North Carolina Orthopaedic Association

2015 Annual Meeting

Upper Extremity
Saturday, October 10

October 9-11, 2015 • Kiawah Island Golf Resort
Kiawah Island, South Carolina

This continuing medical education activity is jointly provided by the NCOA and the Southern Regional Area Health Education Center
35 year old female appointments listed as “Trigger Finger”

- Lifetime difficulty extending fingers (on both hands) “unless my wrist is pointed down.”
- Father and Grandfather had same condition

Physical Exam:

- Exam
  - Normally developed female
  - No stigmata of congenital differences
  - Bilateral Extrinsic Tightness of FDS and ? FDP, and mild involvement of FPL
  - No intrinsic tightness, no wrist flexor/pronator tightness
- Recommendation...
  - Continue as you have for 35 years

3 years later.... Same patient

- “I want to try to fix my fingers”
- “I was teased as a child and am scarred” (emotional at this point in encounter)
- “It is awkward socially shaking hands”
- “I can’t clap at games/concerts, shake hands, braid my daughters’ hair, etc...”
- Long discussion had with the patient

Disclosure

- Educational lecturer for Acumed
Options??

- Z-lengthening of FDS, FPL, and possibly FDP ??
- Flexor slide ??
- Consented for both, contingent on intra-operative findings

Both FDP & FDS tight...Z-lengthening abandoned

Ulnar & Median nerves isolated

Pre-Op Video

First Post-Op (NVI)
OT dorsal ext block splint for 6 weeks- Active Extension no active flexion, but digital PROM allowed.

Knuckle Pads Non-op side

Knuckle Pads Operative Side

POD #28

Week 10
6 months later - Dominant Side
Hereditary Congenital Shortening of FDP/FDS & FDP – paucity of literature


- Trismus pseudocamptodactyly syndrome.
- Inability to open mouth fully, IP contractures with wrist extended

- Congenital Volkmann’s ischemic contracture

1 Year Left / 6 months Right

Thank you

1. Mack Aldridge III, MD
Triangle Orthopaedics
Durham, NC
Massive rotator cuff repairs using interposition porcine acellular dermal matrix xenograft

32nd Annual Southern Orthopaedic Association Annual Meeting
Kiawah Island, SC
October 10, 2015

Duke Orthopaedic Surgery
Julie A Neumann, MD
Kathleen D Reay, MD
Milt H Zgonis, MD
Stephanie W Mayer, MD
Blake R Boggess, DO
Alison P Toth, MD

Disclosures/Source of Funding
- Julie A Neumann, MD - None
- Kathleen D Reay, MD - None
- Milt H Zgonis, MD - None
- Stephanie W Mayer, MD - None
- Blake R Boggess, DO - Educational grants to teach ultrasound courses: GE®; Sonosite, Inc.; Bioventus LLC; Arthrex, Inc.
- Alison P Toth, MD - Research support, Education Consultant, Speaker’s bureau: Tornier, Inc.

Background
- Massive rotator cuff tears (RCT): debilitating shoulder pain & decreased range of motion
- Difficult problem to treat
- Failure rates of primary RCR 20-90%
- Healing ability RCT inversely size tear & retraction

Purpose
- Short-term safety & efficacy of repairing massive tears with interposition porcine acellular dermal matrix xenograft
- Second and largest case series of repair of massive RCTs with porcine xenograft in which patients are followed clinically and via imaging
- Hypothesis: Interposition of porcine acellular dermal matrix xenograft in massive RCT will improve:
  - Subjective outcomes, pain, function, ROM, strength

Background
- Massive RCT:
  - Nonoperative
  - Debridement
  - Partial open or arthroscopic RCR
  - Muscle transfers
  - Arthroplasty
  - Extracellular matrix augmentation
  - Tissue interposition
- No clear front runner
- Porcine acellular dermal matrix xenograft (Conexa™, Tornier, Inc; Bloomington, Minnesota) not FDA-approved as interposition grafts

Methods
- Prospective, observational
- PI performed all surgeries
- RCR
  - Mini-open approach
  - Interposition porcine acellular dermal matrix xenograft
  - Jan 2009 to March 2011
- 37 patients
  - 5 revisions

Arthroscopically place medial sutures

Cuff retracted to glenoid

Mean age 66 years (range, 51 to 80)
Mean follow-up 33 months (range, 23 to 48)
**Indications**

- Full-thickness RCT, >5cm preoperative MRI
- Failed non-operative management X 6 mo
  - NSAIDs and PT
- Inability to restore cuff to anatomic footprint
- No limitation to postoperative PT

**Methods**

- Subjective:
  - Visual Analog Score (VAS) (0 to 10, 0 = no pain)
  - Modified American Shoulder and Elbow Score (MASES)
  - Short-Form 12 (SF-12)
- Objective:
  - Active ROM FF, ER, IR (goniometer)
  - Strength SS and IS:
    - Manually (10 pt scale)
    - IsoSource Control Dynamometer (Medical Devices Solutions AG, Oberburg, Switzerland)
  - Ultrasound: integrity of the repair

**Results**

- No major postoperative complications
  - Infection
  - Tissue rejection
  - Hardware migration/fracture

**Dynamometer Results**

<table>
<thead>
<tr>
<th></th>
<th>Pre-operative</th>
<th>Final Follow-up</th>
<th>P Value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain (VAS)</td>
<td>4.53 (2.22)</td>
<td>1.06 (1.83)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>SF-12</td>
<td>47.49 (6.27)</td>
<td>48.50 (6.81)</td>
<td>0.544</td>
</tr>
<tr>
<td>Active forward flexion</td>
<td>133.2° (42.3)</td>
<td>157.9° (25.4)</td>
<td>0.005</td>
</tr>
<tr>
<td>Active external rotation at 0° abduction</td>
<td>51.56° (21.68)</td>
<td>64.25° (17.1)</td>
<td>0.004</td>
</tr>
<tr>
<td>Active internal rotation at 90° of abduction</td>
<td>49.81° (19.72)</td>
<td>73.96° (8.83)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Supraspinatus strength†</td>
<td>7.3</td>
<td>8.9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Infraspinatus strength†</td>
<td>7.4</td>
<td>9.4</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

*Within subject differences were tested using paired t-tests. Significance (2-tailed) was set at 0.05.
†Based on muscle strength conversion scale adapted from Table 1 of Kendall et al (Kendall)
MASSES/SF-12 Results

Conexa™ graft implanted

- Average post-operative MASSES was 89.23 +/- 13.91
- Post-op SF-12 was 48.5
- Only 14 patients had pre-operative SF-12 scores (mean 47.5)
  - Difference in pre-operative and post-operative scores: not statistically significant

Conclusions

- After RCR with interposition xenograft, significant improvement in pain, range of motion, and manual muscle strength
  - Subjectively good function by MASES and SF-12
- Repair was completely intact in 89% on U/S, vast improvement vs. primary repairs of massive RCT
- Interposition porcine acellular xenograft holds great promise in treatment of massive RCTs

Ultrasound Results

- 89.1% (33/37) fully intact
- 8.1% (3/37) partial tears
  - 1/3: revision RCR
  - 2.7% (1/37) not intact
    - Revision RCR
    - Early post-op weight lifting
    - Tx conservative

Table 2. Characteristics of patients who had partial thickness RCT based on ultrasonographic examination

<table>
<thead>
<tr>
<th>Postop VAS</th>
<th>Patient #1</th>
<th>Patient #2</th>
<th>Patient #3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preop VAS</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Manual pre</td>
<td>SS strength</td>
<td>SS strength</td>
<td>SS strength</td>
</tr>
<tr>
<td>Manual post</td>
<td>SS strength</td>
<td>SS strength</td>
<td>SS strength</td>
</tr>
<tr>
<td>Active ROM</td>
<td>Improved</td>
<td>Improved</td>
<td>Improved</td>
</tr>
<tr>
<td>External rotation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal rotation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Generally, manual SS and IS strength as well as active ROM improved.

Limitations

- Nonrandomized design
- Limited # of patients
- Associated procedures
- Dynamometer only used post-op
- Observation bias
  - Primary surgeon measured post-operative ROM and manual muscle strength
  - Ultrasonographer not blinded to physical exam findings and clinical status of patients during exam

References

References

Introduction

• Providers will soon be reimbursed based on quality performance.
• Growing consensus that patient reported outcome measures (PROMs) will be mandated.
• Adequate information regarding measurement properties for PROMs is needed to select the best PROMs to use in any given patient population.

Purpose

To evaluate which patient reported outcome measures (PROMs) perform best in patients with upper extremity morbidity.

Methods

• New patients presenting with upper extremity complaints were asked to complete questionnaires at initial visit and 6 months later
• Region Specific PROMs
  – American Shoulder and Elbow Surgeon (ASES)
  – Disabilities of the Arm, Shoulder, and Hand (DASH)
• General Health Related Quality of Life PROMs
  – EuroQol-5D (EQ-5D)
  – Veterans Rand – 12 (VR-6D)

Methods: Psychometric Properties

• Ceiling effect and floor effect were analyzed to determine if the PROM differentiates patients at the highest and lowest scores.
• Pearson Interclass Correlation (ICC) to determine if from is valid, e.g. does it measure what it is supposed to measure.
Methods: Psychometric Properties

• Cronbach’s alpha (CA) to determine if the PROM is consistent or reliable from pre to post.
• Effect size to determine if PROM will detect a clinically meaningful change from pre to post

Results

• Mean initial scores
  – ASES: 53.1/100
  – DASH: 26.9/100 (reverse scored)
  – EQ5D: 0.79/1
  – VR6D: 0.70/1

• Mean 6 month scores
  – ASES: 64.6/100
  – DASH: 20.0/100 (reverse scored)
  – EQ5D: 0.81/1
  – VR6D: 0.72/1

Significant differences in the initial and six-month scores were found for all instruments.

Results - Combined

• Ceiling effects with DASH and EQ5D
• Validity: Compared to ASES, DASH (ICC -0.6467, -0.4945) does not meet threshold criterion of 0.7
• Internal consistency/Reliability: DASH is superior (CA 0.6777) to ASES (CA 0.6406).
• Responsiveness: ASES is superior (ES 0.6740) to DASH (ES -0.4056)
• VR-6D is superior to EQ-5D in all aspects

Results - by Body Part

Differences in validity based on region and timepoint

<table>
<thead>
<tr>
<th>Region</th>
<th>EQ-5D</th>
<th>VR-6D</th>
<th>ASES</th>
<th>DASH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand/Wrist</td>
<td>0.7206</td>
<td>-0.6912</td>
<td>-0.6479</td>
<td>0.8506</td>
</tr>
<tr>
<td>Elbow</td>
<td>0.7422</td>
<td>0.0371</td>
<td>0.6406</td>
<td>0.7937</td>
</tr>
<tr>
<td>Shoulder</td>
<td>0.6361</td>
<td>-0.8287</td>
<td>0.7866</td>
<td>-0.8142</td>
</tr>
<tr>
<td>All</td>
<td>0.7007</td>
<td>-0.6457</td>
<td>0.7227</td>
<td>-0.4945</td>
</tr>
</tbody>
</table>

The DASH and VR-6D are the most reliable, or consistent, from initial to 6 months. DASH is least reliable for shoulder patients.

Only the ASES for shoulder patients was responsive to change from initial to 6 months.

<table>
<thead>
<tr>
<th>Region</th>
<th>ASES</th>
<th>DASH</th>
<th>EQ-5D</th>
<th>VR-6D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand/Wrist</td>
<td>--</td>
<td>-0.2466</td>
<td>0.132</td>
<td>0.0993</td>
</tr>
<tr>
<td>Elbow</td>
<td>-0.464</td>
<td>-0.6093</td>
<td>0.0428</td>
<td>0.1548</td>
</tr>
<tr>
<td>Shoulder</td>
<td>-0.8173</td>
<td>-0.8189</td>
<td>0.3688</td>
<td>0.3165</td>
</tr>
<tr>
<td>All</td>
<td>0.674</td>
<td>-0.4056</td>
<td>0.1017</td>
<td>0.1857</td>
</tr>
</tbody>
</table>
Conclusion

• The VR-6D is the best choice for a general HRQOL measure for upper extremity patients.
• Tradeoff between validity, reliability and responsiveness properties between the DASH and ASES region specific measures.
• It may be necessary to use both ASES and DASH instruments to completely measure the PRO of all upper extremity patients.

Thank you
Introduction

• Carpal tunnel syndrome
  – Most commonly reported and treated compression neuropathy within the United States (1,2,3)

Disclosures

• No relevant conflicts to disclose

Introduction

• Current rates of utilization of the open or endoscopic technique?
  – Current practicing orthopaedic surgeons in the United States?
  – Trained hand specialists versus non-hand fellowship trained orthopaedists?

Introduction

• Use of American Board of Orthopaedic Surgery (ABOS) Part II Database:
  – trends amongst orthopaedic surgeons
  – more prevalent in current literature (5,6,7,8).

• Accurate assessment of:
  – Current standards of practice
  – Evaluation of trends in management
  • Inference of core surgical skills (outcomes, complications)
  • Determining areas of need for further research
Purpose

- Utilize ABOS Part II database to investigate Carpal Tunnel Surgery:
  - Current rates (open/endoscopic)
  - Recent trends (regional/national)
  - Complications
  - Influence of type of fellowship training
    • hand vs. non-hand

Methods

- Query of ABOS database from 2003-2013 for:
  - Patients with CTS (ICD-9: 354.0)
  - Carpal tunnel release (CTR) either:
    • Open (CPT: 64721)
    • Endoscopic (CPT: 29848)
  - Exclusion: cases with multiple CPT codes

Methods

- Data gathered:
  - Geographic location
  - Fellowship
  - Surgical Complications

- Divided into two cohorts:
  - Hand fellowship trained
  - Non-hand fellowship trained (all others)

- Analysis with Chi-square tests of independence and for trend.

Results

![Recent Trends in Rates of ECTR vs OCTR](chart.png)

- Analysis with Chi-square tests of independence and for trend.
Results

- **No difference in complications** between two cohorts (fellowship training)
  - Overall, ECTR, OCTR

- Specific complications:
  - **OCTR:** higher wound complications
  - **ECTR:** higher nerve palsy
  - Postoperative pain equivalent (ECTR vs OCTR)

Discussion

Prior Data:

- Leinberry et al. 2012 (9):
  - Repeated a survey of the American Society for the Surgery of the Hand (ASSH)
  - 36% utilized ECTR a majority of the time
  - 48% response rate
  - Complications were not reported.

- Munns et al. 2015 (10):
  - Similar online survey of ASSH members
  - 30% response rate
  - 20% use of the ECTR

Discussion

Our results:

- Much lower utilization rate of 12.4% ECTR (18% for hand fellowship)

- Strong trend towards ECTR over 11 year period (hand-fellowship cohort)

- Regional analysis:
  - NW performed the largest proportion ECTR (23.1%)
  - SW performed the fewest (5.9%)

Discussion

Endoscopic vs. Open?

- **Hypothesized a higher rate of complications than previously reported for two reasons:**
  - candidate surgeons for Part II ABOS would be more likely to report complications
  - case collection falls during the first few years and during the learning curve

- We found similar complication rates compared to previously reported data:
  - 3.6% overall (2.8% ECTR, 3.7% OCTR)

Discussion

Endoscopic vs. Open?

- We expected to discover a higher rate of complications among non-hand fellowship cohort

- **Operative technique** (open versus endoscopic) & **Fellowship training** (hand fellowship versus non-hand fellowship trained)

  → no significant impact on overall complication rates
Limitations

- Observational cohort study:
  - Inherently biased, relying on surgeon reported rates and complications.
- ABOS dataset:
  - No descriptive requirements of reporting complications (rely on the surgeon judgement for reporting)
  - “Surgeon Unspecified” (exact rates unclear)
  - “Conversion to open technique” not listed complication
  - Data only from surgeons early in their career
  - Does not represent the true rates and trends within the US
- 13 cases were coded as both OCTR and ECTR - excluded

Conclusions

- Increasing rate of ECTR over 11 years
  - 12.4% of all CTR cases were done endoscopically.
- Hand fellowship trained orthopaedists - performed 4.5 times (18% versus 4%) the number of ECTR than non-hand fellowship trained surgeons
- Complication rates remain low in the first few years of practice
- No difference in complication rates between these groups

References


Questions?
Define the problem

What is long-toss?

When do we use long-toss?

How is long-toss used?

54 manuscripts

4 meeting inclusion criteria

Data-based Interval Throwing Programs

Biomechanical Studies

A Critical Review of the Long-Toss in Baseball Throwing

Austin V. Stone MD, PhD | Sandeep Mannava MD, PhD
Michael T. Freehill, MD

Wake Forest Baptist Medical Center

Disclosures

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Michael T. Freehill, MD
Research support: Smith & Nephew
Consultant: Smith & Nephew

Sandeep Mannava, MD, PhD
Patent issued: Rotator cuff tensioning device

Austin V. Stone, MD, PhD
Research Support: Smith & Nephew

Return to Throwing

Interval Throwing

Flat ground

Simulated Game

Return to Pitching

Interval Throwing

Biomechanical Studies

Original Research Article

How far is long-toss?

120 ft – 180 ft & Maximal distance 260 ft ± 30 ft
Fleisig et al, 2011

180 ft
Slenker et al, 2014

No differences in humeral internal rotation torque with increasing distances. 60 – 180 ft
Slenker et al.

Increased humeral internal rotation torque with maximal distance throw 260 ± 30 ft
Fleisig et al.

Conclusions
Distance varies
Mechanics vary
Functional use varies
Rehabilitation varies

Next Steps
• Concrete definition of the distance
• Purpose in strengthening and rehabilitation
• Goal in maintenance of strength

Questions
Acknowledgements
Michael T. Freehill, MD
Sandeep Mannava, MD, PhD
Department of Orthopaedic Surgery
Closing the gap: a novel technique for humeral shaft nonunions using cup and cone reamers

Study Purpose

• Describe a novel surgical technique for humeral shaft nonunions using cup and cone reamers, originally designed for MTP arthrodesis

• Report three illustrative patient cases

Introducion

Humeral Shaft Fractures

• 5-8% of all fractures

• Vast majority heal uneventfully with functional bracing

• 5.5% nonunion rate following closed treatment

• Significantly greater than initial rate of 0-2% reported by Sarmiento

Surgical Techniques

Controversy continues around selecting best surgical strategy

Closed: reduce risk of sepsis and radial paralysis
locked IM nailing or external fixation

Open: correct deformity and obtain absolute stability
• compression plating and bone graft
• dual plating
• cortical strut allograft and autograft
• adding biologic augmentation (BMP)

Disclosures

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  – Consultant/Royalties: Tornier, DJO
  – Fellowship/Education/Research Support: Zimmer, Breg, Stryker, Mitek

No funding was provided for this study

Most widely used and standard of care is ORIF with rigid compression plating and autogenous bone grafting

Duke University Medical Center

9/24/2015
ORIF Not Perfect

Nonunion rate of open plating has been reported to be 4.3%–12.5%.\textsuperscript{7,9}

Bone Preparation
- Osteotomy\textsuperscript{15}
- Decortication
- Grafting
  - Autograft
  - Allograft
  - Limited fibrous callus removal\textsuperscript{8}

Optimal treatment: Resecting atrophic nonunions, shortening the bones, drilling sclerotic areas, and apposing bleeding diaphyseal surfaces\textsuperscript{5,15}

Closing the Gap

Osteotomes, curettes, motorized burrs/saws, and rongeurs have been used to fashion the bony ends

Tedious process and can result in imperfect apposition of the contiguous prepared surfaces which can be seen radiographically

Cup/Cone Reamer advantages:
- Maximize bone surface area contact
- Alignment correction in any plane
- Speed
- Simplicity

Convex to Concave Preparation

Hand\textsuperscript{13}

Knee\textsuperscript{14}

Surgical Technique

Expose fracture ends

Video: Proximal Reaming

Cone Reamer creating Proximal Cup

Video: Distal Reaming

Cup Reamer creating Distal Cone
Surgical Technique

1. Expose fracture ends
2. Ream Cup/Cone
3. Reduce

Case Examples

1. 30yr male aseptic nonunion
2. 48yr male aseptic nonunion
3. 31yr female deformed septic nonunion s/p ORIF, I&Dx2, ROH

Case 1: 30yr Male

10 foot fall while roofing.

2 week Sarmiento

6 week
Case 1: Intraoperative Films

Postop Films

2 week

6 week

3 months

Case Examples

1. 30yr male aseptic nonunion
2. 48yr male aseptic nonunion
3. 31yr female deformed septic nonunion s/p ORIF, I&Dx2, ROH

Case 2: 48yr male

fall from ladder

Case 2: 48yr male

2 weeks

6 months
3 months post op

Case Examples

1. 30yr male aseptic nonunion
2. 48yr male aseptic nonunion
3. 31yr female deformed septic nonunion s/p ORIF, I&Dx2, ROH

Case 3: 31yr female

Presents to us for the first time 1.5 years after fracture in MVC, ORIF with acute infection 5 weeks post op requiring I&Dx2 then ROH 4 months post op

Case 3 Intraoperative
Case 3: 31yr female

3 month post op

Results

- All patients achieved union
- Zero pain and full functional outcomes

Conclusion

We describe a simple and effective technique for humeral shaft nonunions which has been successful in both septic and hypertrophic nonunions, as well as from multiple approaches—both anterolateral and posterior.

Works Cited

Perioperative Transfusion Predicts Early Prosthetic-Related Complications In Total Shoulder Arthroplasty

Thorsten M Seyler MD PhD, Abram Bala BA, Colin T Penrose BA BS, Timmothy R Randell MD, Richard C Mather III MD, Michael P Bolognesi MD, Grant E Garrigues MD

Department of Orthopaedic Surgery, Duke University Medical Center, Durham, NC

2015 North Carolina Orthopaedic Association Annual Meeting
Kiawah Island, SC

Purpose/Hypothesis

- 90-day prosthetic related complications are an important metric in hip and knee arthroplasty in the Medicare population, yet these guidelines have not been established for total shoulder arthroplasty (TSA).
- TSA utilization is rising in the Medicare population, however the transfusion rate has remained relatively constant.
- Transfusion in THA/TKA associated with increased odds of mortality, with mixed results in for infection. (1,2)
- Limited data in TSA, but transfusion has been associated with increased surgical site infections. (3)

Materials and Methods

Design:
- Retrospective Medicare database review of TSA and RTSA patients from 2005-2012 using PearlDiver Technologies.
- Analyzed complications with index operation performed between 2005 and 2010, guarantee 2 year follow up minimum.

Outcomes:
- Used ICD-9-CM and CPT codes for Elixhauser comorbidities, medical complications, and surgical complications.
- Measured outcomes at 7 days, 30 days, 90 days, 1 year, 2 years, and overall.

Analysis:
- Analysis comparing groups using chi-squared (statistical significance defined as alpha of <0.05)
- Incidence (IN), Odds Ratios (OR), 95% Confidence Intervals (CI), p-values calculated. Results illustrated as Forest plots.

Transfusion Rate

Transfusion Group: 7,936 | No Transfusion: 83,619 | Overall: 9.5%

Results

90 Day Medical Complications
Results

90 Day Surgical Complications

<table>
<thead>
<tr>
<th>Complication</th>
<th>Transfusion</th>
<th>No Transfusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthrotomy/I&amp;D (Shoulder)</td>
<td>1.90%</td>
<td>1.50%</td>
</tr>
<tr>
<td>Broken Prosthetic Joint</td>
<td>0.37%</td>
<td>0.23%</td>
</tr>
<tr>
<td>Cellulitis or Seroma</td>
<td>2.03%</td>
<td>0.90%</td>
</tr>
<tr>
<td>Closed Acromial/coracoid/glenoid Scapular Fracture</td>
<td>0.88%</td>
<td>0.29%</td>
</tr>
<tr>
<td>Closed Distal Clavicular Fracture</td>
<td>13.42%</td>
<td>3.51%</td>
</tr>
<tr>
<td>Closed Proximal Humerus Fracture</td>
<td>13.42%</td>
<td>3.51%</td>
</tr>
<tr>
<td>Closed Shoulder Dislocation</td>
<td>2.63%</td>
<td>1.51%</td>
</tr>
<tr>
<td>Dislocation of Prosthetic Joint</td>
<td>1.50%</td>
<td>0.78%</td>
</tr>
<tr>
<td>Manipulation Under Anaesthesia Of Shoulder</td>
<td>0.10%</td>
<td>0.38%</td>
</tr>
<tr>
<td>Mechanical Complications</td>
<td>1.20%</td>
<td>0.69%</td>
</tr>
<tr>
<td>Neuro Injury (Shoulder)</td>
<td>0.29%</td>
<td>0.14%</td>
</tr>
<tr>
<td>Osteolysis + Polywear</td>
<td>0.04%</td>
<td>0.84%</td>
</tr>
<tr>
<td>Periprosthetic Fracture</td>
<td>0.42%</td>
<td>0.13%</td>
</tr>
<tr>
<td>Periprosthetic Infection</td>
<td>0.78%</td>
<td>0.30%</td>
</tr>
<tr>
<td>Reduction of Shoulder Dislocation</td>
<td>0.97%</td>
<td>0.43%</td>
</tr>
<tr>
<td>Shoulder Instability</td>
<td>0.78%</td>
<td>0.62%</td>
</tr>
<tr>
<td>Shoulder Pain</td>
<td>26.79%</td>
<td>26.91%</td>
</tr>
<tr>
<td>Shoulder Stiffness</td>
<td>4.11%</td>
<td>5.02%</td>
</tr>
<tr>
<td>TSA Revision/Repair</td>
<td>0.86%</td>
<td>0.75%</td>
</tr>
<tr>
<td>Vascular Injury (Shoulder)</td>
<td>0.40%</td>
<td>0.10%</td>
</tr>
</tbody>
</table>

Overall Surgical Complications

<table>
<thead>
<tr>
<th>Complication</th>
<th>Transfusion</th>
<th>No Transfusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthrotomy/I&amp;D (Shoulder)</td>
<td>1.80%</td>
<td>1.50%</td>
</tr>
<tr>
<td>Broken Prosthetic Joint</td>
<td>0.37%</td>
<td>0.23%</td>
</tr>
<tr>
<td>Cellulitis or Seroma</td>
<td>13.77%</td>
<td>10.16%</td>
</tr>
<tr>
<td>Closed Acromial/coracoid/glenoid Scapular Fracture</td>
<td>1.52%</td>
<td>0.67%</td>
</tr>
<tr>
<td>Closed Distal Clavicular Fracture</td>
<td>0.30%</td>
<td>0.15%</td>
</tr>
<tr>
<td>Closed Proximal Humerus Fracture</td>
<td>14.99%</td>
<td>4.61%</td>
</tr>
<tr>
<td>Closed Shoulder Dislocation</td>
<td>4.30%</td>
<td>2.74%</td>
</tr>
<tr>
<td>Dislocation of Prosthetic Joint</td>
<td>5.03%</td>
<td>3.61%</td>
</tr>
<tr>
<td>Manipulation Under Anaesthesia Of Shoulder</td>
<td>0.28%</td>
<td>0.38%</td>
</tr>
<tr>
<td>Mechanical Complications</td>
<td>4.52%</td>
<td>3.65%</td>
</tr>
<tr>
<td>Neuro Injury (Shoulder)</td>
<td>0.64%</td>
<td>0.47%</td>
</tr>
<tr>
<td>Osteolysis + Polywear</td>
<td>0.91%</td>
<td>0.84%</td>
</tr>
<tr>
<td>Periprosthetic Fracture</td>
<td>1.95%</td>
<td>0.97%</td>
</tr>
<tr>
<td>Periprosthetic Infection</td>
<td>3.91%</td>
<td>2.53%</td>
</tr>
<tr>
<td>Reduction of Shoulder Dislocation</td>
<td>1.83%</td>
<td>1.06%</td>
</tr>
<tr>
<td>Shoulder Instability</td>
<td>1.50%</td>
<td>1.20%</td>
</tr>
<tr>
<td>Shoulder Pain</td>
<td>46.23%</td>
<td>44.47%</td>
</tr>
<tr>
<td>Shoulder Stiffness</td>
<td>7.35%</td>
<td>8.24%</td>
</tr>
<tr>
<td>TSA Revision/Repair</td>
<td>1.55%</td>
<td>1.48%</td>
</tr>
<tr>
<td>Vascular Injury (Shoulder)</td>
<td>0.82%</td>
<td>0.47%</td>
</tr>
</tbody>
</table>

Discussion

• Major Medical Complications:
  – Excluding Bleeding Related
    • ARF
    • Sepsis/SIRS
    • Respiratory Failure

• Major Surgical Complications:
  • Closed fracture (Humerus, Scapula)
  • Periprosthetic Fracture

• No Difference In:
  • TSA Revision (90 Day and Overall)

Conclusion

Summary:

• TSA remains an important treatment modality for numerous indications.

• Surgeons should be aware that these patients may have higher rates of early complications and should pre-emptively counsel patients during admission and at discharge.

Significance:

• First study to examine multiple medical and surgical complications for TSA/RTSA with transfusion.

• Perioperative blood transfusion may serve as a useful metric to identify sicker patients.

References


THE USE OF ULTRASOUND AS THE SOLE DIAGNOSTIC TOOL FOR ROTATOR CUFF TEARS

Chris Caldwell (Brody School of Medicine- M.D. Candidate, Class of 2018)
Dr. Deanna Boyette M.D. (Boyette Orthopedics- Greenville, NC)
Dr. Edwin Bartlett M.D. (Boyette Orthopedics- Greenville, NC)

ABSTRACT

Purpose:
To show that ultrasounds can be an adequate diagnostic tool for rotator cuff tears when compared to MRI

Inclusion criteria:
- Retrospective study
- 51 shoulder arthroscopy patients
- Shoulder ultrasounds prior to the procedure

Comparisons:
- Accuracy versus MRI
- Cost versus MRI

Discussion:
Ultrasound positioning alternative to Crass technique

<table>
<thead>
<tr>
<th>Arthroscopy Findings</th>
<th>Ultrasound Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotator Cuff tear</td>
<td>30</td>
</tr>
<tr>
<td>Rotator Cuff intact</td>
<td>13</td>
</tr>
</tbody>
</table>
The Use of Ultrasound as the Sole Diagnostic Tool for Rotator Cuff Tears:

**STATISTICAL ANALYSIS**

- **Sensitivity:** 0.81 (95% confidence interval: 64.8-92.0)
- **Specificity:** 0.93 (95% confidence interval: 66.1-99.8)
- **Positive Predictive Value:** 0.97 (95% CI: 83.3-99.9)
- **Negative Predictive Value:** 0.65 (95% CI: 40.8-84.6)

The Use of Ultrasound as the Sole Diagnostic Tool for Rotator Cuff Tears:

**COMPARISON**

Ultrasound sensitivity: 81.1%

MRI sensitivity: 87.8%


The Use of Ultrasound as the Sole Diagnostic Tool for Rotator Cuff Tears:

**DISCUSSION**

Crass and Modified Crass Positioning:


The Use of Ultrasound as the Sole Diagnostic Tool for Rotator Cuff Tears:

**DISCUSSION**

New Positioning technique:
THE USE OF ULTRASOUND AS THE SOLE DIAGNOSTIC TOOL FOR ROTATOR CUFF TEARS

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