Suprascapular Nerve Release: True Indications and Tips

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Suprascapular Neuropathy

• Increasingly recognized as cause for shoulder pain
• SSN vulnerable
  − Static or dynamic compression
• Diagnosis often challenging
  − Vague symptoms
  − Co-existence with other conditions
  − Numerous pathologies cause SSN neuropathy
• Surgical techniques described
  − Effective
  − Controversial
SSN Anatomy

- Originates upper trunk brachial plexus
  - C5, C6, some C4
- Passes through suprascapular notch
  - Transverse scapular ligament
  - Notch architecture variable
  - Only SSN through notch
    - Artery/vein travel over ligament

SSN Anatomy

- SSN proceeds to spinoglenoid notch
  - 2 cm medial to glenoid face
  - Spinoglenoid ligament variable
  - Potential site of SSN injury

Pathophysiology

- SSN problems usually at both notches
- SSN injured due to:
  - Anomalous local anatomy
  - Space-occupying lesions (cysts)
  - Retracted RC tears
  - Repetitive microtrauma
Pathophysiology

- Repetitive microtrauma
  - Overhead athletes
    - Up to 30% pro volleyball players have infraspinatus atrophy and weakness (Lajtia, AJSM 2009)
    - Cause unknown but compression by superior infraspinatus suspected

History and Physical Exam

- SSN neuropathy challenging diagnosis
  - Symptoms mimic more common problems
  - May co-exist
- Suggestive characteristics
  - Deep, dull posterior shoulder ache
  - Overhead activities exacerbate symptoms
  - SS notch compression → Abduction/ER weakness
  - Spinoglenoid notch compression → Less pain and weakness

SSN Neuropathy

- Differential diagnosis for:
  - Overhead athletes
  - Supra/infra muscle atrophy
    - More proximal lesions cause atrophy of both muscles
  - Selective injections very valuable
    - SSN injections
    - Diagnostic TOC Higgins (2016)
Imaging Studies

• X-rays show notch anatomy
  – 3D CT scans for variant notches
• MRI
  – RC tears
  – Labral tears
  – Paralabral cysts
  – Supra/infra atrophy

Diagnostic Studies

• EMG/NCS “gold standard”
  – Can confirm diagnosis
  – Tests nerve function when no cause for atrophy
  – Evaluates persistent shoulder pain
  – Monitor nerve function
• EMG/NCS commonly used
  – Controversial
  – EMG “unreliable” (Higgins 2016)
  – EMG/NCS does not preclude SS neuropathy
  – Pain relief after suprascapular or spinoglenoid notch injection highly suggestive

Treatment

• Etiology of neuropathy most important to determine
• Mostly treated non-op initially
  – Dynamic causes almost always respond
  – Structural causes sometimes surgical
    • Duration and severity of symptoms matters
• Surgical management and techniques debated
Non-Operative Treatment

- SSN neuropathy without space-occupying lesion (multiple studies support)
- NSAIDS
- Activity modification
- Rehabilitation

Operative Treatment

- Indications
  - Failure of non-op tx
  - Active compression of SSN
- Surgical procedure should decompress nerve
  - Direct vs. Indirect technique highly debated
  - Does the SSN require direct decompression or para-axial cysts or just cyst decompression?
  - Does reduction of massive RC tears suffice or is concomitant nerve decompression necessary?

Surgical Technique
Suprascapular Notch Without RC Tear

- Routine diagnostic scope
- Subacromial bursectomy
- CA ligament followed to base of coracoid – leads to CC ligaments
- Conoid ligament base adjacent to suprascapular notch medially
- 2 accessory portals placed
  - Neviaser portal
  - Scissors
  - 2 cm medial to Neviaser portal
- Retractor
- Transverse scapular ligament incised
  - Protect underlying artery/vein and underlying SSN
Suprascapular Notch With Retracted RC Tear

- Tx of SSN controversial
- Retracted tear can cause SSN traction injury
  - Can lead to further muscle dysfunction
  - Some evidence suggests RC tear reduction eliminates SSN pressure (indirect)
- Little published on clinical results of combining RC repair with direct SSN decompression


- Compared 44 revision RC repairs
  - 22 with SSN decompression
  - 22 without SSN decompression
- No significant differences between groups post-op (UCLA)
- SSN release group
  - Improved active FF, strength, VAS pain scores post-operatively

Neuropathy of the suprascapular nerve and massive rotator cuff tears: a prospective electromyographic study.

- 49 massive RC patients had pre-op EMGs
- Only 1 patient had SSN lesion
- Concluded that very low association of SSN neuropathy with massive RC tears does not support routine SSN decompression
Suprascapular Nerve Compression from Paralabral Cysts

- Suprascapular nerve susceptible at spinoglenoid notch
  - Nerve relatively immobile
  - Scapular spine forms medial border blocking cyst expansion
    - ↑ cyst pressure on nerve
- Bigliani (Arthroscopy 1990) showed nerve 1.8cm medial to posterior glenoid rim
  - Tung (AJR 2000) showed cysts causing denervation larger (3.1cm) than cysts without denervation

Diagnostic Testing

- MRI demonstrates cysts
  - Well defined, marginated mass of T2 images
  - MRI also helpful in identifying labral tears
    - Tirman (Radiology 1994) showed that 89% of patients with cysts had posterosuperior labral tears
- EMG/NCS
  - Confirms SSN compression
  - Shows ↓ infraspinatus innervation and preserved supraspinatus typically

Paralabral Cyst Treatment

- Initial treatment depends upon nerve status
  - Small cyst without nerve dysfunction and manageable labral symptoms treated non-operatively
  - Intervention best for significant neuropathy or disabling pain
    - Piatt (JSES 2002) showed only 2 of 19 treated non-operatively for suprascapular nerve compression due to cyst became pain free
Paralabral Cyst Treatment

- Cyst aspiration reported
  - Results mixed
    - Hashimoto (1994) good symptoms relief
    - Piatt (JSES 2002) and Tung (AJR 2000) had 45% and 75% recurrences
    - Doesn’t address intra articular pathology

Surgical Cyst Management

- Open
- Arthroscopic
  - Decompression with labral repair
  - Decompression without labral repair
  - Labral repair alone
- Published studies of all technique variations

Arthroscopic Surgical Management

- More versatile
- Commonly accepted and preferred
  - Visualization and treatment of labral lesions
  - Decreased iatrogenic insult
  - Ianotti (Arthroscopy 1996) suggested ↓ recurrences with arthroscopic treatment
Paralabral Cyst Decompression

Summary

- SSN neuropathy relatively rare
- In differential diagnosis for overhead athletes
  - More common cause of inadequately explained pain?
- Non-op tx mainstay for dynamic lesions
- SSN compression tx (cyst or SS notch) controversial
  - Decompression reliable when performed
- Indications for direct SSN decompression in presence of retracted RC tears currently unknown
- Further research necessary to delineate indications

Thank You