AS Management for Shoulders with Significant Glenoid Bone Loss w/ and w/o Bone Fragment

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Significant Bone Loss

- Engaging Hill-Sachs lesion
- Inverted-pear glenoid

Large Glenoid Defect

- "Inverted-pear" glenoid
  - Minimum of 25 to 27% loss of the entire width of the inferior glenoid

Lo and Burkhart, Arthroscopy, 2004

Glenoid Morphology

- Typical 3 subtypes
  - Normal
  - Bony Bankart
  - Erosion

10%  50%  40%


558 Athletic Shoulders

- Prevalence: distinct Bony Bankart

Takahashi, Sugaya, et al. ICSES, 2013

Large Glenoid Defect

- "inverted-pear" type glenoid

◆ Most of the "inverted-pear" type glenoid retains bony fragment!

Sugaya, AANA Advanced Arthroscopy: The Shoulder, 2010
**Bony Bankart Lesion**
- Chronic avulsion type anterior glenoid rim fracture
- Fragment is embedded in soft tissue

**Bony Bankart Lesion**
- Chronic anterior rim fracture
- Fragment ligament junction intact!!
- Can incorporate fragment into Bankart repair!!

**AS Bony Bankart Repair**
- Short term outcome reports
  - Sugaya, et al., JBJS-Am, 2005
    - Failure rate 4.8% (2/42)
  - Porcellini, et al., AJSM, 2007
    - Failure rate 4.2% (1/24)
  - Mologne, et al., AJSM, 2007
  - Park JY, et al., Arthroscopy, 2012
    - Failure rate: 6.5% (2/31)

**Shoulder Instability**
- “Cons” to AS bony Bankart repair
  - Fragment gets smaller with time
  - Poor reduction results in poor outcome

**Questions!**
- Long-term outcomes
  - Recurrence?
  - Survival of the fragment after surgery?
  - Final glenoid bone loss?

**AS Bony Bankart Repair**
- My 1st case in May, 2000
  - Early series in JBJS, 2005 & 2006
- Technical modifications
  - Use of high strength sutures, etc.
    - .....until 2005
- Jan. 2005 to Dec. 2006 (2 years)
  - 85 AS bony Bankart repairs
Clinical Outcome and Glenoid Morphology After Arthroscopic Repair of Chronic Osseous Bankart Lesions
A Five to Eight-Year Follow-up Study

Soichiro Kitayama, MD, Hironori Sugaya, MD, Norimasa Takahashi, MD, Keisuke Matsuki, MD, Nobutaki Kawai, MD, Mochihito Tokai, MD, Kazutoshi Ohishi, MD, Yumiko Ueda, MD, Shota Hoshikawa, MD, Nobuhiro Kitamura, MD, Kazunori Yamasaki, MD, and Junji Morizaka, MD

Investigation performed at the Shoulders and Elbow Center, Panashiku Orthopaedic Hospital, Panashiku, Japan

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◆ Longer-term outcome study after arthroscopic bony Bankart repair
✓ Clinical outcomes
✓ Glenoid morphologic change

Bone Loss Measurements

- Use of inferior circle
  - Loss of diameter
    - Method I
      - Sugaya, JBJS Am, 2005
    - Method II
      - Sugaya, JBJS Am, 2003

Subjects

Jan. 2005 to Dec. 2006
- 85 AS bony Bankart repairs
  - 39 shoulders <15% bone loss
  - 46 shoulders ≥15% bone loss

Method I


Jan. 2005 to Dec. 2006
- 46 shoulders ≥15% bone loss
  - 38 (83%) available for F/U
    - 34 males, 4 females
    - Ave. age: 23.4 (15 – 36) years
    - Ave. F/U: 6.2 (5 – 8.1) years

Method II


Preoperative Bone Loss

- Method I
  - 20.4 (15.2-26.2)%
  - Fragment size: 4.7 (0.4-12.4)%
  - Real bone loss: 17.5 (10.3-24.1)%

- Method II
  - 22.2 (15.9-30.3)%

AS Bony Bankart Repair

- Fragment management
  ◆ Pass around it? or penetrate it?
Bone Stitcher™

Portal Placement
- Main working portal
- Accessory working portal
- Cannulated
- Anterior
- Anterosuperior
- Posterior

AS Bony Bankart Repair
- Bone piece displaced inferiorly & medially

AS Bony Bankart Repair
- Complex release and preparation

AS Bony Bankart Repair
- Inferior labrum repair

AS Bony Bankart Repair
- Bony piece & sup. labrum repair

Sugaya et al, Arthroscopy, 2004
Sugaya et al, JBJS 87A, 2005; JBJS EST, 2006
Results: Recurrence

- 1/38 patients experienced recurrence (2.6%)
  - Due to a major trauma in the traffic accident 5M after surgery
  - Detachment of the fragment confirmed by 3DCT
  - Early stage failure before obtaining bony union

Augmentation necessary!!


Results: Functional Outcome


Results: Glenoid Bone Loss


Case 1: 22y, Male, Rugby Player

Pre-op

8y Post-op

Case 2: 28y, Male, Skier

Pre-op

8y Post-op

Case 3: 24y, Male, Judo-ka

Pre-op

7y Post-op
**Bony Bankart Lesion**

- Bony fragment resorption
  - Fragment becomes smaller with time
    - Nakagawa, et al, AJSM, 2013

**AS Bony Bankart Repair**

- Preop bone tissue (glenoid + fragment) > 80% of normal glenoid

- Reconstructed glenoid size matters
  - Excellent fragment reduction required

**AS Bony Bankart Repair**

- The present study
  - 9 / 34 patients measured <80%

- None failed, bone tissue volume increased from 78.2% to 99.8%

**Why Bone Volume Increased?**

- Extensive labrum release
  - Excellent fragment reduction
  - Entire IGHL retensioning

**AS Bony Bankart Repair**

- Retensioning of the entire IGHL
  - Prevent bone resorption & recurrence
  - Promote bony union
  - Induce new bone formation
  - To avoid early stage failure
  - Secure repair & augmentation

**Bony Bankart Lesion: Recommended Algorithm**


Large Glenoid Defect

• Bony Bankart w/ small fragment
  ➢ If young and active
    ✓ Bone grafting
  ➢ If not so active
    ✓ AS Bony Bankart Repair

• Large attritional glenoid w/o fragment
  Bone Grafting!!

Bone Grafting

• Coracoid transfer
  ➢ Latarjet or Bristow
    ✓ Open
    ✓ Arthroscopic
• Free bone grafting
  ➢ Iliac crest, allo
    ✓ Open
    ✓ Arthroscopic

My Preference

• AS iliac bone grafting with capsulolabral reconstruction
  ➢ Proprioception ...Jerosch, 1993; Gelber, 2006

Take Home Messages

• Mx for glenoid bone loss
  ✓ AS bony Bankart repair w/IGHL re-tension & RI closure works in most cases!
  ✓ Iliac crest grafting w/ capsulolabral reconstruction in robust capsule cases
  ✓ Latarjet if otherwise