Suprascapular Nerve: How to identify when it is a problem and what to do?

Eric C. McCarty, MD
Associate Professor
Chief of Sports Medicine and Shoulder Surgery
University of Colorado School of Medicine
Speaker Disclosure

Disclosure Information
The following relationships exist:

Stryker, Smith Nephew - Institutional Support

Biomet Sports Medicine - Consultant, Royalties

Elsevier - Book Royalties
Thanks to Tony Romeo MD, Kevin Plancher, MD, Les Bisson MD, James Esch MD, and John Orwin, MD for slides
Suprascapular Nerve

- **Brachial Plexus**
  - **Upper Trunk**
    - Cervical Roots
      - 5th and 6th
      - 4th up to 50% Contribution

**Unique Anatomy**

- **Suprascapular Nerve**
  - **Mixed Nerve**
    - Motor
    - Sensory
Anatomical Relationships

- Artery over the transverse scapular ligament
- 3.0 cm from the supragnoid tubercle to the Scapular notch (A)
- 2.0 cm from the glenoid rim to Spinoglenoid notch (C)

Bigliani et al. *Arthroscopy* 1990
Anatomical Relationships
Motor Nerve

- 2 motor branches to the Supraspinatus
- 3 motor branches to the Infraspinatus
Sensory Nerve

- Branches to the
  - AC joint
  - Anterior superior capsule
  - Posterior capsule

The suprascapular nerve and its articular branch to the acromioclavicular joint: an anatomic study
Ebraheim et al, JSES 2011
How Is the Nerve Injured?

• Trauma
• Microtrauma as in volleyball and overhand athletes
• Iatrogenic
• External compression
• Traction from rotator cuff tear
  – Nerve does not slide in the foramen
  – Scapula fixed position can stretch the nerve
Areas of Compression

Spinoglenoid ligament

Transverse Scapular Ligament
Extrinsic Compression
Diagnosis

- History
- Exam
- MRI
- EMG/NCS
  - Negative test doesn’t rule out the diagnosis
- Suprascapular nerve injection
  - Use if suspicious and EMG negative
History

• Pain
  – Shoulder pain that doesn’t “fit.”
  – Pain top and back of the shoulder.
  – Unusual pain (might have had no response to typical shoulder injections)

• Weakness
  – Weak forward flexion and ER
  – Infraspinatus muscle wasting.
Physical Exam

- Weakness of SS/IS muscles
- Atrophy of SS/IS muscles
- +/- Pain @ suprascapular notch
- + Impingement signs
- Sensory changes post/lat deltoid

- Oizumi et al 2012
Physical Exam

Atrophy

Weakness
MRI

- **Denervated Muscles**
  - Signal Intensity Changes
    - with Peripheral Nerve Palsy
      - **T-2 Weighted**
        - High Signal Intensity
          - 15 Days After Palsy
          - Normal Signal 2-3 Months
          - After Nerve Compression Removed
      - **T-1 Weighted**
        - Low Signal Intensity Usually
        - If High Signal Not Clinically Helpful

EMG/NCS

• Not a typical EMG/NCS
• Must place electrodes in the rotator cuff musculature
• Have to tell the neurologist what you are looking for.
• Helpful when positive but often negative
Injection

• Inject SS nerve from superior > relieve pain.
  – Can do with or without fluoroscopy
  – “90% of patients who had relief with this injection had a good outcome with surgical release of the nerve.” JP Warner unpublished

• Better than EMG
  – articles suggest EMG is only 71-90% accurate in detecting SSN dysfunction. So a negative EMG does not completely rule out a SSN dysfunction.
Injection

Spinoglenoid Notch-Inferior Transverse Ligament

- **Lidocaine Injection**
  - Acute Or Chronic Posterior Shoulder Pain
    - Acute - No Wasting
  - Location
    - 4 cm Medial to Posterolateral Corner of the Acromion
      - Just Below the Spine of the Scapula
Injection

Transverse Scapular Ligament

- **Lidocaine Injection**
  - Utilized for Acute Posterior Shoulder Pain
    - Acute with No Wasting
  - **Location**
    - 3cm Medial to Nevaiser’s Portal Towards the Neck Corner of the Acromion
Supracapular Nerve: Rotator Cuff Tear Association
How Can It Occur?
RTC Deficient Patient

- supraspinatus and/or infraspinatus retraction increases tension on SSN at suprascapular notch or spinoglenoid notch
Does It Really Occur?

RARELY!
Prevalence of peripheral neurologic injuries in rotator cuff tears with atrophy.

8% rate of EMG documented suprascapular neuropathy (2/25) in patients with a full-thickness rotator cuff tear and muscle atrophy

Vad et al  *JSES* 2003.
Neuropathy of the suprascapular nerve and massive rotator cuff tears: a prospective electromyographic study.

- Prospective, EMG study, 50 pts
- Massive (SS+IS) RTC Tears
- 1 patient had SS neuropathy
- NO evidence to support the routine practice of suprascapular nerve release when RCT repair is performed

Collin P et al
JSES. 2014 Jan;23(1):28-34
Does SS Nv Release Work?
Lafosse Articles on SS nerve

• 10 patients
  – Abnormal EMG, Posterior shoulder pain, subjective weakness, no cuff tear.
  – Results
    • EMG
      – 7 recovered
      – 2 partial recovery
      – 1 refused test
    • 9 excellent and one moderate improvement

Lafosse...JARR 2007
Lafosse Results

• 75 massive cuff tears that were repaired
  – 39% (29) pos EMG preop)
  – Postop EMG at 6 months postop
    • 13 normal
    • 12 improved
    • 4 no change

• No difference in results whether nerve release or not.

Lafosse...JSES Suppl..2011
Clinical Outcomes of SS Nv Release

- 27 patients at SS or SG notch – avg 22mo fu
- 89% pos preop EMG (24/27)
- All had intact RC by MRI or CT
- 71% reported pain relief (17/24)
- 75% improved ASES
- 71% would have the surgery again

Shah...Higgins, Warner...JSES 2011
Technique
Portals for release of Transverse scapular ligament

- Mid lateral subacromial portal (subacromial bursectomy, viewing, ligament release)
- Nevasier portal (blunt dissection)
- Secondary Nevasier portal (cutting)
- Anterolateral portal (viewing of ligament)
Lafosse Portals for release of Transverse scapular ligament

Arthroscopic suprascapular nerve release: indications and technique
Laurent Lafosse, MD, Kalman Piper, MBBS, FRACS (Orth)*, Ulrich Lanz, MD
McCarty Portals for release of Transverse scapular ligament
Technique

• Start in the subacromial space.
• Visualize the coracoid process must be visualized and the dissection is then carried medially.
• Arthroscopic retractors (switching stick) are helpful to posteriorly retract the supraspinatus muscle belly.
• Dissection is carried along the posterior aspect of the coracoid process.
Technique

• The coracoclavicular ligaments are identified
• Follow the conoid ligament to the medial base of the coracoid and then medial the suprascapular notch is identified.
• The Suprascapular artery and nerve are protected by the switching stick and pushed
Technique

- The Transverse ligament is released using handheld arthroscopic tissue punches
Spinoglenoid Notch

- Nonoperative if no mass
- Surgery if no improvement in 6 months
- Resect Spinoglenoid Ligament
Summary

• SSN entrapment is an uncommon but real cause of shoulder dysfunction.

• Look for it especially after failed Subacromial Decompression or Distal Clavicle Excision

• Consider when pain atypical (cervical) and cervical w/u negative

• Weird Pain

• Must obtain good quality EMG/NCS

• Diagnostic block helpful

• Surgical results are encouraging
Thank you

Eric.McCarty@ucdenver.edu