Decision making for the traumatic anterior instability

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decision making for
- conservative vs. operative management
- arthroscopic vs. open reconstruction
- various methods of operative technique
- various methods of bone defect reconstruction
  - coracoid transfer, bone graft, allograft, autograft

I. Patients goals: How to define success

1. must individualization: apprehension vs. recurrent dislocation
2. return to normal function and quality of life
3. throwing, overhead athletes vs. workers
4. contact/collision, heavy laboring activities
5. depends a great deal on capsulolabral quality and integrity

II. Surgeon experience

1. We must critically assess our own skill development and decide on our ability to address each component of the instability pathology.
2. requires study, thorough planning, rehearsal with OR staff

III. History

1. Age of patient

   1) Higher recurrent rate if age is under 20~22 years old whether open stabilization or arthroscopic stabilization
   2) Age is not an absolute contraindications to arthroscopic stabilization: Depends on capsulolabral quality and tissue elasticity

2. Episode of instability

   1) Mechanism of injury: AbER?
   2) Dislocation vs. subluxation

3) Self-dislocation/reduction
4) As number of instability episodes goes up, recurrent rate increases
5) Likely due to increased capsular strain attenuation, labral tearing, glenoid erosion

3. Level of activity/sports

1) professional player vs. recreational player
2) dominant hand vs. non-dominant hand

4. in season or off season

IV. Physical examinations

1. if excessive anterior and inferior translation is present, you must also determine posterior and inferior laxity.
2. ROM: greater than normal range of motion, especially ER suggests significant capsular laxity.
3. sulcus sign: determine if it corrects at 20' ER: if so, coracohumeral ligament (rotator interval) is likely competent.
4. hyperelasticity tests: consider open stabilization

V. Imaging studies

1. Simple radiographs

1) IR AP/apical oblique/Stryker notch view et al: evaluate Hill Sachs defect
2) Axial view/West point view: glenoid defect

2. MR/CT arthrogram

1) evaluate size of glenoid rim defect and fracture fragment
2) Bankart lesion, ALPSA lesion, HAGL, cuff status

3. Indications for CT scan

1) instability at low abduction
2) marked abduction at low AbER
3) instability with little provocation after requiring reduction
4) multiple instability episodes
5) revision surgery

6) any bone loss appreciated on radiographs

VI. First time dislocation

1. Considerations

1) Immobilization: IR (45%) vs. ER (0%), how long?
2) Age: <30 yo-recurrence rate 85-90%
3) collision/contact sports player

2. Risk factors for recurrence

1) age young: 16~30 years old
2) bone loss
   (1) 25% of glenoid loss
   (2) engaging Hill-Sachs lesion
3) contact/collision sports
4) associated ligament laxity
5) poor ligament quality

** recurrence rate: 10~20% operative repair vs. 47~99% non-operative treatment
- primary repair for high risk patients !!

VII. Non-operative treatment

1. indications

1) atraumatic instability
2) voluntary instability
3) children instability
4) selected athletes: in-season, requiring supranormal ROM (pitcher)

2. immobilization with sling/orthosis

3. therapeutic exercise

1) phase I: brief immobilization and early PROM, AAROM
2) phase II: isokinetic strengthening, scapular, cuff and deltoid exercise

4. life style change: activity modification

5. better results in atraumatic (80%) than traumatic instability (16%)

VIII. Indications for surgery

1. recurrent traumatic instability
2. high risk patients: young, active, high risk sports
3. persistent pain /apprehension
4. previous failed surgery
5. continue to pursue active life style
6. late in-season or off-season

IX. Preoperative considerations

1. voluntary instability
2. generalized ligament laxity
3. multi-directional instability
4. significant osseous defect

** recurrence rate: open 0~12% vs. arthroscopic 0~23%
** None of the study demonstrated that higher recurrence rate with modern arthroscopic technique.
** Patient selection is importance to success !!

X. Indications in arthroscopic Bankart repair

1. recurrent traumatic instability
2. Bankart lesion
3. no glenoid rim fracture: <25% bone loss
4. non-dominant hand
5. non-collision sports

** relative contraindications

1. contact athlete/collision athletes/throwing athletes?
2. multiple recurrences
3. abnormal laxity pattern
4. failed previous Bankart surgery

** contraindications

1. capsular necrosis
2. inverted pear glenoid
3. engaging Hill-Sachs lesion

** advantages of arthroscopic reconstruction

1. ability to assess co-morbidities as well as definitively treat
2. less pain
3. less perioperative morbidity
4. easier rehabilitation
5. less risk of rotational deficit
6. potentially less costly
7. cosmetic
8. less surgical time?

** disadvantages of Arthroscopic reconstruction

1. cannot treat bony defect
2. long learning curve
3. cannot reinforce tissue
4. initial recurrence rate higher

** recurrent rate for contact athletes

- 3~24% open repair vs. 7.5~11% arthroscopic
- no randomized, prospective controlled study
- considerations: sports activity, pathology, age, technique etc

XI. Indications for open reconstruction

1. surgeon preference, experience
2. significant glenoid rim deficit (>25%)
3. very large Hill-Sachs defect
4. previous failed surgery with excessive capsular laxity
5. non-compliant patients

XII. Options for open reconstruction

1. Capsulolabral reconstruction
2. Staple capsulorrhaphy
3. Subscapularis muscle procedure (Putti-Platt/Magnuson-Stack)
4. Bone block (Eden-Hybbinette)
5. Coracoid transfer (Bristow/Latarjet
6. Bone graft to Hill-Sachs lesion
7. Remplissage (infraspinatus tenodesis to Hill-Sachs defect)

XIII. Problems with open reconstruction

1. decrease ROM, especially ER
2. subscapularis failure

XIV. Arthroscopy

1. Bankart lesion vs ALPSA (anterior labral periosteal sleeve avulsion) lesion
   - capsular margin may be difficult to identify if no labrum remaining
2. glenoid rim fracture: identify and estimate size & mobility
   - 〉25% glenoid erosion (using bear spot central reference, "inverted pear"): coracoid transfer or iliac crest bone graft
3. capsule evaluation: capsular strain, capsular "rents"
4. HAGL (humeral avulsion of glenohumeral ligament) & RHAGL (reverse HAGL)
   1) extent of pathology
   2) surgeon's experience
5. Hill-Sachs lesion
   - if large (〉25~30%) or engaging, consider open reconstruction
   - loss of some ER is may be important aspect of prevent recurrence
6. SLAP lesion: associated with micro-instability
7. cuff integrity: may be source of ongoing symptoms-require debridement

XV. During stabilization procedure

1. Position of patient for arthroscopic surgery

   1) lateral decubitus
      - excessive distal traction may compromise ability to retention IGHL
      - accessory lateral traction perpendicular to humeral shaft: easy going to anterior & inferior aspect of joint
   2) beach chair position
      - easier convert to open procedure
      - assess to posterior part of joint is much more difficult

2. glenoid, labrum & capsular preparation

   - mobilization of capsulolabral tissue is essential
   - decortication of anterior glenoid neck
   - fracture fragment evaluation
     a. 〈15%: excise

b. 15%~25%: consider repair of fragment-encycling or penetrating suture from anchor (don't over-reduce)
c. 〉25%: consider bone graft procedure

3. capsulolabral retensioning

1) where to drill hole: 2~3 mm onto articular cartilage (over the top) with 45°
2) how many anchors: 2~6 o'clock position (3~4 anchors)
3) bony secure insertion: press-fit vs. screw type
4) metal vs. absorbable anchor
5) knot vs. knotless anchor (double loaded)
6) sliding knot vs. non-sliding knot: not to be placed in the G-H contact
7) deliver suture through at least 1cm inferior to exit of anchor to adequately retention capsule superiorly
8) traction suture or percutaneous trans-subscapularis or 5 o'clock portal
9) "south to north" direction
10) rotator interval closure
- persistent inferior translation in Add/ER
- arthroscopic finding of RI
- RI closing with arm in ER: stiffness
11) adjunctive thermal shrinkage?

4. address secondary laxity after Bankart repair

1) if posterior translation 〉50%, consider posterior plication
2) if inferior translation 〉5~7 mm, consider rotator interval closure
3) test repair: probing, test after removal of traction device

XVI. Ideal surgical technique

1. Ability to define the lesion
2. Establish the healing potential
3. Anatomic repair
4. Appropriate ligament tensioning
5. Secure fixation
6. Treat all associated pathology
7. Avoid complications (neurovascular or stiffness)