Elbow Arthroscopy

Experience

Uncommonly scoped joint

Based on AAOS Survey:

• Only 7.6% of Orthopaedic Surgeons perform elbow arthroscopy

• Elbow arthroscopy constitutes only 2% of all orthopedic procedures
Elbow Arthroscopy

The most hazardous joint in terms of risk to intimately associated neurovascular structures poses greater technical challenges/neurologic risks than knee/shoulder scope.
Indications

- Removal of Loose body(ies)
- Olecranon Impingement Overload
- OCD Capitellum
- Debridement Degenerative Arthritis
- Synovectomy
- Diagnostic Evaluation
- Capsular Release
- Fx evaluation/Tx
- Debridement Lateral Epicondylitis
Positioning
Supine
Positioning

Prone
Positioning

Lateral Decubitus
Portals Anatomy

Familiarity more critical than w/ any other arthroscopic procedure

• Anterior
• Posterior
Anterior Portals

- Assoc w/ greatest potential risk to nv structures
- Thorough exam of anterior compartment important in all cases
- Lateral
- Medial
Lateral Portals
Anterolateral Portal

Initially described by Andrews and Carson
(Arthroscopy, 1:97-107, 1985)

• 3 cm distal and 1-2 cm anterior to lateral epicondyle
• Penetrates Extensor Carpi Radialis Muscle
Anterolateral Portal

Visualization

- Trochlea
- Distal Humerus
- Coronoid Process and Fossa
- Medial and Superior Capsule
Anterolateral Portal

Structures @ Risk

• **LABCN** ave. 7.6mm (0-20mm), in contact 43%

• **Radial nerve** is “at extreme risk” ave. 4.9mm (2-10mm)
  – Recommended placement 3cm from LE results in entry point that is distal I most pts, below jt in some pts

• **PIN** (fixed @ Arcade of Froshe) poorly protected, even in flexion, close to distal capsular attachment (little chance of displacement w/ jt distension)

• No longer used by some, if used, established from “inside-out”, proximal to radial head
**Proximal Lateral Portal**

*Described by Strothers, Day and Regan*


- 1-2cm proximal to the lateral epicondyle, pierces Brachioradialis and distal Brachialis to reach lateral elbow capsule, lying directly on anterior surface of the humerus
- Improved margin of safety, supplants earlier AL portal
Proximal Lateral Portal

**Visualization**

- Anterior/Lateral aspect of Radial head and capitellum
- Medial aspect of elbow including:
  - Coronoid Process/Fossa
  - Distal Humerus
  - Trochlea
  - Medial Capsule
Proximal Lateral Portal

Structures @ Risk

- **LABCN branch**
  - ave 6.1mm (0-14mm), in contact 29%

- **Radial nerve**
  - 2x distance vs AL portal (ave 9.9mm in flexion)
Medial Portals

Medial View

- Ulnar Nerve
- Brachial Artery
- Median Nerve
- Brachialis Muscle

PM
AM
Anteromedial Portal

- 2cm distal, 2cm ant to medial epicondyle
- Passes through common flexor origin, then beneath or penetrates brachialis to enter capsule
Anteromedial Portal

Visualization

Affords excellent view of both radiocapitellar and ulnohumeral joints, coronoid fossa, capitellum and superior capsule
**Anteromedial Portal**

**Structures @ Risk**
- **MABCN Branch**
  ave 1mm (0-5mm), in contact 71%
- **Median Nerve**
  ave 7mm (5-13mm) w/ flexion
- **Brachial Artery**
  ave 15mm (8-20mm)
Proximal Medial Portal

Described by Poehling
(Arthroscopy, 5:222-224, 1989)

- 2 cm proximal to medial epicondyle, directly anterior to intermuscular septum
- Contact maintained w/ distal humerus to avoid med nerve risk
- Scope lies deep to brachialis muscle
Proximal Medial Portal

Visualization

- Similar to AM portal
- Excellent view, esp distal part of jt
- Radiocapitellar jt
- Ulnohumeral jt
- 70 Deg scope proximal capsule visualization prn
Proximal Medial Portal

Structures @ Risk

- **MABCN** very close, ave. 2.3mm (0-9mm), in contact 56%
- **Median Nerve** ave. 12.4mm (7-20mm)
- **Brachial Artery** ave. 18mm
- **Ulnar Nerve** av4e 12mm (7-18mm)

Important to confirm location, stability of Ulnar nerve before establishing any medial portals.
Proximal Medial Portal

Recommended that proximal medial portal be first portal used in most cases of elbow arthroscopy

• Safer than anteromedial portal
• Excellent view
Posterior Portals

All are relatively safe with distance to closest cutaneous or major nerve 15-20mm

- Mid or Direct Lateral (“Soft spot”)
- Central Posterior
- Posterolateral
**Mid-Lateral Portal**

**AKA “Soft spot” portal**

- Located within triangle formed by olecranon, lateral epicondyle and radial head
- Pierces Anconeus muscle
- Initial joint insufflation
- Only portal to provide easy access to posterior capitellum and radioulnar joint
Mid-Lateral Portal

**Visualization**

- Posterolateral radial head
- Capitellum
- Trochlea notch
- Olecranon
Mid-Lateral Portal

Structures @ Risk

Articular Cartilage
Central Posterior Portal

- **3cm proximal to Olecranon tip**
- **Passes through triceps tendon at its medial margin**
Central Posterior Portal Visualization

- Olecranon Tip
- Olecranon Fossa
- Posteromedial Gutter
Central Posterior Portal

Structures @ Risk

Ulnar Nerve
ave 19.1mm
(15-25mm)
Posterolateral Portal

3 cm proximal to olecranon tip, adjacent to lateral edge of triceps tendon

Passes through triceps muscle
Posterolateral Portal Visualization

- Olecranon Fossa, Tip
- Posterior trochlea
Posterolateral Portal

Structures @ Risk

PABCN branch
Technique - Video
Complications

- Relatively higher incidence compared to other scope procedures (3-14%)
- Most significant is nerve injury (0-14%)
- Radial/PIN most common (Median/Ulnar/AIN/MABC)
  (Rodeo et al. JBJS A 1993;75:917-26)
- Other reported complications include:
  - Compartment syndrome
  - Septic Arthritis
  - Superficial infection
  - Persistent Drainage
Complications

Complications of Elbow Arthroscopy

By Edward W. Kelly, MD, Bernard F. Murray, MD, and Shawn W. O'Driscoll, PhD, MD

Background: Although the potential complications of elbow arthroscopy, including nerve injuries, have been described, the prevalence of their occurrence has not been well defined. The purpose of this paper is to describe the serious and minor complications in a large series of patients treated with elbow arthroscopy.

Methods: A retrospective review of 473 consecutive elbow arthroscopies performed in 449 patients over an eighteen-year period was conducted. Of the 473 cases, 434 were followed for more than six weeks. The most common final diagnosis was osteoarthritis (150 cases), loose bodies (112), and rheumatoid or inflammatory arthritis (seventy-five). The arthroscopic procedures included synovectomy (184), debridement of joint surfaces or adhesions (180), excision of osteophytes (164), diagnostic arthroscopy (154), loose-body removal (144), and capsular procedures such as capsular release, capsulotomy, and capsular lysis (seventy-three).

Results: A serious complication (a joint space infection) occurred after four (0.8%) of the arthroscopic procedures. Minor complications occurred after fifty (11%) of the arthroscopic procedures. These complications included prolonged drainage from or superficial infection at a portal site after thirty-three procedures, persistent minor contracture of 20° or less after seven, and twelve transient nerve palsies (five ulnar palsy, four superficial radial palsies, one posterior interosseous palsy, one medial antebrachial cutaneous palsy, and one anterior interosseous palsy) in ten patients. The most significant risk factors for the development of a temporary nerve palsy were an underlying diagnosis of rheumatoid arthritis (p < 0.001) and a contracture (p < 0.05). There were no permanent neurovascular injuries, hematomas, or compartment syndromes in our series, and all of the minor complications, except for the minor contractures, resolved without sequelae.

Conclusions: Our results indicate that the prevalence of temporary or minor complications following elbow arthroscopy may be greater than previously reported. However, serious or permanent complications were uncommon.
Complications

473 cases

11.8% complication rate

0.8% (N=4) “serious” – Infection

11% (N=50) “minor”

- Prolonged drainage/superficial infection @ portal site (N=33)
- Persistent minor contracture <20 deg (N=7)
- Transient nerve palsies (N=12) (extravasation of local anesthetic, direct blunt trauma, compression by tourniquet/forearm wrapping, use of indwelling catheter)
Avoiding Complications

• Most serious complications are reported assoc. w/ advanced procedures, which ought to be performed only by experienced surgeons
• Most minor complications however, are probably avoidable by
  – Familiarity w/ normal anatomy/portals
  – Attention to technique:
• Incise skin only w/ #11 blade
• Blunt dissection to/through capsule
• Maintain portal sites (avoid repeated re-entry)
• Beware use of pump
• Limit procedure duration
THANK YOU