Herniated Lumbar Intervertebral Discs in Teen-Age Children

JOSEPH A. EPSTEIN, M.D., AND LEROY S. LAVINE, M.D.

Divisions of Neurological Surgery and Orthopedics, Long Island Jewish Hospital, New Hyde Park, New York, and Department of Neurological Surgery, Albert Einstein College of Medicine, Yeshiva University, Bronx, New York

 Herniation of the lumbar intervertebral discs in the 2nd decade of life occurs with extreme rarity despite the frequent episodes of trauma in this age group. In a series of 560 patients operated upon for herniated lumbar intervertebral discs, only 10 were within 15 and 19 years of age. While progressive alterations in the annulus fibrosus and nucleus pulposus occur with advancing age, none is known to be of significant magnitude to compromise seriously the structure of the annulus until the 3rd decade of life. Trauma in this age group plays an important precipitating role in the production of symptoms, unlike in the adult where pre-existing degenerative alterations in the disc render this structure susceptible to herniation.

The excellent results of operation in this age group should encourage active treatment in those cases refractory to conservative measures. As lucidly stated by Key, the parent is more alarmed than the patient and presents a far more difficult problem regarding management.

Review of Cases

Of the 10 patients, there were 6 boys and 4 girls. The youngest was 15 years of age, the oldest was 19, 1 was 16, 4 were 17 and 3 were 18. In 7 patients, a direct history of trauma was elicited. This included two injuries sustained while playing football, one while playing baseball, and one occasioned by a fall while ice-skating. One girl injured herself while leading a cheer and 1 sustained a low-back injury in a rear-end automobile collision. Another patient injured her back 6 years prior to admission when a chair had been pulled from beneath her. Two patients claimed that the onset of low-back pain and sciatica was related to occupational stress although no specific injury could be recalled. In only 1 patient was there no history of recent or remote trauma.

Symptoms of low-back distress had been present for 2 to 6 years in 3 patients before acute sciatic pain appeared. Both low-back pain and sciatica were observed in the entire group, the sciatic distress being the primary disabling factor. In 7 patients symptoms were evident for 2 to 9 months, and in 3 patients from 1 to 3 weeks. With the onset of radicular pain, rapid disability ensued eventually becoming refractory to conservative therapy. The 3 patients whose symptoms were of brief duration before operation were completely incapacitated. This was manifested by inability to stand and walk without extreme pain, partial to complete foot drop and a frank neurological deficit that included both reflex and sensory alterations. Laségue's maneuver was conspicuously positive in each patient.

The symptoms included low-back pain which spread deep into the buttock and posterior thigh and calf. Tingling and numbness were noted in the toes of 7 patients, and there was varying evidence of weakness in 5. With the onset of radicular pain, the distress in the lower part of the back assumed lesser import. Pain was aggravated by coughing and straining. While rest in bed provided initial relief, the pattern of remissions and exacerbations became one of persistent disability. As the sciatic pain increased, these children became incapable of either sitting or standing.

Complete foot drop was observed in 1 patient, and partial foot drop with severe

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paresis of the extensor hallucis longus was evident in 6. Varying evidence of weakness of the quadriceps and hamstring muscles was observed, evaluation being difficult because of pain on manipulation. Alterations in reflexes were observed only in the ankle jerk, which was absent in 5 patients and diminished in 3, the responses being normal in the remaining patients. Three patients showed no sensory deficit. The cutaneous distribution of the S1 nerve root over the outer aspect of the foot and ankle was involved most frequently. This was evident in an isolated pattern in 4 patients, and in 3 others this sensory defect was further complicated by changes along the inner aspect of the foot in the dermatome pattern of the 5th lumbar nerve root. In 1 patient the 2nd sacral dermatome was implicated with numbness in the heel and the posterior portion of the leg and thigh. Lasègue’s maneuver was positive in all patients, and in 3 elevation of the noninvolved extremity elicited pain in the affected thigh and buttocok. Obliteration of the lumbar curve with scoliosis and tilt of the pelvis was noted in 1 patient. The flattening of the lumbar curve with spasm of the erector spinae muscle was common in all patients, reversal of the curve being evident in 5. Atrophy was discernible in the thigh and calf in 6 patients, varying from \( \frac{1}{2} \) to 1 in. at both the mid-thigh and mid-calf areas.

Patients with overt neurological alterations of an objective nature, such as complete or partial foot drop, absent reflexes and advancing atrophy, were not subjected to prolonged periods of observation.

Roentgenograms of the lumbosacral spine disclosed flattening of the lordotic lumbar curve as the most common alteration. A transitional 5th lumbar vertebra was observed twice. Six lumbar vertebrae were found in 1 patient. Narrowing of the lumbar interspaces was not observed. Every effort was made to exclude the possibility of a destructive neoplasm, rheumatoid arthritis or other pathology.

Myelography was performed in all patients. Defects were observed including a bilateral one with a huge discal extrusion at the L5-S1 interspace. Three studies were positive at the L4-L5 interspace, 5 at the L5-S1 interspace and 1 at the L5-L6 interspace. The myelographic findings corresponded accurately with the findings at operation. In 4 patients an additional interspace was explored because of the strong clinical evidence suggesting an extrusion of the disc at a level other than the one indicated on myelography. A negative exploration resulted at the suspected interspace in each case.

The spinal fluid was normal.

Interlaminar laminotomy was performed with resection of the yellow ligament, unroofing of the lateral recess and foraminal decompression where needed. The nerve root was identified after which protruding or extruded discal material was removed from the vertebral canal. All abnormal discal tissue was then removed from the intervertebral space both on the side of herniation and as far across the midline as possible, using appropriately angulated pituitary forceps. This portion of the procedure was restricted because of the relative normalcy of the residual discal structure.

The most common abnormality found in 7 patients was frank extrusion of discal material into the vertebral foramen. In 5 of these patients, the fibrous remnant of the torn annulus that formed a major portion of the extrusion was anchored at one end to the cartilaginous plate and had to be excised sharply. All lesions hinged or attached in this manner occurred at the lumbosacral interspace.

The two other extrusions occurred at the L4-L5 and at the L5-S1 interspaces and could be removed piecemeal with pituitary forceps. These disclosed evidence of focal degenerative and myxomatous changes on microscopic study. In 3 cases, a soft protruding mass of discal material formed a dome-like bulge in the lateral recess, in 2 at the L4-L5 and in 1 at the L5-S1 interspaces. In 1 patient, a girl 17 years of age with a 2-year history of low-back pain and sciatica, there was gross evidence of brown degeneration in the surgical specimen. Spur formation was