LOW BACK PAIN AND SCIATICA DUE TO PROTRUSION OF INTERVERTEBRAL DISCS

Report of Four Cases

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Of the several possible causes of low back pain with radiation along the course of the sciatic nerve, protrusion of a lumbar intervertebral disc is one of the most definite pathological conditions which may explain such pain. Although only a small percentage of cases of low back pain and sciatica probably can be explained on this basis, it is of great importance to bear in mind the possibility of such a condition. Within the past four years an increasing number of these cases has been reported in the literature and it would seem that the condition is of fairly frequent occurrence. The recognition of the clinical picture associated with protrusion of a lumbar intervertebral disc and the development of measures for investigating the condition have made it possible to arrive at a definite diagnosis.

The outstanding symptom is pain. This pain is severe in character and frequently is referred to the lateral aspect of the leg. On examination of the patient the following signs are significant: a decrease in lumbar lordosis, limitation of motion in flexion of the lumbar spine, and diminution or absence of an Achilles reflex. Lumbar puncture is an important procedure in diagnosis. In approximately 80 per cent of cases, the total protein content of the cerebrospinal fluid is elevated above the normal limit of 40 mg. per 100 cc. The injection of a contrast medium, such as lipiodol, into the lumbar subarachnoid space followed by roentgen examination demonstrates the protruded disc and completes the diagnosis.

Surgical removal of the protruded portion of the disc, thus freeing the involved nerve from pressure, is followed by prompt relief of pain.

The following cases present the important clinical features and roentgen findings of a protruded lumbar intervertebral disc.

REPORT OF CASES

Case 1: The patient, a man 57 years of age, came to the Clinic complaining of severe pain in the right hip. This pain radiated into the entire right leg and there was severe radiation into the posterior aspect of the thigh and the lateral aspect of the leg just above the lateral malleolus. The condition began eight months previously when the patient felt something snap in his back after the extraordinary exertion of a heavy lift. The difficulty immediately following the injury consisted of stiffness and aching but there was no severe pain. Treatment had com-

prised a period of rest in Florida which resulted in some improvement due to the change in climate and the limited activity. Six months after the injury and two months before examination at the Clinic, the pain began to radiate into the right leg and to become very severe. The patient stated that he felt the pain must be due to a pinched nerve because it was so intense. The pain was described as burning, aching, cramping, and at times lancinating in character.

Examination revealed a well developed and nourished man whose lumbar spine was definitely flattened. There was restriction of motion in the lumbar spine in flexion and lateral bending to the right. These movements aggravated the pain. By deep palpation, tender areas were noted to the right of the fourth and fifth lumbar spinous processes. The neurological examination revealed definite hyperesthesia over the lateral aspect of the right calf and diminution in the right Achilles reflex.

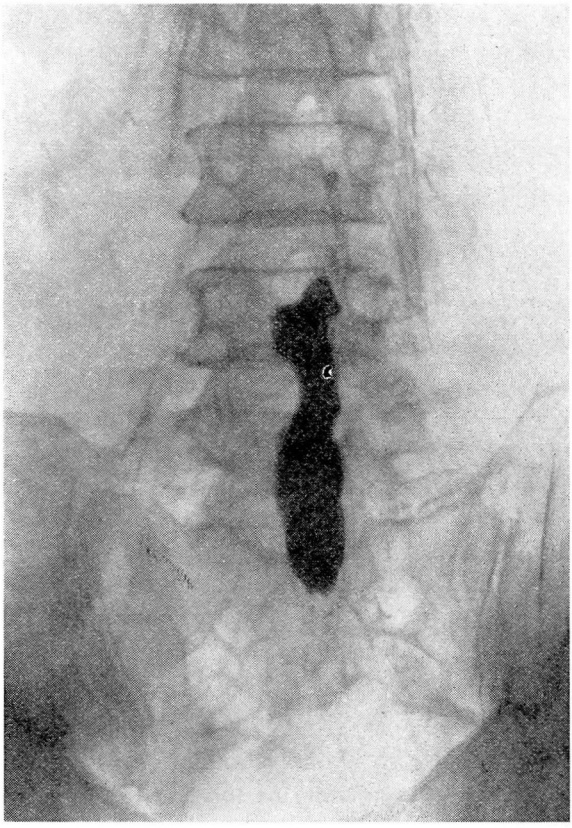

FIGURE 1: Roentgenogram showing deformity in column of lipiodol characteristic of protruded intervertebral disc between the fourth and fifth lumbar vertebrae.

A clinical diagnosis of protrusion of a lumbar intervertebral disc was made.

The patient was admitted to the hospital for further investigation. A lumbar puncture was done between the fourth and fifth vertebrae and the first 5 cc. of fluid withdrawn were sent to the laboratory for examination. The total protein content was reported as 45 mg. per 100 cc. In view of the clinical picture and the elevated protein content, the next step in the diagnosis was the injection of lipiodol into the lumbar subarachnoid space. The roentgenogram (Fig. 1) showed a deformity in the lipiodol column on the right side, adjacent to the intervertebral disc between the fourth and fifth lumbar vertebrae. This completed the diagnosis.

A laminectomy was performed with removal of the laminae of the fourth and fifth lumbar vertebrae. After removal of the laminae, a greatly thickened ligamentum flavum was noted overlying the dura. When this thickened ligament was removed, the fourth lumbar nerve was seen to be pushed backward by the protruding intervertebral disc. The dura was opened and the lipiodol removed. The dura was then closed and the herniated portion of the disc and the nuclear substance was removed extradurally. The muscles and fascia were closed in layers. There was prompt relief of the severe pain.

Three weeks after operation the patient was permitted to be out of bed. He wore a light aluminum brace to support the lumbar spine for four months and then discarded it. The patient has been back at his work for four months and has been perfectly well.

Case 2: This patient, a man 41 years of age, complained of pain in the small of the back, in the left hip, and down the left leg. The onset dated back sixteen months at which time stiffness and dull aching developed following any exertion. With the onset of warm weather, the patient had a remission of symptoms and not until five months previous to examination and following the lifting of some heavy kegs and tubs of ashes did the soreness in the back recur. At this time the radiation of the pain began. The pain was severe and radiated down the posterior aspect of the left thigh to the lateral aspect of the leg. The leg was described as feeling numb and the pain as aching and cramping.

On examination there was noted some flattening of the lumbar spine. Flexion movements of the spine were limited and these movements aggravated the pain. By deep palpation, an area of tenderness was made out just to the left of the fifth lumbar spinous process. The neurological examination revealed some atrophy of the left thigh and calf, hyperesthesia over the lateral aspect of the leg, and diminution of the left Achilles reflex.

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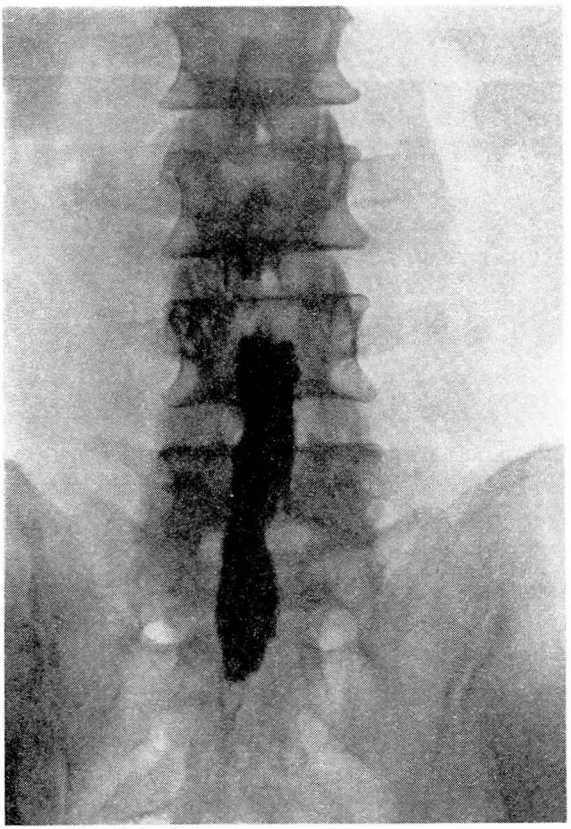

FIGURE 2: Roentgenogram showing deformity in column of lipiodol characteristic of protruded intervertebral disc between the fifth lumbar vertebra and the sacrum.

subarachnoid space, roentgenograms (Fig. 2) revealed a deformity in the lipiodol column on the left side adjacent to the intervertebral disc at the lumbosacral junction. This completed the diagnosis.

A laminectomy was performed, removing the lamina of the fifth lumbar vertebra and a portion of the sacrum. The ligamentum flavum was considerably thickened. The dura was exposed and opened and the lipiodol removed. The fifth nerve was retracted to the right and the disc protrusion was removed. The sheath of the nerve was thickened from the

pressure of the thickened ligament and protruding disc. The dura was closed and the muscles and fascia closed in layers. There was prompt relief of the severe pain.

Three weeks after operation, the patient was out of bed wearing a light aluminum brace to support the lumbar spine. The brace was worn for four months and then discarded. He has continued to have some numbness in the left leg but none of the severe pain. A complete range of motion has returned to the lumbar spine and no pain followed these movements. He has returned to light work and is anxious to resume his former occupation which requires considerable physical exertion.

Case 3: A 38 year old white man was seen in the Orthopedic Department on October 11, 1937. His chief complaint was of pain which had been present for six months. The pain was dull and steady in character, extending from the right buttock down the back of the right thigh and leg to the ankle; it was most noticeable in the popliteal space. The pain was aggravated by arising from the sitting position. There was no antecedent history of trauma. No disorders of micturition or defecation had occurred and he had experienced no numbness.

Examination revealed limitation of forward and lateral flexion of the lumbar spine. The patient had a tendency to stand with a slightly backward curve of the lumbar spine. Roentgen examination of the lumbosacral region and of the sacro-iliac joints revealed no abnormality. At that time the condition was considered to be a mechanical strain of the back for which a Williams brace, baking, and massage were prescribed. After three months, the pain continued to be just as severe as formerly and a sacro-iliac belt was then applied but this failed to give relief even after four months. In the meantime the patient had resorted to various osteopathic and short-wave treatments without relief.

On May 9, 1938, the patient was re-examined. The forward and backward movements of the lumbar spine were still definitely restricted and the lumbar lordosis was absent as before. The patellar and Achilles reflexes were equal and active. There was less than one-half inch of atrophy of the right thigh, but the right calf showed one inch of atrophy. Investigations for a protruded lumbar intervertebral disc were then carried out. Lumbar puncture between the third and fourth lumbar vertebrae and examination of the cerebrospinal fluid showed a total protein content of 50 mg. per 100 cc. which was definitely above the normal limit. Through a spinal puncture needle, 5 cc. of heavy lipiodol were then injected into the spinal subarachnoid space between the first and second lumbar vertebrae. Fluoroscopy and roentgenograms revealed a definite deformity in the right side of the column of opaque

material at the level of the interspace between the fourth and fifth lumbar vertebrae, representing a protrusion of the intervertebral disc (Fig. 3).

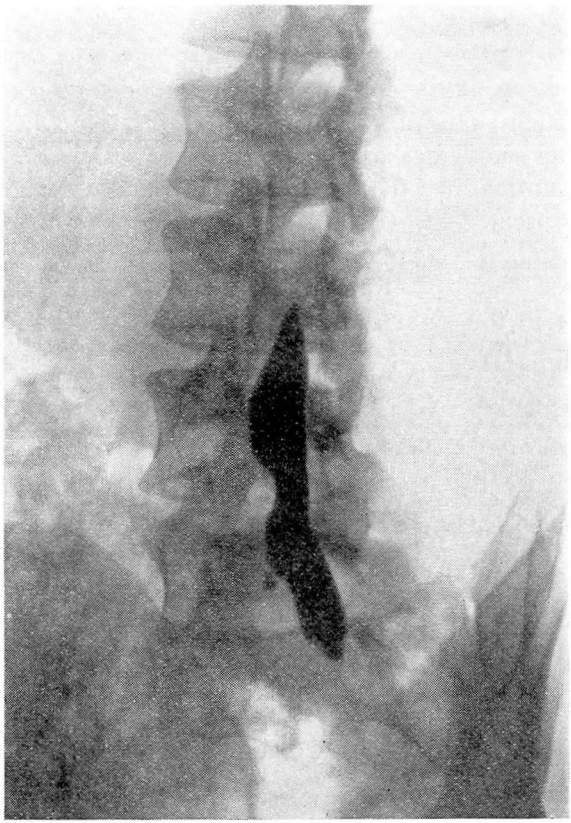

FIGURE 3: Roentgenogram showing deformity in column of lipiodol characteristic of protruded intervertebral disc between the fourth and fifth lumbar vertebrae.

Laminectomy of the fourth and fifth lumbar vertebrae was performed on May 11, 1938. A markedly thickened ligamentum flavum was found to be compressing the dural sac and there was a protrusion of the intervertebral disc between the fourth and fifth lumbar vertebrae, causing compression of the fourth lumbar nerve root on the right side. The hypertrophied ligamentum flavum and the protruded portion of the intervertebral disc were removed, and the nerve root was thus released from pressure. Through a small opening in the dura the lipiodol was removed by irrigation and aspiration.

The postoperative course was uneventful, the wound healed well, and the patient was discharged from the hospital on the twenty-first

postoperative day. He has remained entirely free from his former pain ever since the operation. He wore a light brace for four months and then discarded it. When he was last seen on September 8, 1938, four months after operation, he was in good health and free from pain. There was a good range of motion of the spine in all directions.

Case 4: This patient, a man 39 years of age, was first seen by Dr. James A. Dickson of the Orthopedic Department on June 28, 1938. He stated that ten years previously, while doing some heavy lifting, he "felt something snap" in the lower part of his back. He rested in bed for three or four days and then returned to work. Ten days later, the pain was entirely absent. No pain had been referred down the leg. Since that time he had had recurrent pain in the lower back for several days at a time. Three months before coming to the Clinic, he began to experience pain in the right hip, radiating down the back of the right thigh and leg. There was a sensation of numbness over the lateral

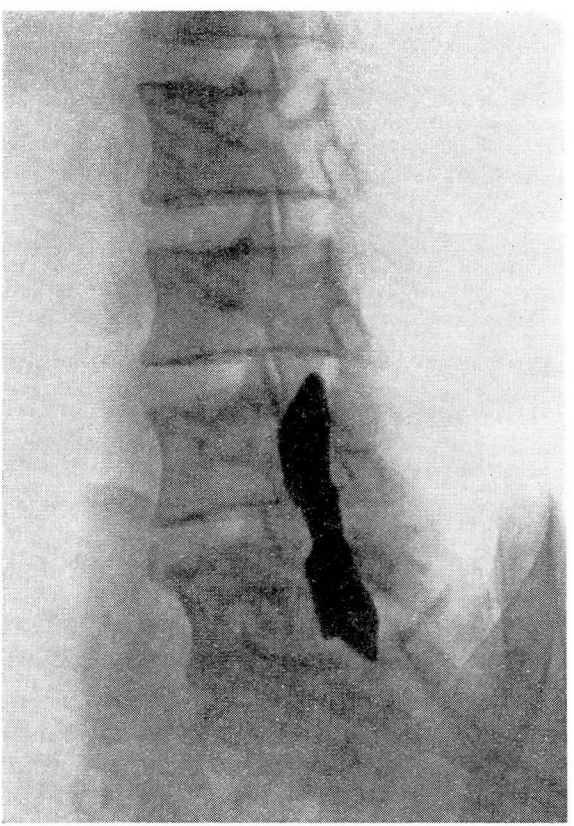

FIGURE 4: Roentgenogram showing deformity in column of lipiodol characteristic of protruded intervertebral disc between the fourth and fifth lumbar vertebrae.

aspect of the right lower leg. The patient had been obliged to spend most of his time in bed during the two weeks before he came to the Clinic.

Examination showed marked restriction of all movements of the lumbar spine, especially of flexion. There was three-fourths of an inch of atrophy of the right thigh and calf. Flexion of the right hip with the right leg extended was impossible because of pain. The patellar and Achilles reflexes were equal and active.

Roentgenograms of the lumbosacral region revealed nothing of pathological significance.

Spinal puncture between the third and fourth lumbar vertebrae and examination of the cerebrospinal fluid showed a total protein content of 55 mg. per 100 cc., which is definitely above the normal limit. An injection of 5 cc. of heavy lipiodol into the spinal subarachnoid space was then made between the first and second lumbar vertebrae. Roentgen examination showed a deformity in the right side of the column of opaque material at the level of the interspace between the fourth and fifth lumbar vertebrae, characteristic of a protruded intervertebral disc (Fig. 4).

Laminectomy of the fourth and fifth lumbar vertebrae was performed on July 11, 1938. A thickened ligamentum flavum was removed from its position overlying the dura. Extradural exposure of the right fourth lumbar nerve showed that the nerve was compressed between the thickened ligamentum flavum and a protruded intervertebral disc. After the ligamentum flavum had been removed, the protruded portion of the intervertebral disc was entirely removed and the fourth lumbar nerve was thus freed from compression. The lipiodol was removed by irrigation and aspiration through a small opening in the dura. Following operation, the patient made a satisfactory convalescence and he has remained entirely free from his former pain.

The patient will continue to wear a light brace for three or four months after operation and will then discard it.