Cervical Spondylosis

- MRI-Based Machine Learning and Radiomics Methods for Assessing Spinal Cord Function in Patients with Mild Cervical Spondylotic Myelopathy
- An Uncommon Presentation of Crowned Dens Syndrome Without Systemic Inflammation
- Laminectomy with fusion for cervical spondylotic myelopathy is associated with higher early morbidity and risk of perioperative complications compared with laminectomy alone: a retrospective study in the United States
- Positioning and clinical application of the inflection point of the uncinate process in anterior cervical discectomy and fusion (ACDF): a retrospective study
- Does the Pillow Affect the Sleep Quality and Disability in Patients With Cervical Spondylosis? A Study Protocol for a Randomized Clinical Trial
- Mid-Term Functional Recovery After ACDF and ACCF in the Treatment of Adjacent Two-Level Cervical Spondylosis: A Comparative Study
- Uniportal Full Endoscopic Posterolateral Transforaminal Lumbar Interbody Fusion
- Magnetic resonance imaging in the evaluation of different compression locations in patients with cervical spondylotic radiculopathy

Cervical degenerative disc disease is generally discussed in terms of cervical spondylosis, a term which is sometimes used synonymously with cervical spinal stenosis.

Spondylosis usually implies a more widespread age-related degenerative condition of the cervical spine including various combinations of the following:

1. congenital cervical spinal stenosis (the “shallow cervical canal”)

2. degeneration of the intervertebral disc producing focal stenosis due to a “cervical bar” which is usually a combination of:

a) osteophytic spurs (“hard disc” in neurosurgical jargon)

b) and/or protrusion of intervertebral disc material (“soft disc”)

3. hypertrophy of any of the following (which also contributes to canal stenosis):

a) lamina

b) dura

c) articular facets

d) ligaments, including

● increased stenosis in extension is more common than with flexion (based on MRI studies and cadaver studies), largely due to posterior inbuckling of ligamentum flavum

● posterior longitudinal ligament: may include the ossification of the posterior longitudinal ligament(OPLL).Maybe segmental or diffuse. Often adherent to the dura

● ossification of the ligamentum flavum (yellow ligament)

4. subluxation: due to disc and facet joint degeneration

5. altered mobility: severely spondylotic levels may be fused and are usually stable, however there is often hypermobility at adjacent or other segments

6. telescoping of the spine due to loss of height of VBs →“shingling” of laminae

7. alteration of the normal lordotic curvature (NB: the amount of abnormal curvature did not correlate with the degree of myelopathy)

a) reduction of lordosis: including

● straightening

● reversal of the curvature (kyphosis): may cause “bowstringing” of the spinal cord across osteophytes

b) exaggerated lordosis (hyperlordosis): the least common variant (may also cause bowstringing).

Clinical features

Cervical spondylosis is the most common progressive disorder in the aging cervical spine. It results from the process of degeneration of the intervertebral discs and facet joints of the cervical spine. Biomechanically, the disc and the facets are the connecting structures between the vertebrae for the transmission of external forces. They also facilitate cervical spine mobility. Symptoms related to myelopathy and radiculopathy are caused by the formation of osteophytes, which compromise the diameter of the spinal canal. This compromise may also be partially developmental. The developmental process, together with the degenerative process, may cause mechanical pressure on the spinal cord at one or multiple levels. This pressure may produce direct neurological damage or ischemic changes and, thus, lead to spinal cord disturbances. A thorough understanding of the biomechanics, the pathology, the clinical presentation, the radiological evaluation, as well as the surgical indications of cervical spondylosis, is essential for the management of patients with cervical spondylosis [1)].

Diagnosis

Cervical spondylosis is the common degenerative disease of the vertebrae in adults which can lead to change in sagittal alignment of cervical spine. Radiograph and Magnetic resonance imaging (MRI) are widely used imaging modalities for measuring the sagittal parameters. However sagittal parameters measured using radiograph and MRI can be influence by patient positioning and imaging technique.

A study was done retrospectively. 77 patients who underwent both MRI and radiograph were included in the study. The sagittal parameters such as Neck Tilt (NT), T1 slope (T1S),thoracic inlet angle (TIA), C2-C7 angle (C2-C7A) and C2-C7 sagittal vertical axis (C2-C7 SVA) were measured on sagittal MRI and lateral cervical spine radiograph. Paired t-test was used to compare cervical sagittal measurements between MRI and radiography.

The cervical sagittal parameters such as NT, T1S, TIA and C2-7 SVA showed significant difference between MRI and radiograph ($p < 0.05$). But C2-C7A did not show significant difference ($p > 0.05$).

The study concludes that MRI cannot be used as an alternative to cervical spine radiograph in spondylosis patient for measuring the sagittal balance as there was significant difference between sagittal parameters except C2-C7 [2)]

The study provides useful evidence that MRI measurements of sagittal parameters differ significantly from radiographic measurements in cervical spondylosis patients, reinforcing the continued use of radiographs in clinical practice. However, methodological limitations and gaps in standardization reduce the robustness of the conclusions. Addressing these issues in future studies would provide a more definitive understanding of the role of MRI in sagittal balance assessment.

Treatment

see Cervical spondylosis treatment.

Complications

see Cervical spondylosis complications.

Case series

Ito et al., retrospectively investigated data from adults who underwent surgical treatment for cervical spondylosis between 2006 and 2016. The clinical outcomes and postoperative complications of patients who were <80 years old were compared to those of patients who were ≥80 years old. Of the 108 patients included in the study, 14 (13.0%) were ≥80 years old. The preoperative neurosurgical cervical spine score was significantly different between patients who were <80 (9.1 ± 2.4) and ≥80 (6.1 ± 2.1) years old ($p < .001$). The recovery rate was 58.2 ± 30.0% and 41.3 ± 24.7% in patients who were <80 and ≥80 years old, respectively ($p = .05$). However, the number of recovery points scored was 2.8 ± 2.0 and 3.4 ± 2.3 in patients who were <80 and ≥80 years old, respectively, which was not significantly different. Although 12 patients had medical comorbidities, they had no surgical complications. This study clarifies the benefits of surgical treatment for older adults with cervical spondylosis. Generally, older adults have lower recovery rates and are unlikely to experience full recovery; however, surgery for cervical spondylosis appears to improve patients' quality of life [3)].

Computer-aided design techniques were used to analyze the degree of spinal curvature shown on cervical spine radiograms of 28 patients. On films standardized as to size, a geometrical chord was constructed from the 2nd to the 7th cervical vertebrae (C2 to C7), and an arc was drawn along the posterior margin of the vertebrae. The resulting area was used as an index of curvature, and the spinal canal diameter was measured. Severity of myelopathy as well as clinical improvement was related to the geometrical data. There was no clear correlation between severity of the preoperative myelopathy and degree of curvature. Severe myelopathy was seen in association with straight, lordotic, and hyperlordotic spines. Neck pain was most severe in patients with reversed cervical curvature. The degree of curvature, however, seems to relate to the postoperative clinical outcome.

Patients with relatively normal curvature showed the greatest improvement in symptoms and signs. Postoperative magnetic resonance scanning confirms that posterior migration of the spinal cord after laminectomy may be inadequate to clear osteophytes in patients with straightened or reversed curvature of the cervical spine. Spinal geometry should be considered in the selection of the best surgical procedure and the extent of laminectomy for patients with spondylotic myelopathy. Significant abnormalities of spinal curvature may account for some instances of poor outcome after laminectomy [4].

References

1)

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3)

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