management of un-reconstructable distal humerus fractures where total elbow arthroplasty is not indicated.

We present a retrospective single surgeon series of 22 patients who underwent DHH over a 4-year period (2013-2017) and their outcomes at a mean 14.8 months (range 2-41 months). Outcome measures included range of motion Oxford Elbow Score (OES) QuickDASH (Q-DASH) Visual Analogue Score (VAS) and grip strength between arms. Average age at surgery was 78.8 years (range 64-88 years).

Patients demonstrated mean flexion of 124.4 degrees (range 100-145) extension deficit of 28.9 degrees (range 10-80) all demonstrated full pronation of 90 degrees and mean supination of 73.8 degrees (range 0-90). Mean VAS was 1.8 (range 0-2.5) mean OES of 36.5 (range 17-48) mean Q-DASH 31.1 (range 2.3-68.1) mean difference in grip strength between hands 11.7 lbs (range 4-32). No heterotopic ossification elbow dislocations or subluxations were observed. One patient had lax lateral ligaments but this had no clinical effect. One patient had ulnar nerve symptoms post operatively despite a satisfactory decompression. Complications included one patient with lateral flap necrosis requiring free tissue transfer. Four patients died of unrelated causes and 2 were lost to follow up.

This review suggests that DHH offers a satisfactory option for the treatment of un-reconstructable distal humerus fractures with outcomes similar to previously published results.

LABORATORY STUDY OF PRINCIPAL STRAINS AND STRAIN ENERGY DENSITY DEVELOPED IN THE GLENOID AND SCAPULA DURING PHYSIOLOGICAL LOADING OF A REVERSE SHOULDER REPLACEMENT

Author: S Lambert; K Chin; S Taylor

Institution: Institute of Orthopaedics and Musculoskeletal Science, UCL

Introduction:

We aimed to study the principal strains and strain energy density profile developed in the glenoid and scapular bone during simulated physiological loading through an implanted reverse total shoulder replacement (R-TSR).

Material and Results:

A custom-made R-TSR was implanted into each of 3 sawbone scapulae. Strain gauge rosettes were bonded at seven surgically relevant locations on each scapula. Each prosthesis was loaded in a Zwick computer-controlled loading rig using an in-line load cell for 30 seconds ramping up to 500N peak load at 4 functionally relevant angles: 45° scapular plane abduction 90° scapular plane elevation 45° elevation with 45° anterior-posterior load and 45° elevation with 45° posterior-anterior load. The strain energy density (SED) was calculated from the principal strains recorded from each gauge for each loading condition and the sawbones elastic modulus.

Matsen's point registered 30-50% of the total SEDs during all tests except during 45° elevation with 45° anterior-posterior load when the dorsal basal coracoid gauge recorded the highest principal strains. The antero-superior and postero-superior glenoid rim registered the second (19-28%) and third (10-27%) highest SEDs. The infraglenoid tubercle and anterior lateral column registered the lowest SED (1-5% and 2-13% respectively). Minimal differences in the coefficient of variability were noted between repeats.

Conclusion:

Strain energy is the energy stored by a material undergoing deformation. SED is considered to be predictive of osteoblastic activity: at optimal SEDs bone formation around implants may be enhanced. Conversely suboptimal SED may reflect poor potential for osseointegration and predictive of loosening. It would appear that a central screw should gain cortical purchase at Matsen's point and that for optimal load-sharing fixation should be gained in the superior glenoid vault region. Fixation in the subequatorial regions of the glenoid may not be relevant.

LONG TERM RESULTS OF TOTAL ELBOW REPLACEMENTS IN HEMOPHILIC ARTHROPATHY

Author: L Ernstbrunner; A Hingsammer; [MA Imam](#); R Sutter; B Brand; DC Meyer; K Wieser

Institution: Balgrist University Hospital, University of Zürich, Switzerland

Background:

It was hypothesized that the long-term survivorship and clinical outcome are reasonable justifying total elbow arthroplasty (TEA) in patients with end-stage hemophilic arthropathy.

Methods:

From 2002 to 2012 13 primary TEAs (Coonrad-Morrey design) were implanted in 9 consecutive patients with an average age of 55 (range 39-76) years. Type A hemophilia was diagnosed in 7 patients and type B hemophilia in 2 patients. Clinical and radiographic results of all (11 TEAs) but 1 patient were retrospectively analyzed.

Results:

After a mean of 9.1 (range 5-14) years the mean visual analog scale score for pain total Mayo Elbow Performance Score and subjective elbow value were significantly improved from 5 (standard deviation ± 3) to 2 (± 2 ; $P = .007$) points from 64 (± 16) to 89 (± 11 ; $P = .008$) points and from 47% ($\pm 15\%$) to 81% ($\pm 11\%$; $P < .001$) respectively. Whereas the flexion arc remained unchanged ($P = .279$) mean active pronation improved significantly ($P = .024$). Postoperative complications were recorded in 8 TEAs (62%) whereas 5 TEAs (38%) underwent partial component exchange after a mean of 7.2 (range 3-10) years: 2 for periprosthetic infection 2 for polyethylene wear and 1 for humeral component loosening. Of the living patients after partial component exchange ($n = 3$) the mean final total Mayo Elbow Performance Score flexion and rotation arc visual analog scale score for pain and subjective elbow value were comparable with the results of the living patients without revision surgery ($n = 8$).

Conclusions:

TEA for patients with advanced hemophilic arthropathy is associated with a substantial complication and revision rate. However even after revision without implant removal it provides good functional and subjective long-term results.

Level of evidence:

Level IV; Case Series; Treatment Study

PROSPECTIVE STUDY OF MRI FINDINGS IN SIMPLE ELBOW DISLOCATION

Author: T Luukkala; S Basu; D Temperley; TV Karjalainen; AC Watts

Institution: Wrightington Hospital, Wrightington, Wigan and Leigh NHS Foundation Trust

Purpose:

The elbow is the second most commonly dislocated joint. A model has been proposed in which simple elbow dislocations follow a stepwise posterolateral rotatory instability (PLRI) pattern from lateral to medial (Horii circle). The aim of this study is to describe the soft tissue injury patterns in adult simple elbow dislocation to test this model.

Methods:

A prospective study was conducted in a consecutive series of simple elbow dislocations presenting to a single surgeon over two years. Elbows were examined with x-ray prior to reduction and plain MRI. Injury to the medial and lateral ligament common flexor and extensor origin and anterior and posterior capsule were evaluated by two independent radiologists blinded to the aim of the study. Statistical comparison was with Fisher exact test and Cohen's kappa coefficient.

Results:

17 consecutive cases of simple elbow dislocation were included in the study. The most common injury was a posterolateral dislocation (PLD) on plain Xray (12 elbows). In these patients 100% had a tear of the medial collateral ligament. 92% had tears to the lateral ligament and common flexor origin and 67% had injury to the anterior capsule. Only 50% had common extensor origin tears and 1/12 (8%) had a tear to the posterior capsule. Inter-rater reliability was substantial (0.66 for MRI).

Conclusion:

The injury pattern in the majority of simple elbow dislocations appears to start on the medial side in keeping with a model of valgus hyper-extension injury. This conflicts with the standard model described by the Horii circle. Furthermore it is evident that a spectrum of soft tissue injury exists. The use of MRI may help to stratify patients and identify those at risk of persistent instability."

REVERSE TOTAL SHOULDER ARTHROPLASTY IN PATIENTS WITH PARKINSON'S DISEASE

Author: C Witney-Lagen; A Leonidou; L Natera; G Panagopoulos; G Sforza; J Bruguera; O Levy

Institution: Reading Shoulder Unit

Introduction:

Parkinson's disease is associated with increased muscle tone tremor and high risk of falls. Poor outcomes have been reported with anatomic total shoulder arthroplasty and there is concern regarding the potential for poor outcomes of reverse total shoulder arthroplasty (rTSA).

Aim:

The study purpose was to report rTSA outcomes in patients with Parkinson's disease.

Methods:

We identified all patients treated with rTSA who also had a diagnosis of Parkinson's disease. Data was collected prospectively. Clinical outcomes were Constant score Pain score Subjective Shoulder Value (SSV) strength range of movement and complications. Mean follow-up was 49 months.

Results:

There were 9 shoulders in 7 patients 2 bilateral. 5 were revision surgeries to rTSA: 1 from anatomic TSA 2 from hemiarthroplasty and 2 from resurfacing. Mean age at surgery was 71y 3m. Mean Constant score improved from 24.1 (Adjusted 32.2) preoperatively to 65.8 (Adjusted 91.1)

postoperatively ($p < 0.0001$). Pain Score (No pain = 15) improved from 5.6/15 to 13.7/15 ($p < 0.005$) and SSV from 1.4/10 to 8.4/10 ($p < 0.005$). Strength improved from 2.4lb to 9.5lb ($p = 0.0001$). Mean postoperative movement was 132 forward flexion 121 abduction 26 external rotation and 85 internal rotation. All patients could reach to or beyond the top of their head and their sacroiliac joint. There was no difference between 1-year follow-up and final follow-up scores. All patients were happy with surgery rating 8 shoulders as "much better" and 1 as "better" than preoperatively. There were no intra-operative surgical complications. X-ray review showed only 2 cases of non-progressive Grade 1 glenoid notching. There were no lucencies subsidence or stress shielding. No periprosthetic fractures occurred.

Conclusion:

Parkinson's disease should not be considered a contraindication for rTSA. Patients with Parkinson's can expect good clinical and radiographic outcomes and high rates of satisfaction. rTSA allows return to activities of daily living and functional independence.

REVERSE TOTAL SHOULDER REPLACEMENT FOR SHOULDER TRAUMA

Author: S Patel; H Sheikh; M Papanna; D Thyagarajan

Institution: Northern General Hospital, Sheffield Teaching Hospital NHS Trust

Background:

Recent trials looking at treatment of proximal humeral fractures have concluded that conservative treatment is as effective as surgery especially in the elderly. Under this cohort of "elderly" patients we often see active individuals with high functional demands who benefit from surgery.

Treatment of certain complex displaced fracture patterns fracture dislocations head split fractures is fraught with complications when internally fixed. In such cases shoulder hemi arthroplasty or more recently reverse shoulder replacement are widely accepted surgical options.

Aim:

To review clinical and radiological outcomes following reverse shoulder replacement for proximal humeral fractures.

Methods:

Retrospective review of prospectively collected data in 23 patients treated between 2014 – 2017 with reverse total shoulder replacement following complex fracture patterns. The procedures were carried out using a standard deltopectoral approach in all cases. New generation dual platform shoulder replacement system was used. All patients were followed up at six weeks six months and yearly thereafter. Shoulder range of movements Oxford Shoulder Score and complications were recorded during follow up. Radiological assessment was performed to look for notching tuberosity healing and implant loosening.

Results:

There were 21 females and 2 males with a mean age of 73.5 (range 64 -86). 18 were acute fractures and 5 were fracture sequelae. 21/23 patients regained good shoulder function following surgery. The average active elevation was 110° (70° – 170°). There were no postoperative infections or dislocations. One patient developed CRPS which responded to gabapentin and physiotherapy. No scapular notching was noted.

Conclusion:

Amidst the controversy surrounding operative management of proximal humeral fractures in elderly surgical management using reverse shoulder replacement appears to be beneficial in a select sub group of patients. Early results with this new generation system demonstrate good functional outcomes and low complication rates.

SCAPULAR WINGING DUE TO SERRATUS ANTERIOR PALSY: DEMOGRAPHICS, PRESENTATION AND AETIOLOGY IN A CONSECUTIVE SERIES OF 54 PATIENTS

Author: CY Ng

Institution: Wrightington Hospital, Wrightington, Wigan and Leigh NHS Foundation Trust

Purpose:

To analyse demographics presentations and aetiologies of serratus anterior (SA) palsy.

Methods:

This was a retrospective review of patients who presented to a single surgeon with scapular winging secondary to SA palsy. Video recordings of scapular movements were captured at each review. All of them underwent EMG. Blood tests (CK fascioscapulohumeral dystrophy (FSHD) genes Pompe enzyme assay) for muscular disorders were requested depending on presentations. Patients were diagnosed as 'classical' Parsonage-Turner syndrome (PTS) only if they reported spontaneous onset or flu-like illness heralding acute shoulder pain followed by muscle paralysis and resolution of winging within 2 years of onset. Scapular winging triggered by trauma was considered separately.

Results:

Between December 2014 and January 2018 54 patients with medial winging and scapular dyskinesia typical of SA palsy were assessed by the author. 30 of them saw a neurologist. There were 22 females and 32 males with a mean age of 39 years (range 15-77). The right scapula was affected in 40 left in 11 and bilateral in three patients.

43 patients had long thoracic nerve (LTN) palsy. Of them two were postsurgical (axillary surgery and thoracotomy) 8 were regarded as 'classical' PTS and 19 had a traumatic onset.

9 patients had a myopathic cause (7 FSHD one unspecified myopathy one myotonic dystrophy). Notably 6 FSHD cases were initially referred as suspected LTN palsy.

Overall 26 (48%) patients had persistent scapular winging beyond two years of onset. Two had negative investigations despite characteristic clinical features.

Conclusion:

In this series 80% of SA palsy had a neurogenic cause 16% were due to myopathy and 4% were indeterminate. Not all scapular winging resolve spontaneously. One should consider LTN injury and myopathy as differential diagnosis and investigate accordingly. Assessment by a neurologist particularly for those with atypical presentations is recommended.

SHORT TO MID-TERM OUTCOMES OF STEMLESS HUMERAL TOTAL SHOULDER ARTHROPLASTY

Author: Z Borton; MC Papanna; A Jaiswal; M Morgan; A Tambe; T Cresswell; M Espag; D Clarke

Institution: Derby Shoulder Unit

Background:

Shoulder arthritis refractive to conservative management can be successfully treated with total shoulder arthroplasty. There is increasing interest in 'stemless' humeral components proposed to preserve humeral bone stock for potential future revision and mitigate the risk of peri-prosthetic fracture. Published data on clinical results are comparable with stemmed shoulder arthroplasty.

Objectives:

To evaluate the short to medium term clinical and radiological outcomes of an anatomical stemless shoulder arthroplasty.

Material and Methods:

A prospectively maintained database was retrospectively reviewed. All patients who underwent total shoulder arthroplasty using a stemless humeral component were identified. Patient-reported outcomes were collected preoperatively and post operatively at 3 6 and 12 months and then yearly thereafter. Clinical and functional outcomes were recorded at each of these time points. Radiographic analysis was performed to evaluate for radiolucent lines and bone mineral density at the prosthesis-bone interface.

Results:

Thirty nine patients were identified with a mean follow up of 32 months (12-58) and age at operation of 59.10 (55-75). Flexion was increased by 32.1 degrees to a mean of 117.6° abduction by 44.1° to 112° and external rotation by 23.4° to 48°. All were significant at $p < 0.001$. Oxford shoulder score improved by 19.3 points to 21.2 and Constant-Murley score by 35 to 60.01. These improvements were also significant at $p < 0.001$ at most recent follow-up and remained significant at all intervening time-points. On review of the radiographs 29 (74.4%) had no evidence of altered bone density 9 (23%) demonstrated reduced humeral mineralisation adjacent to the implant without a lucent line and 1 patient (2.6) had evidence of a lucent line $< 2\text{mm}$.

Conclusions:

The clinical results of this study are comparable with similar previous studies reported in the literature. Furthermore the radiological parameters had no impact on the overall functional outcomes.

TIME TO SURGERY: EFFECT ON PATIENT-REPORTED OUTCOMES IN PROXIMAL HUMERAL FRACTURES. A SUB-ANALYSIS OF THE PROFHER TRIAL

Author: JG Norman; A Keding; S Brealey; D Torgerson; A Rangan

Institution: York Trials Unit, University of York

Purpose:

To descriptively explore the relationship between patient outcomes and time from trauma to surgery in fractures of the proximal humerus.

Methods:

Due to the reduced statistical power of this post hoc study only descriptive analyses of data from the Proximal Fracture of the Humerus Evaluation by Randomisation (PROFHER) trial were undertaken. Oxford Shoulder Score (OSS) data was plotted against time to surgery age and fracture type with cut-offs drawn to illustrate variations in international practice. Long-term recovery was explored by plotting six-month OSS against OSS at five-years. Agreement of OSS at both time points was illustrated with a Bland-Altman plot.

Results:

The mean time from initial trauma to surgery was 10.5 days (range 1-33 days $SD \pm 6.51$ days 95% CI 9.26-11.7). Descriptive analyses indicated that earlier surgical intervention was no more likely to generate superior OSS at any point of follow-up compared to later management. This includes when stratifying by patient age (< 65 versus ≥ 65 years old) and fracture severity (1- and 2-part versus 3- and 4-part fractures). Furthermore patients managed later than reported international averages (3 days in the USA/Europe 8 days in the UK) did not have correspondingly inferior outcomes. 76% ($n=50$) of the 66 patients managed surgically with OSS data available at 6-months and 5-years had the same ($n=3$) or improved ($n=47$) OSS scores at the end of follow-up. A moderate to strong correlation coefficient was calculated ($r=0.613$). A Bland-Altman plot demonstrated a positive average mean difference ($+3.3$ OSS points ± 7.92 days) with wide 95% limits of agreement (-12.2 and 18.8 OSS points).

Conclusion:

Descriptive analyses cautiously suggest that timing of surgery post-injury has no effect on the OSS at any time-point in PROFHER patients. Most patients experienced improved OSS at 5-years compared to 6-months but with considerable variation in agreement of improvement.



BESS
Evidence through knowledge

Thank you for joining us at BESS Glasgow 2018 for our 30th annual scientific meeting
