SUBARACHNOID RUPTURE OF INTERVERTEBRAL DISC FRAGMENTS*

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The clinical entity of ruptured lumbar intervertebral disc was defined by Dandy in 1929.1 Mixter and Barr2 in their classical paper in 1934 described the full significance of herniated nucleus pulposus as a cause of pain in the back. Since that time there have been reports of many patients operated upon for lumbar disc protrusions.3,4,5,6,7,8,9,10,11

The potential seriousness of herniated lumbar nucleus pulposus with occasional extradural compression of the cauda equina, paraplegia and block of the cerebral spinal fluid has been well documented.9,11 However, erosion of a fragment of disc through the dura mater has been mentioned only rarely. One case was described by Dandy in 19422 and 2 cases were reported by Paterson and Gray in 1952.8 A review of over 2500 surgical cases by O. W. Jones, Jr.4 revealed only 1 such lesion.

Dandy’s patient was a 53-year-old male laborer with a 5-year history of recurrent pain in the back and lower extremity, who was thought to have an extruded disc on the basis of the history. He had severe weakness with a motor and sensory level at L4. He remained in bed for 78 days before myelography was carried out; the findings suggested a tumor of the cauda equina. At operation several fragments of the 4th lumbar disc were found in the subarachnoid space, compressing the cauda equina. The fragments of disc were fixed to the dura mater and the arachnoid by dense scar tissue. Dense scar was seen in the posterior longitudinal ligament over the L4 interspace, where the fragments of disc had apparently ruptured through the dura mater and arachnoid. Following the removal of the fragments of disc, the patient’s pain was relieved but neurological recovery was incomplete.

In the cases of Paterson and Gray, the L4 disc was also involved. A large fragment of nucleus pulposus was encountered in the subarachnoid space at the level of rupture. Each patient was a male in the fourth decade with a long history of recurrent pain in the back and lower extremity and sudden exacerbation of symptoms precipitated by minor trauma. One patient had profound lumbar and sacral motor and sensory loss while the other did not. Each showed a total subarachnoid block on Queckenstedt’s test, and a myelographic block at L4. Each made slow but functionally good recovery postoperatively. The preoperative diagnosis in each case was that of herniated lumbar intervertebral disc. The location of the fragments within the subarachnoid space was not suspected before operation.

CASE REPORT

A 66-year-old white male was admitted to the Ft. Miley Veterans Administration Hospital, San Francisco, on July 22, 1959. Five days before admission he noted the sudden onset of numbness in both feet, inability to move the feet or toes and inability to urinate.

The patient, a retired glazier, had had recurrent attacks of low-back pain, beginning spontaneously in 1954. The pain was localized in the lumbosacral area and was aggravated by bending, sitting, coughing and straining, and underwent spontaneous remissions and exacerbations. Over the last 12 months the pain had become more intense and prolonged, and radiated into the right lower extremity. Three weeks prior to admission, the pain became worse and was associated with transient numbness of the lateral aspect of the right calf. With rest, he felt his symptoms were improving until 5 days before admission. On arising from bed that morning he noted numbness in the right foot and inability to move the right toes. Two hours later similar symptoms developed in the left lower extremity, and he was unable to urinate. He was hospitalized elsewhere on July 16, 1959 and was noted to be anesthetic in the lower extremities except for the anterior thighs and medial portions of his legs and feet. There was sacral anesthesia. Lumbar puncture at the 5th lumbar interspace yielded xanthochromic cerebrospinal fluid under no pressure, containing 1050 mg, per cent of protein. Queckenstedt’s test revealed total subarachnoid block.

He was transferred to the Veterans Administration Hospital with a diagnosis of possible spinal cord tumor.

On admission, the patient complained of severe pain in the lumbosacral area and in the right thigh and buttock. He was forced to remain in the sitting position, being completely unable to extend the thigh on his hip without increasing the pain. Pain also was increased on coughing and straining.

Examination. The paravertebral muscles were in spasm with loss of normal lordotic curve in the lumbar

area but there was no list. Pain was reproduced on percussi-
on the lumbosacral region of his back and this radiated into the entire right lower extremity. The thighs were kept flexed on the pelvis and extension of either the right or the left produced severe pain in the posterior thigh on that side. Straight-leg raising could be accomplished to 90° bilaterally and Lasègue's sign was negative. The patient could demonstrate no voluntary movement in the feet or toes bilaterally. There was approximately 50 per cent loss of the strength in the mus-
culature of the posterior thigh on each side and no contrac-
tions could be seen in the anterior tibial or posterior tibial groups of muscles on either side. The quadriceps femoris was normal. Patellar reflexes were brisk and equal bilaterally. Achilles reflexes were absent. There was no response to plantar stimulation. The bulb-
cavernous reflex was absent. The patient could per-
ceive pinprick only over the anterior and lateral thighs and medial portion of each leg. There was complete anesthesia over the sacral areas and in the remainder of the leg and foot bilaterally.

Radiograms revealed narrowed L4 and L5 interver-
tebral disc spaces with marked degenerative arthritic changes. Lumbar puncture at L5 space confirmed the presence of a subarachnoid block on jugular compression and a Pantopaque myelogram demonstrated a block below the L4 interspace. A second injection of Panto-
paque at the L2 interspace demonstrated the upper margin of the block, the edges of which appeared ir-
regular. Spinal fluid obtained at the L2 level was under normal pressure and quickly rose and fell with jugular compression. It was clear and colorless in contrast to the fluid obtained at the lumbosacral level, which was very xanthochromic.

Operation. Immediately following myelography, lam-
inctomy was carried out at the L3 level. The dura mater, which was tense and nonpulsatile, was incised longitudinally. Within the arachnoidal sac there was a dense white mass enmeshed in the elements of the cauda equina. The arachnoid was opened and two fragments of fibrous material were removed without difficulty. They were irregular and lying free in the subarachnoid space. Following removal, the spinal fluid came down from above and was seen to be pulsating. The nerve roots were hyperemic and several appeared to have been severely compressed. On retracting the roots laterally, a small tear could be seen in the anterior dural surface and the arachnoid was bound down to the dura mater at this point. The intact bulging annulus of the L3 inter-
tervertebral disc was immediately under the dural tear. This was incised and degenerated nucleus pulposus was removed. The ligamentum flavum between the L4 and L5 laminae was then removed and the L4 interspace was palpated. The annulus had a large rent in it just to the left of the midline and the center of the disc was devoid of nucleus pulposus. The dura mater appeared intact at this level. A soft rubber catheter could be passed caudally and in a cephalad direction in the sub-
arachnoid space and Ringer's solution was irrigated through it. No further disc material was discovered and the wound was closed in layers.

Pathologic Report. The fibrous fragments removed measured 2.5 X 1.5 cm. and 2 X 1 X 1 cm. Histologically they were consistent with intervertebral disc material.

Course. The patient made an uneventful recovery. His pain was relieved when he awoke from the anes-
thetic.

He was discharged 2 months postoperatively after un-
dergoing intensive physiotherapy and making gradual functional improvement. He walked with the aid of foot-drop braces and crutches. Tone of the bladder had improved somewhat, although he was forced to continue to use an indwelling catheter. Evacuation of bowel was accomplished by means of periodic enemas. The patient was entirely relieved of his pain and movements of the back were free. Sensation had improved but the per-
ineum remained anesthetic.

DISCUSSION

Erosion of the dura mater and arachnoid by a herniated nucleus pulposus is a rare occurrence. In the cases reviewed and in the case presented here, it appears that there was gradual erosion of the overlying dura mater by continued pressure from a dislocated fragment of nucleus pulposus. The myelographic picture can be misleading and the true nature of the lesion must be determined primarily by a careful history and confirmed at operation. The rupture of a fragment of disc ma-
terial into the subarachnoid space may cause acute serious damage of the cauda equina. It can be avoided by early recognition and removal of the pre-existing extradural herniated nucleus pulposus.

SUMMARY

A case is described in which portions of a rupt-
tured lumbar intervertebral disc eroded through the dura mater and the arachnoid. The history and findings are described. Four similar cases re-
ported previously are cited.

It is concluded that this condition is a compli-
cation of chronic extradural herniation of disc with erosion through the overlying meninges. In the case reported here, the fragments appear to have migrated cephalad in the extradural space before eroding the meninges.

REFERENCES


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