AXIAL LOADING OF THE LUMBAR SPINE IN CT SCANNING

A valuable complement in the diagnosis of central spinal stenosis

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Objectives

To assess the diagnostic aid of axial loading of the lumbar spine in CT scanning compared to conventional CT examination in the evaluation of lumbar spinal stenosis.

Axial Loading technique

Both MR and CT are performed with the patient lying in the scanner when the compression load is only about 25%, as compared with the spinal load in a standing position. Myelograms can be taken in an upright position but does not provide cross-sectional images of the dural sac, which is valuable in the diagnosis of central spinal stenosis (1).

A new portable device, DynaWell™, which facilitates compression of the lumbar spine and simulates the normal pressure exerted when standing has recently been introduced by J. Willén, B. Danielson and coworkers (2,3). They have reported good clinical results with this method using MR and CT-Myelography examinations.

Patients and methods

One hundred consecutive patients, referred from ORTON Rehabilitation to CT examination due to chronic lower back problems and clinical symptoms suggesting spinal stenosis, were investigated. There were 45 women and 55 men, aged 25 to 59 years (mean 48).

The patients underwent ordinary CT scanning completed with a complementary compression examination. For the latter, a harness was strapped over their shoulders and upper chest. Two straps attached this vest to the DynaWell™ compression device (fig.1). By tightening the straps, the pulling load (appr. 50% of the body weight or max 35 kg) was adjusted to simulate the compression of the dural sac when standing. In the 100 patients, 300 disc levels were available for examination.

With a software program on Picker PQ2000 CT scanner, the area of the dural sacs was measured both at the ordinary CT and the compression examination. The cross sectional areas were classified as follows: >100mm² = normal, 100 - 75mm² = relative spinal stenosis, and <75mm² = absolute spinal stenosis (4,5).

Results

In almost every patient and at every disc space the area of the dural sac diminished in compression (fig. 3). In L5-S1, the spinal canal was widest, the size of the dural sac varied the most and the effect of the compression was smallest.

References


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