Little Girl Lost: An Unusual Case of Neurogenic Thoracic Outlet Syndrome

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Presentation

15-yr-old female softball athlete presented with a 7 week history of right shoulder pain that began with a “pop” when throwing a softball. Pain was associated with development of a round erythematous patch on top of right shoulder that evolved to large purple and brown area around right upper extremity that was warm to the touch. Initial imaging studies and biopsy of shoulder showed no abnormalities. Patient self-limited her right upper extremity by holding it in “functional position” (abduction, flexion and internal rotation) and complained of exquisite pain over anterior and lateral right shoulder and origin of deltoid. No muscle weakness.

Special Examinations

MRI right shoulder: no evidence of bone or joint involvement, edema in deltoid muscle around top of shoulder
Venous Duplex: no signs of venous congestion, thrombosis, or recanalization; no vascular abnormalities
MRI C-spine and brachial plexus: normal
Bone scan: hyperemia along superolateral aspect of the right shoulder with no focal increased osteoblastic activity
EMG: normal nerve conduction study except relative decrease in amplitude of R radial SNAP
Ultrasound neck: Enlarged anterior scalene muscle when compared to left.
CT Plexogram: See Figure 2: Flow limited at clavicle-1st rib crossing

Working Clinical Diagnosis: Neurogenic Thoracic Outlet Syndrome (NTOS)

Discussion

- NTOS causes pain, hyperesthesia, muscle atrophy and edema in the upper extremities due to compression of neurovascular bundles in the course of thoracic outlet from neck to axillary region.
- NTOS can adversely affect the anterior and middle scalene muscles; cervical nerves of the brachial plexus, long thoracic, suprascapular, and dorsal scapular nerves; and the stellate ganglion.
- The vast majority of TOS is neurogenic, with this form comprising approximately 95% of all cases and involves compromise of the brachial plexus trunks or cords formed from nerves that come from the C5 to T1 spinal levels.
- This case illustrates the difficulty involved in both diagnosis and treatment of this complex syndrome and highlights the diverse management options that can be employed to alleviate NTOS.

Hospital Course

7/25: Diagnostic right C7/8 cervical paravertebral catheter (RCPVC)– no improvement in pain control
7/26: Replacement with C5/6 RCPVC 1 day later – 0/10 pain, improved ROM
7/31: Direct scalene muscle injection with 100 units of Botox under US guidance – resolution of pain for 6 weeks
9/12: Scalene muscle injection repeated with 100 units of Botox – relief of symptoms for another 6 weeks;
9/27: repeat RCPVC– no pain relief
10/5: Memantine p.o., stellate ganglion block – no pain relief
10/12: cervical epidural – excellent pain relief
10/19: epidural removed with return of pain
10/16: 2nd stellate ganglion – no improvement
10/30: Patient referred for first rib resection after failed specific stretching physical therapy.

Figure 2

CT with cervical nerve root catheter (yellow) w/ 30 cc contrast followed by interscalene catheter injection (blue): Limited contrast spread laterally along brachial plexus to 1st rib and clavicle

References