UNUSUAL TUMORS SIMULATING PROTRUSION OF THE INTERVERTEBRAL DISC

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In any of the various branches of medicine and surgery it is of basic importance to diagnose a given condition as accurately as possible. Very often a given lesion will produce characteristic signs and symptoms as with the protruded intervertebral disc in the production of low back pain with sciatic radiation. By the use of suitable diagnostic procedures, not the least of which is a careful history and physical examination, an intelligent therapeutic attack may be planned. Even though all reasonable possibilities have been considered, a presumably "simple problem" may be loaded with surprise. It is just as important to stress the necessity for avoiding the error of omission in the diagnostic effort as an error of commission in the therapeusis.

In recent years the syndrome of protruded intervertebral disc as a source of low back pain with sciatic radiation has aroused considerable interest. Because the history is often so typical and the physical findings so conclusive, it is almost inevitable that there should be a tendency to relax diagnostic vigilance. As this syndrome is encountered more frequently and as the surgeon's experience enlarges, it is easier to overlook the limitations of the general and special physical examinations, i.e., orthopedic and neurologic. This, however, is no more true of the protruded intervertebral disc syndrome than of any other. Each individual patient presents a particular problem in the choice of a diagnostic routine. Whether or not lumbar puncture or x-ray study, with or without an intraspinal contrast medium, should be made is a point in the judgment of each individual case to be dictated by necessity rather than by a fixed routine.

The individuality of the problems presented by the syndrome of intervertebral disc protrusion can best be demonstrated by the presentation of the following cases.

Case 1. A 45 year old white laborer complained of low back pain with "sciatica of the left leg" of two years' duration. He recalled feeling a sharp snap in his back after lifting a hundred pound sack of potatoes. The leg pain began thereafter and was exaggerated by coughing and straining. He noted atrophy and a progressive weakness of the left leg. Alcohol injection of the left sciatic nerve had been done elsewhere, but had failed to give satisfactory relief from pain.

Examination disclosed atrophy of the left thigh and calf, possibly from the alcohol injection. The left knee jerk was absent, as were both Achilles jerks. Weakness of dorsal and plantar flexion of the left foot was present. There was a band-like area of hypesthesia involving the lower left calf and the toes and sole of the left foot. The Naffziger and Laségue tests were negative.

The laboratory findings upon examination of the urine, blood, and spinal fluid were normal.

The clinical diagnosis was neurofibroma involving the left fourth lumbar nerve, or a protruded intervertebral disc on the left side between the fourth and fifth lumbar vertebrae. To clarify the situation a thorotrast myelogram was recommended and done

(Fig. 1). A large neoplasm, intradural in location, was seen almost completely obstructing the spinal canal at the level of the second and third lumbar vertebrae. The preoperative diagnosis was intradural tumor originating from the fourth lumbar nerve.

A laminectomy was done under pentothal anesthesia. The laminae of the second and third lumbar vertebrae and a portion of the fourth lumbar vertebra were removed, and the presence of an intradural tumor mass was evident to palpation. The dura was incised for the length of the exposure, and upon retraction of the cauda equina a large,

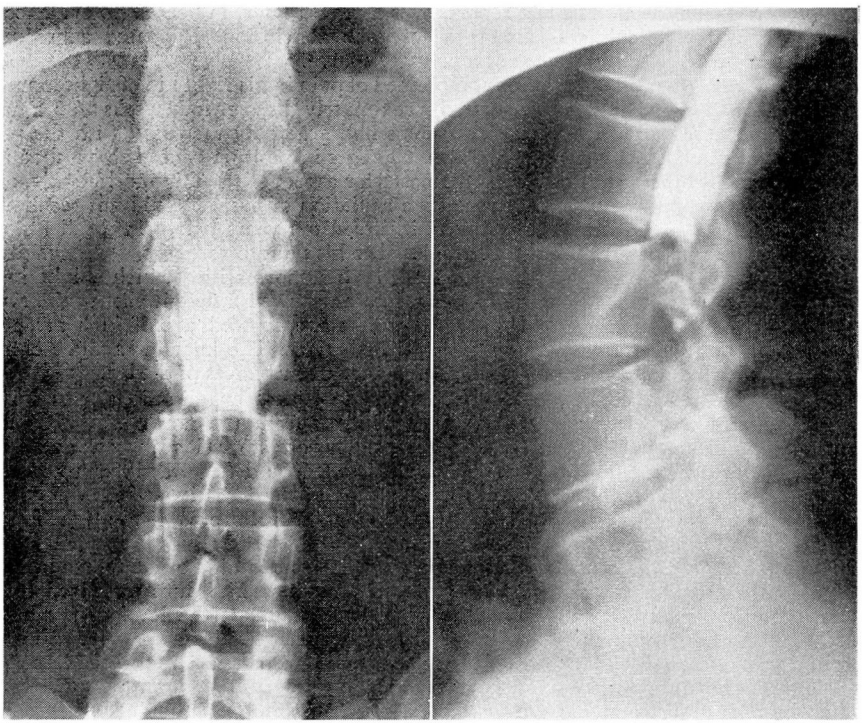

FIGURE 1. Direct frontal and lateral views of the thorotrast column. Position of intradural tumor is accurately determined, and in the lateral view its lower border can be faintly seen.

slate-blue, rubbery tumor mass filling the entire spinal canal was found. The tumor mass was approximately 5 cm. long and apparently well-encapsulated. After the nerve roots were retracted, the tumor was rolled to the right and was found to have entered the spinal canal via the course of the right third lumbar nerve. This nerve was so involved in the tumor mass that it was decided to sacrifice it, which was done between two silver clips. Although it could not be definitely established, this area was possibly the site of origin of the tumor mass. The tumor was incised, and the interior evacuated by suction. By grasping the empty capsule the operator was able to excise the circular dime-sized area of the dura together with the involved nerve in removing the intraspinal tumor mass. It was immediately evident that the largest part of the tumor extended through the intervertebral foramen on the right and into the right prevertebral space. More bone was rongeured away, and the tumor mass extended into this area for approximately 7 to 8 cm. By aspiration of the contents of the capsule and by grasping the capsule in the manner of emptying a sac, the operator was able to remove the tumor mass entirely to what appeared to be a small constriction at the depth of approximately 8 cm. It was evident, however, that more tumor lay in the extreme prevertebral area in a position inaccessible by this approach. The dura was then closed by a continuous run-

ning suture. The muscles were reapproximated, and the wound closed without drainage.

Gross description of this tumor revealed that the specimen consisted of multiple small portions of a velvety blackish-brown material, parts of which were encapsulated with a thin brown fibrous capsule. The gross appearance was that of a melanoma, which was confirmed by microscopic diagnosis.

The patient made an uneventful recovery and was discharged on the eighteenth hospital day. The only residual symptom was a left foot drop of moderate degree for which he was fitted with a spring lift. The patient was completely relieved of his pain and felt remarkably well. The last report, over a month later, indicated no evidence of recurrence, although this was almost a foregone conclusion. Repeated subsequent examinations revealed no evidence of a primary source.

Case 2. A 24 year old tool maker complained of pain in his right hip of eight months' duration. It had begun as low back pain approximately three or four weeks after a mild throat infection. The severity of the symptoms had gradually increased with the pain shifting from the back to the right hip also. Changes in position caused sharp shooting pain in the right hip with radiation to the posterior aspect of the thigh, calf, ankle, and heel. Walking would frequently produce such radiation of pain. He did not recall any immediate injury except for a back injury incurred ten years before in a fall from a bicycle, and did not believe that this was related to his symptoms.

The general physical examination revealed no abnormalities which might have contributed to the described condition. Examination showed a definite list to the right with restriction of motion on bending. The right thigh showed a half inch atrophy. There was a positive straight leg raising test on the right. The knee jerks and Achilles reflexes were equal and active. There were no motor disturbances of the leg.

Urinalysis, blood counts, blood chemistry, serological examinations, and spinal fluid examinations revealed no significant deviations from the normal. The clinical diagnosis was protrusion of an intervertebral disc. Thorotrast myelography was advised, and a circular defect in the thorotrast column noted. The defect was interpreted as a neurinoma of the fourth nerve. Upon close scrutiny of the films its attachment to the nerve could be seen. The preoperative diagnosis was neurofibroma of the right fourth lumbar nerve (Fig. 2).

Laminectomy was done under avertin anesthesia. The lamina of the fourth lumbar vertebra was removed as well as the ligamentum flavum. The dura appeared to be normal. A firm mass could be palpated through the dura at the level of the lower portion of the fourth lumbar vertebra on the right side. The dura was opened in the midline and retracted widely. An ovoid tumor about 1.5 cm. in its longest dimension was found. The tumor was definitely attached to one nerve, apparently to the right fourth lumbar nerve, and partially extended into the foramen, but did not have an extradural projection. The nerve was found to enter and leave the capsule distally. The nerve was divided between clips about 4 mm. above and below the tumor. The tumor was firm and elastic in consistency and had a definite capsule. No other lesions were found in the cauda equina at this level. A routine closure was made.

The gross description of the lesion revealed it to be a small, encapsulated, ovoid tumor attached to the nerve root. The tumor was firm and elastic. The external surface was smooth and gray in color. Cross section through the nerve and its attached tumor revealed that the tumor originated from the nerve sheath. The capsule of the tumor was light in color except for diffuse small areas of hemorrhage. The gross diagnosis was neurofibroma, as was also the microscopic diagnosis.

The patient had an uneventful postoperative course except for a moderate degree of urinary retention in the first 48 hours which responded well to drugs. Upon his discharge from the hospital 20 days later the patient was walking freely without loss of motor power and with only mild symptoms of hypesthesia upon the dorsum of each foot and the back of the left calf. He was completely relieved of his pain, and after progress study several months later the patient returned to work. The only residual finding was a small area of numbness in the lateral side of his right foot.

Case 3. A 41 year old police officer complained of pain in the back of two months' duration. He recalled that his symptoms had begun when he had been "kicked" by his motorcycle in starting it. He had been thrown into marked hyperextension and had noted a sharp, lower back pain. Several days later the pain had extended into his leg

and had radiated down the posterior aspect to the foot. He had been confined to bed for one week, and after an adequate rest period had resumed very limited activities at the station house. The pain, however, had persisted. Several adjustments had been made by a chiropractor, and the patient had improved enough to return to work. The pain had recurred and became almost constant. From that time he had been confined to bed until his hospital admission.

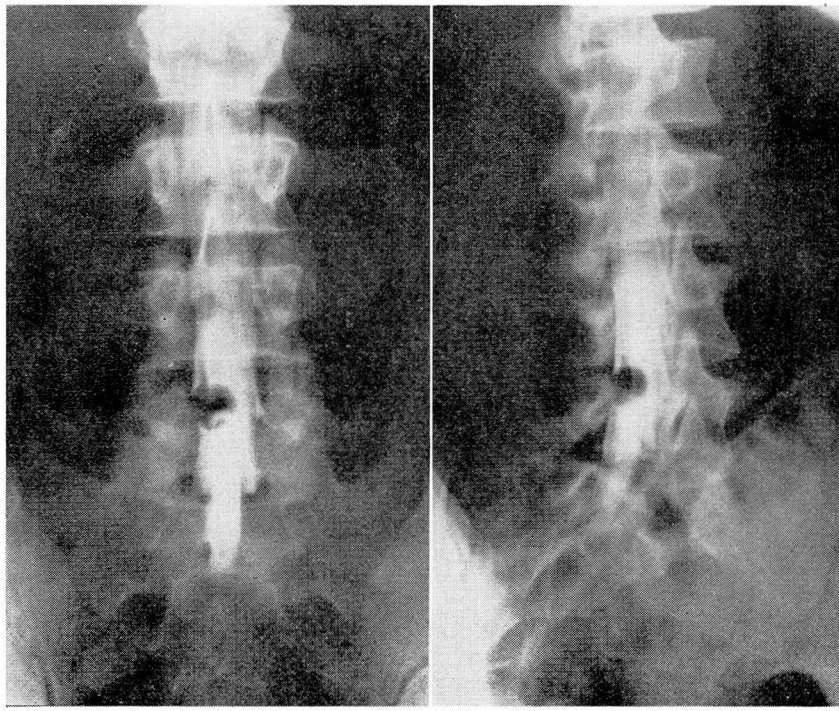

FIGURE 2. Thorotrast myelogram showing frontal and oblique views of thorotrast column. The nerve with its attached neurofibroma as well as area of attachment can be seen.

The pain was aggravated by coughing and sneezing and was located in the lower lumbar area. More or less constant in its presence, it was aggravated by the jolting of the patient's motorcycle. He had a loss of muscle power in his leg and some paresthesia, especially of the right great toe, which had improved considerably over a period of three weeks.

The general examination revealed no abnormalities which might have contributed to the general symptoms. Upon examination a deviation of the spine to the right was noted. The back was flattened, and there was marked restriction of motion of the back in all directions. Half inch atrophy of the left thigh and left calf was present. The knee jerks were present, but decreased. The ankle jerks were absent bilaterally. Lumbosacral x-rays revealed a narrowing of the disc between the fifth lumbar vertebra and the sacrum. No sensory changes were found; Naffziger's sign was negative; the Laségue sign was positive on the left.

Urinalysis, blood examinations, blood chemistry examinations, and serologic reactions were entirely normal in every respect. Spinal fluid examination revealed the presence of 3 cells and 120 mg. of protein. The clinical diagnosis at this time was protruded intervertebral disc between the fifth lumbar and the first sacral vertebrae, probably obstructing the canal.

To establish this diagnosis a thorotrast myelogram was recommended before laminectomy was performed. The myelogram showed an almost complete block at the level of the mid-portion of the fourth lumbar vertebra (Fig. 3). A large anterior filling defect was seen in this region. The mass extended downward to the superior margin of the first sacral vertebra. The preoperative diagnosis was extradural tumor opposite the fourth and fifth lumbar and the first sacral vertebrae.

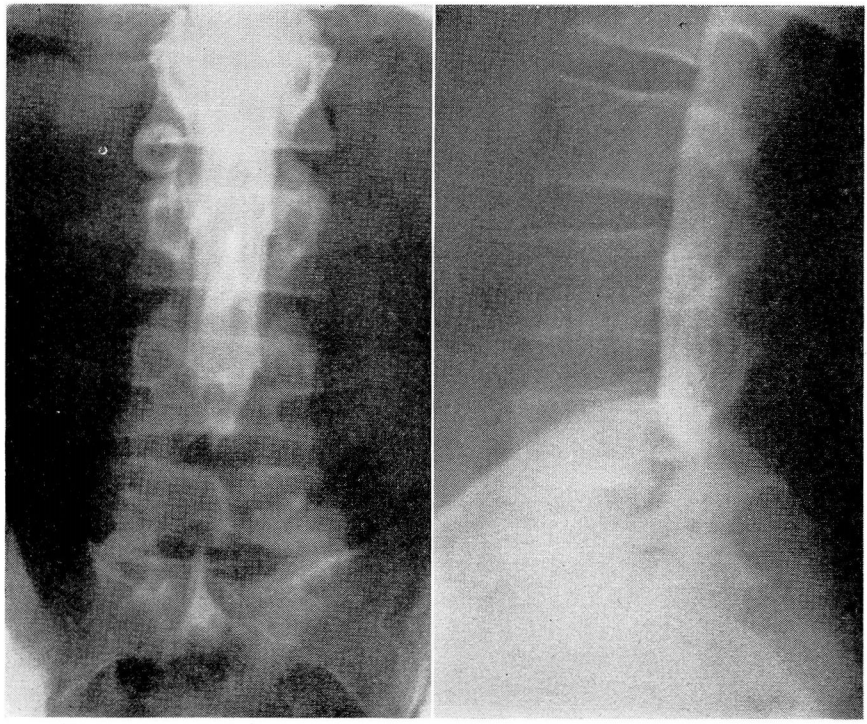

Figure 3. A direct frontal and lateral view of the thorotrast column showing the presence of an almost complete obstruction originating extradurally. A small amount of thorotrast is seen beyond the obstructed area.

Under pentothal anesthesia a laminectomy was done. The spines and laminae of the fourth and fifth lumbar, and a portion of the first sacral vertebrae were removed. Palpation of the dura revealed the presence of a firm smooth mass compressing the spinal canal extradurally and lying on the posterior surface of the vertebral bodies. Incision was made into the dura, and the nerves seemed to be compressed from the anteriorly placed mass. The dura was retracted medially, and the anterior epidural space explored. A large, gummy, grayish-tan tumor was seen lying anterior to the dura in this region, extending from the third lumbar to the second sacral and involving the anterior portion of the dural sac and the fourth and fifth lumbar and first sacral nerves. With retraction the tumor was separated from the dura and nerve sleeves by dissection to the midline. This mass was then sectioned from the body of the tumor, and the same process repeated on the opposite side for the length of the exposure. Upon removal of this tumor the freed nerve sleeves and their contained nerves seemed to be almost suspended in space. Shreds of tumor tissue undoubtedly remained attached to the periosteum, although all evident tumor was apparently removed. Hemostasis was effected, and the dura closed with a single continuous black silk suture. The anterior dural wall seemed to have been invaded by the tumor in the fourth lumbar region. The wound was closed in routine fashion without drainage.

Gross description of this tumor showed it to be a grayish-tan mass, rubbery in consistency, which roughly took the form of the lumbosacral canal with extensions that enveloped the nerve sheaths. It was approximately 2 cm. thick and 7 cm. long. Microscopic examination revealed it to be plasma cell myeloma.

The patient made an entirely uneventful recovery and was discharged from the hospital on the twentieth day. The patient has been carefully studied in follow-up examinations. Special blood counts, sternal puncture, and repeated x-rays have shown no evidence of metastases or further lesions. An occasional abnormal plasma cell has been reported in the sternal puncture. The blood has been found positive for the Bence-Jones protein, but repeated urinalysis has not revealed this finding. Recheck examination has revealed his condition to be excellent, with general improvement in the neurologic findings.

DISCUSSION

Summaries have been presented of the findings in three patients who had the classical syndrome of the protruded intervertebral disc. In two of these three cases the onset of the difficulty was incorrectly ascribed in all honesty to a specific back trauma. As is not infrequently the case, the trauma possibly served only to call attention to an already existing pathology.

In these patients, two of whom had an intradural and one an extradural tumor, the clinical findings were those of a protruded intervertebral disc. These tumors were especially interesting in themselves in that they were rather unusual in type and location. While the single neurofibroma, developing from the epineurium of a nerve, is frequently found in the spinal canal, the only concern here was that an exact preoperative diagnosis could be made with the methods at hand.

It is of considerable value to the surgeon in planning the operation to know the exact location and possible nature of the lesion he expects to encounter. This was evident in the other cases, i.e., the intradural melanoma and the extradural myeloma, where the exact location and disposition of the tumor was known and the surgical attack considered in the light of the pathology most frequently encountered in this diagnostic pattern. Whether or not the melanoma was primarily of meningeal origin can be determined only at autopsy, since no detectable evidence of a primary source existed. The presence of an isolated extradural myeloma without the presence of multiple lesions is an infrequently encountered circumstance. In this case, as in the others, there was no evidence of another lesion.

The presentation of these cases illustrates the fact that even though a syndrome as well defined as that of the protruded intervertebral disc may be present, all diagnostic measures should be utilized in its final clarification. It is noteworthy that other common or uncommon conditions, surgical or nonsurgical, may simulate this clinical picture. Infallible accuracy in diagnosis is not always possible, and valuable information may be overlooked to the patient's detriment if the available methods of examination are not fully utilized in a given case.