Cervical spinal stenosis diagnosis

A diagnosis of cervical spinal stenosis usually is based on the history of symptoms and a physical exam.

Imaging tests that may be used include X-rays, magnetic resonance imaging (MRI), and computed tomography (CT) scans.

Cervical spinal stenosis can be inferred from plain X-rays.

★ NB: Canal diameters measured on Xrays are actually surrogate markers for the entity of interest: viz. spinal canal narrowing sufficient to produce spinal cord compression and thereby spinal cord symptoms. This can be directly demonstrated on MRI or CT/myelo, and MRI can also detect intrinsic spinal cord signal abnormalities.

Patients with CSM have an average minimal AP canal diameter of 11.8mm, [1] and values ≤ 10mm were likely to be associated with myelopathy [2].

Patients with an AP diameter < 14mm may be at increased risk, [3] and CSM is rare in patients with a diameter > 16mm, even with significant spurs [4]

Cervical spinal stenosis is also suggested on plain films when the spinolaminar line is close to the posterior margin of the lateral masses.

Torg-Pavlov ratio, (AKA Pavlov ratio, Torg ratio) or so called “Canal Body Ratio” CBR was first described in 1987 by Pavlov et al., it represented the ratio between the sagittal diameter of the spinal canal and the sagittal diameter of the corresponding vertebral body and was first measured on lateral cervical spine X-ray. A ratio of <0.7–0.8 indicated a significant spinal stenosis with high risk of neurological injury [5] [6]: the ratio of the AP diameter of the spinal canal at the mid VB level to the VB at the same location. A ratio < 0.8 is sensitive

Canal diameter

Normal canal diameter on lateral C-spine X-ray (from spinolaminar line (SLL) to posterior vertebral body with 6 foot tube to film distance) [7]: 15 ± 5mm for C3 through T1 with the beam centered on C4 (uncorrected measurements; true measurements are 1.5mm or less). In the presence of osteophytic spurs, measure from the back of the spur to the SLL. Cervical spinal stenosis: various cutoffs for the normal minimum AP diameter have been suggested. 10 On a plain lateral C-spine X-ray this is usually measured from the posterior vertebral body (or the posterior aspect of an osteophyte) to the spinolaminar line. Some use 15mm. Most agree that stenosis is present when the AP diameter is < 12mm in an adult. This measurement is less critical than it once was, it is a surrogate marker for stenosis severe enough to compress the spinal cord, which now may be demonstrated directly with MRI (or myelography).

In unclear cases of degenerative disorders of the cervical spine, particularly multilevel stenosis, myelography and CT myelogram add relevant information for therapeutic decisions in more than a

quarter of the patients in comparison with MRI as the sole diagnostic modality, and changes therapeutic strategies. However, a significant part of the information drawn out of myelography and MCT can be obtained by a completion of noninvasive examinations (native CT and radiographs) [8].

The relationship of the presence, absence or extent of intramedullary T2 weighted signal change to clinical myelopathy, and to the likely outcome after surgery, remains complex and controversial.

More recent publications tend to indicate that T2 weighted signal change, particularly if multisegmental, is a poor prognostic feature for response to surgery.

Kinetic magnetic resonance imaging of the cervical spine

Kinetic magnetic resonance imaging of the cervical spine

1)
Adams CBT, Logue V. Studies in Cervical Spondylotic Myelopathy: II. The Movement and Contour of the Spine in Relation to the Neural Complications of Cervical Spondylosis. Brain. 1971; 94:569–586
2), 7)
Wolf BS, Khilnani M, Malis L. The Sagittal Diameter of the Bony Cervical Spinal Canal and its Significance in Cervical Spondylosis. J of Mount Sinai Hospital. 1956; 23:283–292
3)
Krauss WE, Ebersold MJ, Quast LM. Cervical Spondylotic Myelopathy: Surgical Indications and Technique. Contemp Neurosurg. 1998; 20:1–6
4)
Cooper PR. Cervical Spondylotic Myelopathy. Contemp Neurosurg. 1997; 19:1–7
5)
Pavlov H, Torg JS, Robie B, et al. Cervical Spinal Stenosis: Determination with Vertebral Body Ratio Method. Radiology. 1987; 164:771–775
6)
Torg JS, Naranja RJ, Pavlov H, et al. The Relationship of Developmental Narrowing of the Cervical Spinal Canal to Reversible and Irreversible Injury of the Cervical Spinal Cord in Football Players. J Bone Joint Surg. 1996; 78A:1308–1314
8)
Westermaier T, Doerr C, Stetter C, Linsenmann T, Koehler S, Eriskat J, Solymosi L, Ernestus RI. Influence of Myelography and Postmyelographic CT on Therapeutic Decisions in Degenerative Diseases of the Cervical Spine. J Spinal Disord Tech. 2015 Nov 12. [Epub ahead of print] PubMed PMID: 26566254.