February 2010 Case Study - Cervical Stenosis

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Chief Complaint: Neck pain

HPI: 19 year old male wrestler presented during the competitive season with a 2 week history of left-sided neck pain. It was located deep in the trapezius. He states he woke up one day and the pain began. He thought he had slept awkwardly, causing the pain. He felt well enough to wrestle, so he participated in practices without any significant increase in his pain. Several days later, his head and shoulder were driven in to the mat and he reports developing a stinger in the left arm. The numbness, tingling, and pain all resolved within 10 seconds. However, his left trapezius pain worsened. Stretching and electric stimulation performed by the school certified athletic trainer failed to improve his pain.

He has had 2 to 3 stingers in the past. He reports all resolved spontaneously in less than 1 minute. He reports that an episode this past fall included bilateral arm numbness after a tackle in football. No history of automobile accidents or other significant trauma. He denies weakness, clumsiness, or sensory changes.

PMH: Exercise induced asthma, Right ankle sprain.

PSH: Right Knee grade 2 MCL injury with posterior horn meniscal tear and patellar interosseous ganglion, surgery 2006

Meds: None

Allergies: Penicillin

Family History: Dad with history of cervical disk herniation (no surgical intervention), mild obesity and well controlled hypertension. Mom with lupus and fibromyalgia.

Social History: Senior in high school. Plays football (linebacker) and wrestles. Intentions of playing NCAA Division II football next year, on scholarship. Mom is a nurse at the hospital where evaluation is occurring.

Physical Exam:
Heart Rate 64
Height 178 cm
Weight 104.5 kg

General Appearance: well appearing, well nourished
Psych: pleasant affect

Range of Motion: full range of motion with pain in extension only.
Inspection / Palpation: C-spine non-tender. Mild tenderness deep left trapezius muscle with no significant trigger points or spasm.

Special tests: Positive Spurling’s test on the left, with pain radiating to left lateral arm. Negative on the right.

Shoulders:
Inspection: symmetric muscle mass, no evidence of atrophy

ROM: Full and pain free.

Strength: 4/5 left bicep strength, 4/5 deltoid strength. Otherwise strength testing was full and symmetric bilaterally.

Neurological exam: Trace bicep jerk left, 2+ right. 1+ triceps jerk bilaterally. Normal symmetric sensation to light touch throughout upper extremities. No muscle wasting.

Skin exam: normal.

Lymphatic exam: unremarkable.

Impression: 19 year old male with left-sided neck pain, history of recurrent stingers, including one episode of “bilateral stinger” and possible transient cervical cord neuropraxia, and abnormal left upper extremity neurologic exam.

Differential Diagnosis:
Cervical Disk Disease w/ radiculopathy
Brachial Plexus Injury
Thoracic Outlet Syndrome
Congenital Cervical Canal Stenosis
Trapezius strain
Cervical rib

Imaging:
Cervical spine films: 6 view C-Spine series negative.

MRI: There was evidence of reduced functional reserve at multiple levels. C3/C4 level had a spinal canal measurement of 8.3mm, C4/5 level 7.5mm, C5/6 level 8.0mm. Mild bulging disks at C3/4 and C4/5.

Follow-up visit: Patient admitted to a history of 6 episodes of bilateral arm numbness, tingling, and weakness that occurred throughout past football and wrestling season. He also reported 10 unilateral, left more frequently than right, stingers throughout his high
school football career. All episodes occurred with football tackling or with having his head / shoulder driven into the mat. All episodes spontaneously resolved within minutes. He denies lower extremity symptoms and bowel or bladder problems. He denies noticing weakness or any other neurologic symptoms between episodes.

Final Diagnosis and Assessment: 19 year old male football player with recurrent transient cervical cord neuropraxia and evidence of congenital cervical canal stenosis.

Outcome:
The patient was advised to discontinue contact sports. The family was very accepting of the diagnosis and understood the risks and benefits of continuing contact. We did discuss the varying opinions in the medical literature about the controversy surrounding cervical cord neuropraxia and the potential for irreversible neurologic damage. They were encouraged to see a neurosurgeon to discuss his current neck pain and abnormal neurologic exam to determine if any intervention was necessary. Two separate neurosurgeons both recommended stopping contact sports. The family and patient agreed.

Discussion and References/ Recommended reading:

Football accounts for more catastrophic injuries than any other sport, with catastrophic injury being defined as “injuries resulting in death, brain or spinal cord injury, or cranial/cervical spine fracture” (Cantu 2000). The majority of these injuries occur as a result of improper tackling technique call spearing where the player strikes the opponent head first with the neck slightly flexed causing an axial load of the spine (Torg 1997). Other mechanisms of cervical spine injury include hyperflexion and hypextension. The incidence of transient bilateral motor or sensory symptoms is 1.3/10000 in college level football players (Torg 1984). An episode of transient paresis or paresthesia should prompt a thorough work-up to look for spinal injury and cervical stenosis. Plain x-rays and/or CT scan can be used to evaluate the bony structures. MRI can be used to look for the presence of nerve root compression, intrinsic cord abnormalities and spinal stenosis. Congenital cervical stenosis has been associated with an increase risk for neurological injury (Matsuura 1989, Firooznia 1985, Schneider 1961,1966) MRI is supported as the most accurate means of determining if spinal stenosis is present. A spinal –canal diameter of more than 15mm is considered normal and less than 12.5 mm is abnormal with a grey area in between (Castro 2003). MRI is also used to evaluate whether or not spinal fluid surround the cord at all levels of the cervical spine or if the canal is narrow enough at any level that there is obliteration of fluid at that level, indicating inadequate “space available for the cord”. (Tierney 2002)

The Torg ratio has also been used as a method for determining spinal stenosis. The Torg ratio is determined by dividing the sagittal diameter of the spinal canal by the sagittal diameter of the vertebral body. The sagittal spinal canal diameter is measured from the middle of the posterior vertebral body to the laminar line and the sagittal vertebral-body diameter is measured at the midpoint of the vertebral body. A ratio of less than 0.80-0.70 is indicative of spinal stenosis (see figure). Unfortunately, in subjects with larger vertebral bodies the ratio may be falsely small, diagnosing stenosis when it is not present.
Because congenital cervical stenosis is associated with increased risk for injury including para/quadriplegia, contact sport participation is not recommended.

Schneider RS, Reifel E, Grisler H et al. Serious and fatal football injuries involving the head and spinal cord. JAMA 1961;177:362-367

X: sagittal spinal cord diameter
Y: sagittal spinal canal diameter
Z: sagittal vertebral body diameter
Torg ratio=Y/Z
Diagram from: Telnery 2002