



Interobserver Reliability of MRI Predictors of Outcome in Cervical Spine Degenerative Conditions

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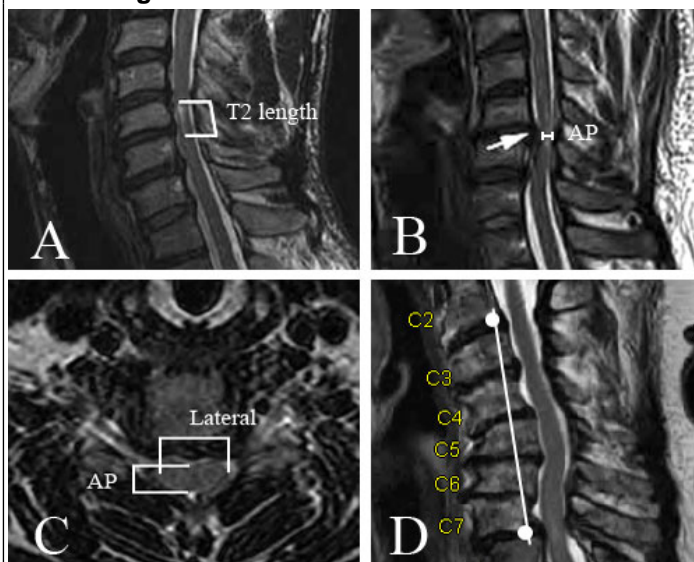
Introduction

Recent work has focused on identifying MRI findings predictive of outcome in surgical management of cervical spondylosis. To date, however, agreement in measuring these markers remains unknown. We aim to evaluate interobserver agreement for such markers.

Methods

A secondary analysis of cervical MRI images was performed among patients who underwent elective cervical spine surgery. Two neuroradiologists independently reviewed MRIs for: presence/absence and length of spinal cord signal change, the intervertebral level of worst compression, measurements of AP and lateral spinal cord diameter in the axial plane, AP measurements in the mid-sagittal plane, and presence/absence of kyphotic deformity. Kyphosis was noted to be present if any part of the vertebral body passed through a line drawn from the dorsocaudal aspect of the C2 vertebral body to the dorsocaudal aspect of the C7 vertebral body (Batzdorf and Batzdorff line). Interobserver reliability was compared using kappa for dichotomous variables where agreement was defined as poor ($K=0.00-0.20$), fair ($K=0.21-0.40$), moderate ($K=0.41-0.60$), good ($K=0.61-0.80$), or very good ($K>0.80$). Interclass correlation coefficient was used to evaluate reliability for continuous variables.

Figure 2. Measurement of MRI Markers



Measurements for A) length of spinal cord signal change, B) level of worst compression and AP cord diameter (sagittal), C) AP and lateral cord diameter (axial), and D) kyphotic deformity based on Batzdorf and Batzdorff criteria.

Results

- Of 209 patient evaluated for spinal cord signal change, 27 (13%) had signal change on T2
- Mean patient age was 51.0 and 54% were myelopathic
- Signal change length was not compared on T1 images as only 3 patients had signal change on this sequence.
- Best agreement was observed with AP measurements of spinal cord diameter in the sagittal plane on T2
- Moderate agreement in lateral spinal cord measurements may argue against the use of compression ratio given that it is formulated in part from lateral measurements.

Table 1

MRI Marker	Reliability	95% CI
Spinal cord signal change		
T1	0.33 (fair)	0.04-0.62
T2	0.74 (good)	0.62-0.86
Length of T2 signal change	0.67* (good)	0.36-0.85
Spinal cord compression		
Level of worst compression	0.79 (good)	0.72-0.87
Diameter		
AP on T2 mid-sagittal	0.82 (very good)*	0.77-0.86
AP on T2 axial	0.66 (good)*	0.57-0.73
Lateral on T2 axial	0.55 (moderate)*	0.44-0.64
Kyphosis	0.76 (good)	0.67-0.84

Inter-observer reliability based on Kappa statistic. *ICC-interclass correlation coefficient. CI-confidence interval.

Conclusions

- AP measurements on T2 mid-sagittal images were the most reliable marker.
- Good reliability was observed for: T2-weighted spinal cord signal change, level of worst cord compression, kyphotic deformity, measurements of AP cord diameter on T2 axial images, and measurements of signal change length on T2 sagittal images.

Learning Objectives

At the conclusion of this session, participants should be able to: 1) Identify MRI markers cited to be predictive of surgical outcome 2) Understand which markers exhibit the greatest interobserver reliability

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References Contact Andrew Lozen M.D. at alozen@mcw.edu for complete list

Figure 1

