Frozen shoulder

Postgraduate Teaching Programme 2010

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Codman 1934

● 'This is a class of cases I find difficult to define, difficult to treat, and difficult to explain from the point of view of pathology'

● (sigh)
What you need to know

- What it is...
- Who gets it...
- What happens to it...
- What, if anything, we can do...
- Most aspects are controversial!
The Problem

- Clinical diagnosis
- Affects 2-5% general population
- And those of working age
- Painful, Stiff and Disabling
- Unknown aetiology
- ?inflammatory ?fibrotic condition
- Protracted natural history
Background

- Duplay 1872
- Dickson & Crosby 1932
- Pasteur 1932
- Codman 1934
- Lippman 1943
- Nevasier/ Moseley 1945
- Withers 1949
- Simmonds 1949

- Periarthrite scapulohumerale
- Periarthritis
- Tenosynovitis LHB
- Uncalcified tendonitis
- Scarring of LHB
- Adhesive capsulitis
- Involvement of subacromial bursa
- Inelastic fibrous tissue
Background

- DePalma 1952: muscular inactivity
- Meulengracht 1952: 18% Dupuytren’s
- Nevasier 1962: decreased joint volume
- Lundberg 1969/70: role of GAG, C-spine
- McNab 1971: autoimmune role
- DeSeze 1974: associated shoulder pathology
- Bruckner 1981: SAH/ depression
- Neer 1992: importance of coracohumeral ligament
What is it?

Codman 1934

- Described shoulder pain of insidious onset with stiffness
- Identified the classic restriction of elevation and external rotation
What it isn’t

- OA
- Rotator cuff disorder
- MUST BE EXCLUDED
Who gets it?

- Females > males (1.5 : 1)
- Age 40-70 (mean 56y)
- Dominant = non-dominant
- Pain: constant, toothache-like, sharp pain with movements, affects sleep
Diagnosis

No consensus

Codman

- Global restriction of movement
- Idiopathic aetiology
- Usually painful at onset
- Normal x-ray
- Limitation of ER and elevation
Diagnosis

Lundberg 1969

1. Elevation < 135 degrees
2. Glenohumeral restriction only
3. No other explanation

- No agreement on range of movement
- ER <50% normal often used
Classification of stiff shoulder

- Primary (idiopathic) or true frozen
- Secondary - stiff due to known cause
Frozen shoulder

Associations
1. Diabetes
2. Dupuytren’s
3. Cardiovascular/ hyperlipidaemia
4. Epilepsy
5. Endocrine: thyroid
Diabetes

- 10-20% of frozen shoulders
- Bridgman 1972 (n=800 DM patients)
- 11% of DM had frozen shoulder
- Insulin dependent have 36% incidence
- Bilateral in 42% of DM
- More severe and resistant
- Look for occult DM in frozen shoulder
Dupuytren’s

- Tim Bunker 1995, 2000
- 58% (n=50) of idiopathics had DD
- **Myofibroblastic** proliferation; vascular collagen
- Similar pro-inflammatory cytokines: TGF-beta, PDGF
- **N.b. DD is a progressive disease**, biopsies from late stage cases
Secondary ‘Stiff’ Shoulder

- Intrinsic/ extrinsic
- Post traumatic e.g. #, chondral lesions, AVN, tendinopathy
- Iatrogenic e.g. capsule procedures
Anatomy
Anatomy

Sagittal MRI
Normal rotator interval
= Hypointense band (blue arrows)
LHB (red arrow)
Anatomy

- Axial MRI view
- Coracohumeral ligament = Hypointense band
Anatomy

- Sagittal T1 MRI/gad
- CHL (blue arrow) surrounded by soft tissue (white arrows)
- = synovitis
- LHB (red arrow)
Pathology

- **Early**: inflammatory, cytokine modulated
- **Later**: fibrosis, cytokine down-regulation?

**Histology:**
- **Early:**
  - Lymphocytes
  - increased vascularity; synovitis
- **Late:**
  - Collagen bundles and nodules
  - Highly cellular: Fibroblasts and myofibroblasts
  - Reorganisation of collagen matrix
Pathology

- Thickened fibrotic anterior capsule (MGHL)
- Rotator interval: coraco-humeral ligament
- Contracture: check rein to ER

- Reduced gleno-humeral joint volume
  (5-10 ml vs 25-30 ml normally)
Investigations

- Bloods
  - ESR/CRP may be raised
  - TFT
  - Lipids
  - Glucose intolerance
- Xray
  - Osteopenia
  - Superior migration
  - Rule out posterior dislocation! (esp epilepsy)
Investigations

- Arthrogram
  - little used now
  - Distension and rupture of capsule

- Ultrasound
  - Associated cuff pathology
  - Restricted movement of supraspinatus
Investigations

- **Isotope bone scan**
  - Increased uptake
  - No relation to severity or length of Sx

- **Arthroscopy**
  - Gold standard to confirm Dx

- **MRI**
  - Rarely used/needed/excluding other Dx
  - Demonstrates capsule thickness
  - >4mm diagnostic?
Arthroscopic findings

- Small joint; difficult to get into
- Loss of axillary fold
- Tight anterior capsule
- Mild/ moderate synovitis
- NO ADHESIONS
- N.b. May find a secondary cause
Arthroscopic findings

Four arthroscopic stages: Neviaser 1987

1. Inflammatory synovitis; no capsule involved
2. Proliferative synovitis; hypertrophic
3. Maturation of capsule; reduced vascularity
4. Burnt out synovium; dense scarring
Natural history

- 1-3 years but varies (educate the patient!)
- Self-limiting? but incomplete restoration of ROM

- Stage 1: Freezing phase
- Stage 2: Frozen phase
- Stage 3: Thawing phase
Freezing phase

- Pain is predominant
- Often confused with impingement, night pain
- Arm used less and less
- Lasts 2-9 months
Frozen phase

- Stiffening phase
- Lasts 4-12 months
- **Decreased ROM**
- Pain reduces usually
- Aches at the extremes of motion
Thawing phase

- Gradual improvement in ROM
- Lasts 4-12 months
Outcome

- 10-15% suffer persistent pain and stiffness (Dudkiewicz et al 2004, Shaffer 1992)
- Can improve up to 10 years
- ‘Normal’ Constant score with ‘supervised neglect’ (Diercks 2004) at 2 years
- Recurrence is very rare (case reports)
Treatment

1. Education
2. Analgesia
3. Steroid injections
4. Physio
5. MUA
6. Open / arthroscopic capsular release
7. Others
Summary

- Condition peculiar to the shoulder
- Good history and examination required
- X-ray usually all that is needed for Ix
- Fibrosis and contracture of the rotator interval
- No intra-articular adhesions
The End
References

2. Bunker TD et al. Expression of growth factors, cytokines and MMPs in frozen shoulder. JBJS 2000; 82 (B): 768-773