Intradural Herniated Lumbar Disc

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Rupture of the intervertebral disc in the lumbar spine most often occurs to one or the other side of the strong posterior longitudinal ligament. Rarely the central part of the ligament itself is perforated. Even more rare is the observation that the disc material has ruptured through the anterior aspect of the spinal dura and is displaced intrathecally. Only nine such cases have been reported.¹-³⁻⁷

Two patients with intradural disc herniation recently treated in the Neurosurgical Department of Ullevål Hospital provided the stimulus for an anatomical investigation of the relation between the spinal dura and the posterior longitudinal ligament in the lower lumbar region.

Case Reports

Case 1. An otherwise healthy 42-year-old man had experienced short episodes of slight low back pain 20 years ago. During the past 5 years pain in the lumbar region had recurred with increasing intensity and with irradiation to both legs. For the last 10 months the pain in both legs had been more severe and was exaggerated by coughing and by bending the neck. For the last 2 to 3 years, increasing weakness of both legs had developed, and he was no longer able to drive his car.

Examination. On admission in March, 1966, there was hypesthesia and hypalgesia of the legs anteriorly below a point 10 cm above the knees, and posteriorly from the perineum down. Position sense was reduced in the toes. The patient had marked atrophy and hypotonia of the gluteal, thigh, and leg muscles bilaterally, with reduced power of all movements, and slight bladder paresis.

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The myelogram showed a complete block at the level of the fourth lumbar vertebral body, suggesting an intradural localization (Fig. 1). The history and the clinical findings were characteristic of an intraspinal tumor.

Operation. Laminectomy of the fourth and fifth lumbar vertebrae was performed. A solid intradural tumor could be felt above the level of the arch of the fourth vertebra. When the dura was opened an irregular solid
mass could be seen occupying nearly the whole dural sac and compressing the nerve roots (Fig. 2 top). The mass was a herniated disc at L4-L5 that had ruptured through an irregular 5 to 6 mm tear of the anterior dural wall (Fig. 2 bottom). It was removed together with a small residuum of disc tissue still in an intervertebral position. The rupture in the anterior wall of the dura could not be closed by suture without causing a stricture. A cuff of Teflon was placed inside the dura before closing the incision in the posterior wall.

Microscopic examination of the mass showed degenerated cartilage and connective tissue with no signs of neoplastic activity.

Postoperative course. The immediate postoperative course was uneventful, but 3 months later a cerebrospinal fluid cyst had to be removed. It had been caused by a small fistula in the suture line in the posterior wall of the dura. The fistula was closed by suture. The patient was back to work 6 months after the first operation. He had regained normal sensation and bladder function, and almost full strength in his legs.

Case 2. A 57-year-old man had for 30 years experienced mild episodes of low back pain, but had never suffered from sciatica. Severe pain irradiating to his right leg started in July, 1967, as he was bending forward to pick up something from the ground.

Examination. On admission to the Neurosurgical Department 3½ weeks later the patient had right-sided foot drop, weakness of the right knee and hip, and paresis of the bladder and the anal sphincter. There was hypesthesia of the perineum and the dorsum of both feet. Radiculography showed complete block at L3-L4.

Operation. Dense adhesions were found between the L3-L4 disc, the right fourth lumbar root, and the dura. After incision of the dura posteriorly, several pieces of herniated disc tissue were found intradurally between the roots and a rupture in the ventral wall of the dura. After removal of the pieces of cartilage, the rupture in the ventral wall and the incision in the dorsal wall of the dura were sutured. More disc material was removed extradurally through an incision in the annulus on the left side.

Postoperative course. The patient made an uneventful recovery. Three weeks after operation he had normal bladder and anal sphincter function, normal sensation, and only a slight paresis of dorsal movement of the foot.

Discussion

It has been difficult to explain how disc material perforates the dura. Pathological adhesions between the dura and the posterior longitudinal ligament have been suggested as a cause, in some cases subsequent to operations. In nearly all the previously published cases the intrathecal disc tissue has originated from the L4-L5 intervertebral disc, as in our first case.

Most anatomy textbooks state that the ventral dura is loosely attached to the posterior longitudinal ligament. In Gray’s Anatomy, it is mentioned that the spinal dura is attached to the posterior surface of the bodies of the cervical and lumbar vertebrae.2

The relation between the ventral dura and the posterior longitudinal ligament in the dorsal and lumbar regions has been examined in 40 autopsies on patients who died from a variety of causes. The spinal processes and the laminae were removed and the dura opened longitudinally. The spinal cord was then removed after section of the