RETROPULSION OF RUPTURED NUCLEUS PULPOSUS SIMULATING TUMOR OF THE CAUDA EQUINA

Report of a Case

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During the past three years at the Cleveland Clinic more than sixty patients, whose preoperative diagnosis was ruptured intervertebral disc, have revealed such a lesion at operation. In all but two of these cases the lesion occurred in the lumbar spine. It usually was situated on one side only, impinging on a single nerve root, and causing low back pain with radiation into one leg. The clinical impression was confirmed in each case by contrast myelography before resorting to operation. In only one case, the subject of this report, was a definite preoperative diagnosis of tumor of the cauda equina made and firmly adhered to until laminectomy revealed a large ruptured fragment of the nucleus pulposus of the intervertebral disc between the third and fourth lumbar vertebrae. Because of the interesting and confusing characteristics of this case, it is reported below.

CASE REPORT

History: A married white woman, thirty-five years of age, first noticed pain in the lumbar spine and in both hips five or six years previously. The pain occurred most frequently while the patient was in the sitting position. It was intermittent, recurring at intervals. Following the birth of a baby eighteen months prior to examination, there was a marked exacerbation of pain in the lower back and in both hips, with aggravation of the pain on coughing and sneezing. For six months prior to examination the symptoms gradually became more troublesome. During the last six weeks the pain became severe and was accompanied by marked weakness of the legs, inability to move the toes of the right foot and the right ankle, and numbness and tingling of the feet and saddle area. The pain shifted from one hip and thigh to the other. She received injections for "neuritis." There was bowel incontinence on one occasion, but no loss of vesical sphincter control.

Examination: The general physical condition of the patient was excellent. Neurological examination revealed marked weakness of both legs with a foot drop on the right side. The patellar reflexes were equal and active. Both Achilles reflexes were absent. There was a peculiar disorder of sensation with hyperesthesia and paresthesia over the entire right leg from the hip down and over the left leg below the knee. There was no definite hypesthesia or anesthesia. The anal reflex was intact.

Roentgen examination of the lumbosacral spine showed no abnormality other than slight narrowing of the intervertebral space between the third and fourth lumbar vertebrae, and sacralization of the fifth lumbar vertebrae on the left side. The width of the spinal canal was normal.

Lumbar puncture between the fifth lumbar vertebra and the sacrum obtained only one or two cc. of clear yellow fluid which quickly clotted in the test tube.

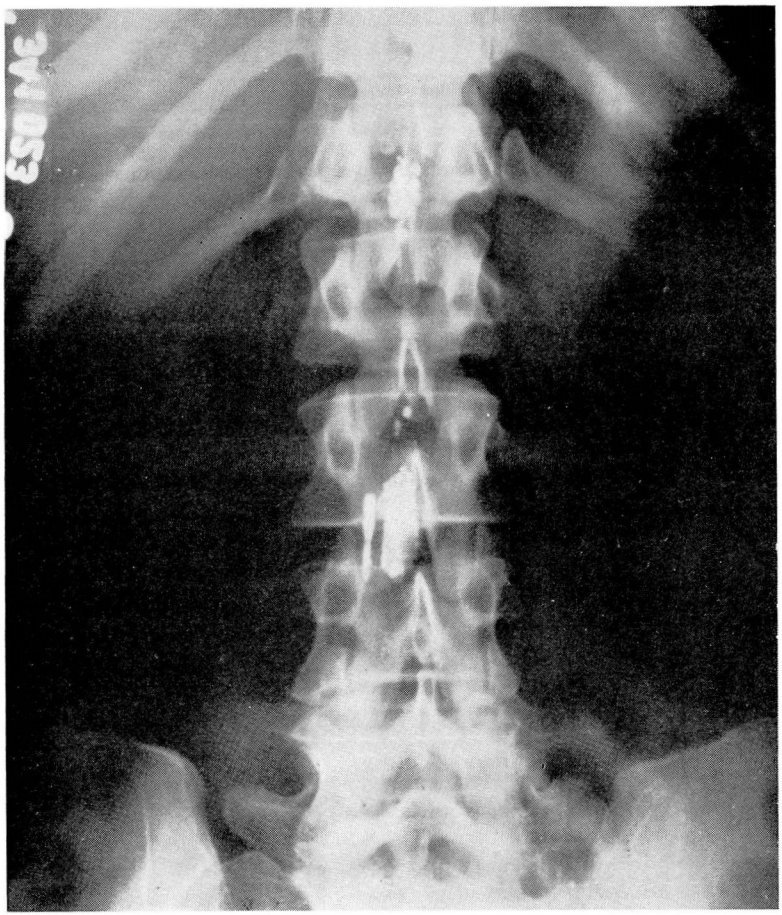

FIGURE 1: Contrast myelogram of the lumbar spine showing complete block of lipiodol at the upper part of the third lumbar vertebra.

There was no response to jugular compression, indicating a complete spinal subarachnoid block. The fluid contained 3,500 mg. of total protein per 100 cc.

Cisternal puncture showed clear, colorless fluid under normal pressure, containing 35 mg. of total protein per 100 cc. An injection of 1 cc. of heavy lipiodol was made into the cisterna magna. Roentgen studies of the spine revealed that the descent of the oil was completely blocked at the level of the upper part of the third lumbar vertebral body (Fig. 1), even after the patient had been lying for twenty-four hours with the head of the bed markedly elevated.

The preoperative diagnosis was tumor of the cauda equina.

Operation: Laminectomy of the second, third, fourth, and fifth lumbar vertebrae was carried out. The laminae and pedicles showed no pressure atrophy. The ligamenta flava were normal in thickness. The posterior aspect of the dura was normal. The dura and the arachnoid were opened in the midline throughout the length of the exposure. The strands of the cauda equina showed no abnormal change other than an apparent extravasation of blood in one nerve sheath, although

the bundle of nerves seemed to be displaced posteriorly opposite the third lumbar vertebral body. Above this level, droplets of lipiodol seemed to be captured in the meshes of the arachnoid and were removed by manipulation, irrigation, and aspiration. There was no evidence of an intradural tumor, but when the bundle of nerves was retracted gently to one side at the level of the third lumbar vertebral body, a smooth posterior bulging of the anterior dura about 1.5 inches long was seen. Palpation through the dura showed the mass to be soft and elastic. The mass was much longer and wider than that usually seen in a ruptured intervertebral disc. It extended across the entire width of the spinal canal, causing marked compression of the dural sac and its contained cauda equina. The operator considered it to be an extradural neoplasm. A linear incision 1.5 inches long was made through the dura overlying the mass, and at once an irregular, white, shaggy mass of tissue partially extruded itself through the dural opening. It had the gross appearance of fibrocartilage and was thought to be a ruptured nucleus pulposus. By careful blunt dissection the unusually large mass was removed entirely through the dural opening. It had arisen from the intervertebral disc between the third and fourth lumbar vertebrae and apparently had forced its way upward in the spinal canal between the anterior dura and the body of the third lumbar vertebra. Its only remaining attachment to the interior of the intervertebral disc was by a fine strand of fibrocartilage. The operator was unable to determine whether or not there was a complete rupture of the posterior longitudinal ligament. The anterior dural opening was closed with interrupted silk sutures and the posterior dural opening was closed with a continuous silk suture. The muscles, fascia, and skin were closed in the usual manner.

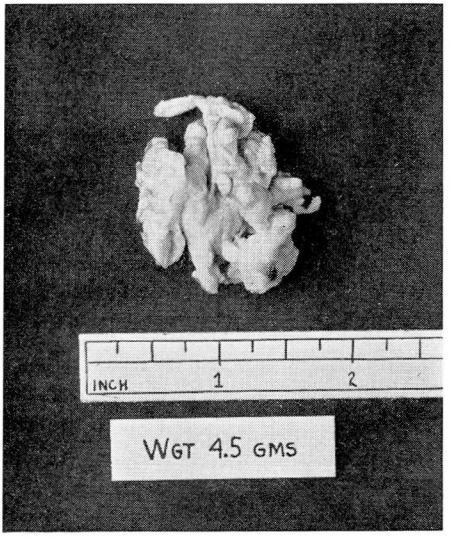

FIGURE 2: Ruptured nucleus pulposus removed in this case.

Pathological report: The specimen consisted of an irregular, white, shaggy, elastic piece of tissue, weighing 4.5 grams and measuring 1.5 inches in its longest dimension (Fig. 2). The histological picture was characteristic of fibrocartilage.

At the time of this report, two weeks after operation, the patient is making an uneventful and satisfactory recovery in the hospital. She is free from her former

pain. Motor function of the left leg is good, but the right leg still is weak, although somewhat stronger than before operation. Return to normal function will undoubtedly be gradual over a period of months.

Discussion

A thorough consideration of the history and the neurological signs in this case, with the yellow color and high protein content of the cerebrospinal fluid, the presence of a complete spinal subarachnoid block by Queckenstedt's test, and a complete block of lipiodol at the level of the third lumbar vertebra would certainly justify the diagnosis of a tumor of the cauda equina. In no other case of ruptured intervertebral disc observed at the Cleveland Clinic has a complete spinal subarachnoid block been found by Queckenstedt's test and by lipiodol myelography. In every other case the cerebrospinal fluid has been colorless and the total protein content has not exceeded 195 mg. per 100 cc. In 30 per cent of the cases the total protein content has been below 40 mg. per 100 cc. and has rarely exceeded 100 mg. in the remaining cases.

Following operation an attempt was made to obtain a more detailed chronological history of symptoms from the patient in order to bring out points which might have caused us to suspect a possible ruptured intervertebral disc. She emphasized the intermittency of the pain over a period of five or six years and stated that five weeks prior to her visit to the Clinic there had been a rather sudden exacerbation of severe pain in the lower back, both hips and thighs. This occurred when she attempted to change her position in bed by grasping the head of the bed with her hands and pulling her body upwards. Almost immediately she began to notice weakness and numbness of the legs. There probably had been a partial retropulsion of the intervertebral disc for several years, giving rise to intermittent symptoms. The annulus fibrosus and the posterior longitudinal ligament may have become thinned out by years of pressure until slight, indirect trauma suddenly caused the nucleus pulposus to break through these atrophic structures and extrude itself into the spinal canal. The mass of fibrocartilage was unusually large, weighing four times as much as the average mass of tissue removed in cases of ruptured intervertebral disc seen at the Cleveland Clinic. The extrusion of such a large mass into the spinal canal caused a pronounced posterior dislocation of the dural sac, with compression of the cauda equina and complete obstruction of the subarachnoid space. Thus, it may be possible to explain the mechanism by which such a lesion could give rise to a clinical picture closely simulating that of a tumor of the cauda equina.