Cervical Disc Lesion

ICD

Evaluation
* Cervical Directional Preference Testing
* Cervical Distraction
* Maximal Foraminal Compression Test
* Neurodynamic Quick Screen Cluster- Upper Extremity
* Shoulder Abduction Sign
* Spurling'sTest
* Upper Extremity Neurologic Evaluation

IMAGING RECOMMENDATIONS

Management
Modalities
* Cervical Traction

Soft Tissue
* STM- Cervical Erectors
* STM- Suboccipitals
* STM- Upper Trapezius

Manipulation/Mobilization
* Manipulation-Cervical and Thoracic

Phase I exercises
* YTWL Scapular Depression
* Levator Stretch

Phase II exercises
* Cervical Retractions
* Deep Neck Flexion

Clinical Pearls
* 90% of cervical disc lesions are at C5/6 or C6/7.
* Peak incidence of disc lesions is in the fourth decade.
* Radiculopathy in a patient over 50 is more likely from degenerative stenosis.
* Asymptomatic "protrusions" are present in up to 63% of males over the age of 40, while asymptomatic "herniations" are present in 10% of adults under 40, and 5% of adults over 40

"Disc lesion" refers to a disruption of annular fibers and subsequent displacement of nuclear material. Annular disruption is accompanied by an inflammatory reaction capable of producing local symptoms or in more severe cares, a "chemical radiculopathy." Significant annular disruption can lead to disc bulging or herniation, resulting in mechanical compression of adjacent nerve roots. Most radicular complaints are thought to arise from a combination of mechanical and chemical factors. (1) Ensuing symptoms may include pain, paresthesia, numbness, or weakness in the distribution of the affected nerve root(s).

Disc lesions are rarely the result of a single traumatic event, but rather, the undesirable mid-point on a continuum of problems, beginning with repetitive disc sprain, leading to herniation, ending in degeneration. The age-related loss of the normal viscoelastic properties of the disc coupled with repetitive mechanical stressors like compressive loading, sheer stress, and vibration weaken annular fibers. This process eventually leads to annular disruption via fissures and avulsion of annular fibers from their vertebral body attachments. (2) Constant cervical motion and awkward postures combined with compressive loading allow for hydrostatic migration of nuclear material through the weakened annular fibers. (3) Diffuse annular fiber weakening can lead to broad-based or circumferential bulging, while more concentrated fiber disruption allows focal protrusions or extrusions.

Only the outermost annular lamellae are innervated so early disruption may be asymptomatic. Asymptomatic "protrusions" are present in up to 63% of males over the age of 40. (4) Asymptomatic "herniations" are present in 10% of adults under 40, and 5% of adults over 40. (5)

The normal cervical lordosis is created, in part, by wedge-shaped discs that are thinner posteriorly. (6) Most disc lesions occur in this thinner and weaker posterior annulus, usually more laterally where the posterior longitudinal ligament thins. (7,8) The intervertebral foramina progressively decrease in size caudally from C2-3 through C6-7, making herniations of the lower levels more likely symptomatic. (9) Ninety percent of symptomatic disc herniations occur at C5-6 or C6-7. (8,16)

Disc problems may be classified by location as central, paracentral, or foraminal. The most accepted nomenclature for disc lesions is the use of the term "protrusion" to describe bulging of an intact annulus, "extrusion" to describe contiguous nuclear material that has herniated through the annulus, and "sequestration" to describe a detached nuclear fragment. The degree to which the periphery of the disc is involved may further classify lesions as "focal," meaning less than 25% of the disc circumference is displaced, "broad-based", involving 25-50% of the perimeter, and "circumferential" involving 50-100%. (10)

Cervical disc lesion is the second most common cause of cervical radiculopathy behind degenerative stenosis. (11,12) Cervical disc herniation is most likely to affect adults below the age of 55 with a peak incidence in the fourth decade. (13,62) Cervical disc herniations are slightly more common in males. (13,62) Activities that are thought to predispose patients to cervical disc problems include repetitive stressful workstation postures (i.e. maintaining a prolonged forward head posture), repetitive cervical flexion, improper sleep postures, trauma, frequent heavy lifting, cigarette smoking, and driving or operating vibrating equipment- including motor vehicles. (13,14,62)

Symptoms may arise from inflammation, mechanical compression, or both. (15) Cervical discogenic pain often begins with localized symptoms and progresses into radicular complaints. (16) Lesions without mechanical compression may produce only local discomfort and pain or sensory disturbances that radiate into the head, neck, shoulders, or interscapular area. Neck pain may be worse with prolonged workstation use or prolonged flexion. The distribution of non-radicular, cervical discogenic pain is well documented. (see table 1) (17,18).

The effects of a "chemical radiculopathy" may include sensory disturbances, which radiate into the ipsilateral extremity, sometimes below the elbow. True mechanical compression of a nerve root can produce all of the above, plus motor deficits and diminished reflexes. Local pain may be described as sharp or dull, while radicular pain is generally described as sharp and superficial, sometimes accompanied by paresthesia. Arm pain may be the predominant symptom in cases of radiculopathy. (12) Patients may note an increase in radicular pain when coughing or sneezing and find relief by elevating their arm above their head. (2)

Clinical evaluation may demonstrate diminished or painful cervical range of motion, particularly in rotation or extension. (15) Palpation will often elicit localized tenderness and demonstrate hypertonicity in the suboccipital, paracervical, and shoulder girdle musculature. Foraminal compression and Spurling's test may elicit local or radicular complaints. (19) Cervical distraction may provide relief. Patients may exhibit a positive "Shoulder abduction sign" with the elimination of symptoms when holding their hand above their head. Upper extremity nerve tension testing may elicit radicular complaints. Additional space occupying lesion assessments include Valsalva, Soto Hall, and Modified Slump tests.

Joint restrictions at the level of disc herniation may impair normal imbibition and healing. Joint restrictions near the site of a disc herniation can transfer mechanical stresses to the "path of least resistance," i.e. the herniated disc, so clinicians should assess for the presence of joint restrictions throughout the cervical and upper thoracic regions. (20) Care must be taken to recognize biomechanical and postural faults, including a forward head posture, upper crossed syndrome, excessive thoracic kyphosis, altered scapulohumeral rhythm, weakness of the deep neck flexors, and paradoxical breathing. (21)

The most common clinical neurologic findings for radiculopathy from cervical disc lesion include upper extremity sensory disorders (88.3%), reflex abnormalities (61.7%), and motor weakness (51.7%). (36) Motor/muscle testing provides the most specific assessment of individual nerve roots. (23) Evidence of progressive neurologic deficit warrants surgical consultation. See the accompanying table for neurologic evaluation of cervical radicular complaints.

Clinicians should perform a neurologic evaluation of both the upper and lower extremities to assess for the possibility of myelopathy. Signs of myelopathy or upper motor neuron lesion include hyperreflexia, diffuse weakness, spasticity, and the presence of pathologic reflexes (Ankle clonus,

Babinski sign, Hoffman sign, and Lhermitte's test.)

A radicular complaint in the upper extremity may suggest the need for radiographic workup, including AP, lateral, and oblique views. (63) Additional justification for radiographs include: a history of significant trauma, suspicion of fracture or instability, age over 50, lack of improvement with conservative care, litigated cases, neuromotor deficits, and the presence of red flags- including: unexplained weight loss, history of cancer, corticosteroid use, fever, or drug/alcohol abuse. (24) Plain film radiographs of cervical disc lesions are often normal but may show concurrent degenerative change, particularly in older patients. Apophyseal and uncovertebral joint degenerative hypertrophy will cause narrowing of the intervertebral foramen and is visualized on the oblique films. Symptoms often arise from a combination of disc bulging and spondylolytic bony encroachment, i.e. "disc/ osteophyte complex" or "hard disc".

MRI is a sensitive modality for detection of cervical disc lesions and provides additional information concerning the hydration status of the disc. (25) MRI yields false positives, and the true origin of the patient's complaints may not always arise from the imaged disc lesion. (5) Direct displacement of a nerve root or fluid within the nerve root are generally associated with symptomatology but are not always present. As noted earlier, asymptomatic disc lesions are common and should be correlated with history and physical findings to determine relevance. Even demonstrable cord compression may be asymptomatic in up to 7.6% of adults over age 50, however, providers should not dismiss the significance of any stenosis when considering manual treatment. (26) CT is an alternative in cases where MRI is contraindicated. CT can be more sensitive than MRI when combined with invasive discography or myelography but is not routinely used. (27-29)

In addition to cervical degeneration, the differential diagnosis for cervical disc lesion includes, facet syndrome, sprain/strain, brachial neuritis, peripheral nerve entrapment, Pancoast tumor, infection, neoplasm, Parsonage Turner syndrome, TOS, herpes zoster, sympathetic mediated syndromes, Brown Sequard syndrome, chronic regional pain syndrome/ RSD, rotator cuff injury, and viscerosomatic referred pain- particularly cardiac.

The goal of conservative management should be to reduce pain and inflammation, decrease mechanical compression, and improve functional stability. Conservative management of cervical disc herniation with radiculopathy has been shown to result in regression of herniated material with subsequent reduction in local and radicular complaints. (22,30-33) The relatively avascular anatomy of the intervertebral disc may prolong recovery times.

A study by Croft (34) found that 93% of chiropractors utilize manipulation in cases of cervical disc herniation. While sometimes controversial, the judicious application of spinal manipulation has been shown to be safe, appropriate, and effective for the management of cervical disc herniation and/or radiculopathy. (35-50,65,66) One study of 50 patients undergoing HVLA manipulation at the level of cervical disc herniation demonstrated significant improvement after two weeks of care with none worsening and 85.7% reporting significant improvement at three months. (40) Another study of 104 MRI-confirmed disc herniations demonstrated that patients treated with SMT were significantly more likely to report relevant "improvement" compared to those treated with cervical nerve root injection blocks. (65) Although at least one biomechanist (33) believes that disc failure or exacerbation related to spinal manipulation is unlikely, clinicians must apply this modality judiciously.

Practitioners should assess for a directional preference by having the patient perform repetitive extensions (and flexion) if needed, while observing for symptom centralization. Discontinue this assessment at any sign of peripheralization. Alternatives to HVLA manipulation include Grade 3-4 mobilization, instrument-assisted adjusting, and cervical flexion distraction. Absolute contraindications for manipulation include the presence of cord compression (myelopathy), disc prolapse with neurologic deficit, progressive neurologic deficit, or the presence of unexplained red flags. (52-54)

Cervical spine traction is a beneficial modality for cervical disc lesion and has been shown to help decompress, rehydrate, and promote recovery. (8,56-60) The use of ice, electrical stimulation, or ultrasound may provide benefit.

Restoration of normal flexibility and mobility allows for a more balanced distribution of forces away from the injured segment. Stretching and myofascial release techniques may be necessary for the paracervical region, including the suboccipital, posterior cervical, SCM, levator, and trapezius muscles. Implementation of IASTM procedures may help release myofascial adhesions in chronic cases. Cautious application of upper extremity nerve flossing may help mobilize and de-sensitize the irritated nerves.

Stabilization programs should focus on coordinating cervical, thoracic, and shoulder girdle movement and correct for biomechanical deficits including weakness in the deep neck flexors, upper crossed syndrome, or paradoxical breathing. Patients should be counseled on proper workstation and sleep postures and should avoid activities that involve axial loading of the cervical spine, like headstands, carrying objects on the head, and diving into water.

NSAIDs may help relieve inflammation. Medical co-management of acute cases with short-term tapering oral steroids is a potent anti-inflammatory adjunct. Recalcitrant cases may require pain management and/or neurosurgical consult. Cervical epidural injections or selective nerve root blocks may be helpful. (64) The addition of spinal manipulation post-epidural injection has been shown to improve outcomes. (61) Surgical alternatives, including discectomy, or discectomy with fusion, should be considered only after a failed trial of conservative therapy, or in the presence of progressive neurologic deficit. (22)

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