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CT Evaluation of the Lumbosacral Spine

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The biologic cost-effectiveness of computed tomography (CT) versus myelography is so favorable to CT that it is now the method of choice for evaluating patients with less clear-cut clinical findings. CT is now used to detect lesions formerly difficult to diagnose, such as subluxation, arthrosis, facet osteophytes, and stenosis of the vertebral canal, as well as herniated disks and lateral disks. The findings in over 1,000 patients examined by CT for lumbosacral spinal pathology are documented. Associated or multiple abnormalities were present in about 60% of cases, with bulging or herniated disks occurring in 45% and 44%, respectively. Postsurgical arachnoiditis was seen in 43% of 64 patients studied for recurrence of symptoms after surgery.

In the past few years computed tomography (CT) of the spine has been the subject of many papers. Its role in the diagnosis of the herniated or bulging disk is now well known [1-5]. The advantages of CT as compared with myelography (even myelography with metrizamide or iopamidol) are enormous [6, 7]. Our experience with CT of the spine [8, 9] has been remarkable, particularly in offering a new approach to spinal problems that were previously neglected, such as luxation or arthropathies of the vertebral facets and pathology of the foramina. The extremely favorable biologic cost of CT as compared with myelography has given us the opportunity of studying many patients who would never have undergone myelography. Treatment and management of these patients may become more difficult as a consequence of the large amount of diagnostic information amassed; but therapy and prognosis can now be much more precise.

Materials and Methods

During a 16 month period, 1,021 patients underwent CT of the lumbosacral spine with the G.E. CT/T 8800 scanner. Slice thickness was 1.5 mm, scanning time 10 sec at 737 mAs, 120 kV, using a 0.75 mm pixel size and a patient dose of 3 rad (0.03 Gy) per section. Gantry angles and slice levels were chosen on a localizing scan (ScoutView).

Ninety-nine patients (9.9% of cases) underwent myelography with the contrast medium iopamidol (5-10 ml).

One hundred fifty patients with herniated or bulging disks (15% of cases) underwent surgical treatment.

Results

CT findings were normal in 7% of the 1,021 cases studied. Herniated disks were found in 44%; bulging disks in 45% (with

concomitant narrowing of the intervertebral foramina in 17%); and osteophytes of the intervertebral facets in 30%. Stenosis of the vertebral canal and/or miscellaneous findings were seen in 7.7%. Associated or multiple abnormalities were present in about 60% of the entire group of cases studied. Finally, postsurgical arachnoiditis was seen in 43% of 64 patients studied for recurrence of symptoms after surgery.

The patients in this series were referred from departments of neurosurgery, neurology, physical medicine and rehabilitation, and orthopedics for CT evaluation of lumbosacral spinal pathology. This explains the low percentage of normal findings. The most common finding was a combination of various abnormalities, particularly bulging or herniated disks associated with a narrowed canal due to osteophytes on the intervertebral facets (fig. 1). Another common finding was disk bulging into the intervertebral foramina, with compression (figs. 2A and 2B).

We found strict diagnostic agreement between CT and myelography. The images are quite different, however, and it was sometimes difficult to explain and correlate the findings from the two examinations to the satisfaction of our clinicians. We found also a very close agreement between CT and surgical findings (figs. 2C and 2D). In two cases there was differing prediction of the size of the hernia.

Discussion

During this period of CT diagnosis we conducted 99 myelographic examinations. The first 30 were performed to check and confirm the findings of the first CT examinations [8]. Thereafter, myelography was used only for differential diagnosis when the CT findings were normal or ambiguous. We occasionally had to do myelography to convince the surgeons of the accuracy of the CT findings. Even so we performed only 40% of the number of myelographies done before the introduction of CT in our institution. We believe that the number of myelograms will decrease even more in the future. In addition, the number of surgically treated patients decreased by 25%. We are confident that the accuracy of CT detection of associated pathology is responsible for the dramatic decline in the percentage of operated cases.

An interesting finding, but difficult to assess, is that in 43% of 64 patients, studied after surgery with recurrence of clinical symptoms, we found superabundant scar tissue with compression and adhesion of the dural sac to the area of surgery. We now wonder if arachnoiditis, previously attributed to myelography, is in fact, at least in most cases, the result of surgery.

Very good therapeutic results, which will be the subject of a separate communication, were occasionally obtained with simple manipulation.

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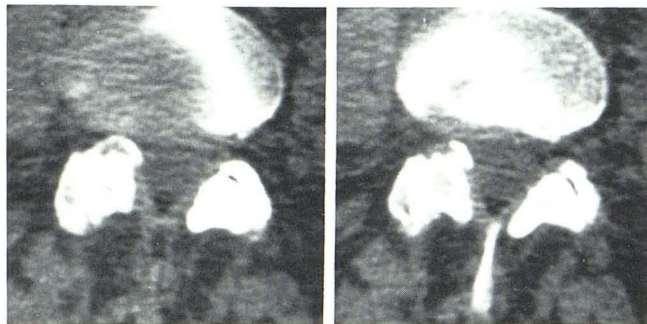


Fig. 1.—CT scans in 57-year-old woman. Selective compression of right L4 nerve root at L4–L5 level due to subluxation of L4 right facet in abnormal sagittal articulation with associated calcification of right ligamentum flavum.

Part of the reason for our diagnostic success with CT is the fact that we started from a lower diagnostic level. Nonetheless, it is certain that since the advent of CT the evaluation of pathology has been much more precise, and the therapeutic approach and prognosis have changed for the better.

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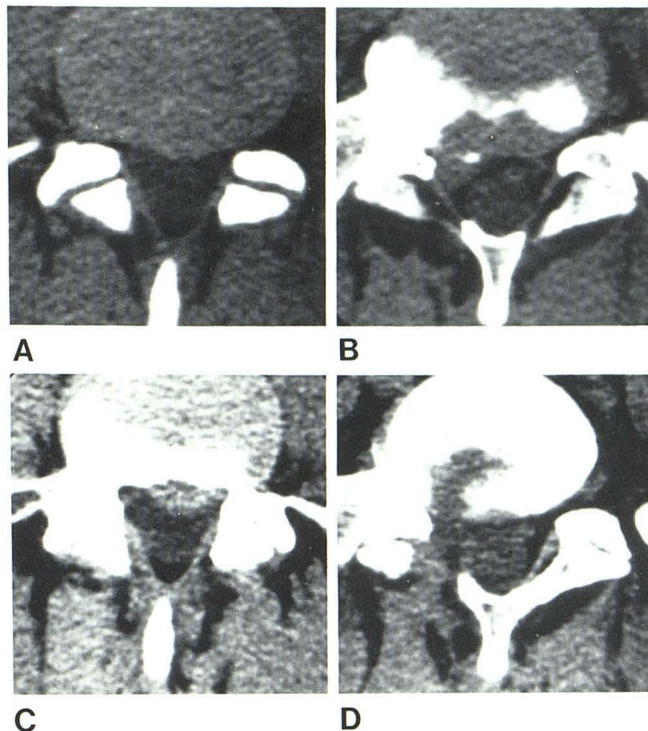


Fig. 2.—A and B, CT scans in 40-year-old man with right-sided sciatica. At L4–L5 level (A), slight disk bulging. At L5–S1 level (B), right herniation with compression of S1 nerve root. Patient later underwent surgery at L5–S1 level, but prognosis was unfavorable because of bulging disk at L4–L5 level. C and D, CT scans in same patient 4 months later with recurrence of sciatica on contralateral side. Previously bulging disk at L4–L5 level (C) is now herniated. L5–S1 level (D) shows results of surgical removal of hernia: section of right posterior arch; minimal scar tissue; normal appearance of disk, dural sac, and nerve root sheaths.