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## Radiologic Aspects of Low Back Pain and Sciatic Syndromes

I have always said that the most difficult area in neuroradiology is the evaluation and diagnosis of low back pain and sciatic syndromes. In the past, we had plain films, plain-film tomography, and Pantopaque myelography. We had to do our best with these procedures to make a diagnosis and, with the clinical evaluation, to arrive at a therapeutic decision. Myelography is insensitive, particularly at the L5–S1 vertebral levels, owing to a relatively wide ventral epidural space that placed the radiopaque column too far away from the posterior margin of the vertebral body. Therefore, we had to rely on minor changes in the myelographic picture to suggest herniated intervertebral disk at the L5–S1 level. This was a lesser problem at L4–L5, where, ordinarily, the radiopaque column was closer to the posterior margin of the vertebrae. No one knew what our percentage of accuracy was, but in general we quoted the figure of 90% or better at the L4–L5 level and not more than about 80% at the L5–S1 level.

With the advent of water-soluble contrast media that permitted better filling of the nerve root sheaths, it was widely hoped that we would improve our accuracy, and although this happened to a certain extent, it did not add more than a few percentage points to our ability to make an accurate diagnosis.

CT was not helpful in the examination of the spine until the late 1970s, because the resolution provided by the total-body units was not good enough until then. As we obtained higher-resolution CT images, the percentage of patients in whom we could see herniated intervertebral disk at the appropriate location increased significantly. We could see not only herniations on the dorsal side of the intervertebral disk space but also pathologic changes at the level of the intervertebral foramen or more lateral to that, which could never be seen myelographically. We could also see straight lateral and anterior herniations.

The next improvement occurred when many investigators in the field decided to do CT examinations immediately after myelography with water-soluble contrast media. In my opinion, this represents a significant advance, and at the Massachusetts General Hospital, myelography in the lumbar region is almost routinely followed by CT examination of the spine. CT adds considerable information and clarifies minor changes that might have doubtful interpretations on the myelograms.

Now MR has come in, and we are obtaining still more anatomic information. I can see the day when the use of myelography may well be decreased and replaced by a combination of CT and MR examinations.

However, our ability to diagnose significant symptomatic disk herniations and other causes of nerve root involvement *that would correlate with the patient's clinical findings is not improving* as we obtain progressively more information about the anatomic status of these structures. Two articles in this issue of the *AJNR* are intended to clarify some of the difficulties that we have in evaluating patients who have lower back pain. It is common to find anatomic changes sometimes exclusively on the opposite side, where the patient's symptoms are referred, and sometimes on both right and left sides at different levels. Perhaps of greater importance than we had thought is the combination of factors related to involvement of both the somatic and sympathetic nervous systems that result from changes around the intervertebral disk, which encompass the bulging disk itself, the stretched anterior and posterior ligaments, the edges of the vertebral bodies, the compressed nerve roots, the apophyseal joints with their respective ligaments and synovial membranes, and the inflammatory changes that undoubtedly occur and involve the surrounding soft tissues.

The reader is referred to the paper by Jinkins [pages 219–231] in this issue. The article by Wilmink [pages 233–248] is

also important in pointing out the difficulties encountered in arriving at a reasoned analysis of the myelographic findings and comparing the myelogram with the premyelographic CT examination. The frequency with which both procedures may reveal what would normally be diagnosed as a herniated intervertebral disk on the side opposite the symptoms is disheartening. Are we missing the diagnosis? Are we failing to attribute the importance they might deserve to some minor changes that are visible on the images? Or are these changes simply not there? How often does a disk herniation spontaneously disappear before the examination is carried out even while symptoms from root irritation continue?

Our diagnostic problems are compounded by the fact that so many of these examinations are performed on patients who have had surgery. If it is difficult enough to make a diagnosis of cause and effect in new patients, it is several times more difficult, with few exceptions, to decide what is

the real cause of patients' complaints after they have had one or two or more surgical treatments.

The low back and sciatic syndromes are extremely important problems and ones in which the neuroradiologist must seriously become involved in order to contribute to the optimal therapeutic decision. The results of treatment of these syndromes need improvement and can be improved. The team approach is probably best, and I suggest that neuroradiologists become part of a team to try and contribute all they can toward improving the management of low back and sciatic syndromes.

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