THE RÔLE OF THE DENTATE LIGAMENTS IN SPINAL CORD COMPRESSION AND THE SYNDROME OF LATERAL SCLEROSIS*

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The importance of the dentate ligaments in the pathological physiology of spinal cord compression has not been sufficiently stressed. I believe there are cases of anterior spinal cord compression that have been mistakenly diagnosed as primary lateral sclerosis chiefly because of the rôle played by the dentate ligaments.

Wechsler and Brody in a recent article state as their opinion that “selectivity” on the pyramidal tracts “by a noxious agent, whatever its nature,” accounts for a disease entity, primary lateral sclerosis. Of their 61 cases recorded in the past ten years with the tentative diagnosis of lateral sclerosis at least 34 later evolved as other syndromes, including spinal cord compression. It is not the purpose of this article to attempt solution of the problem as to whether there is a disease entity of primary lateral sclerosis, but rather to show how a condition similar clinically can have a mechanical origin.

Case 1. A man aged 50 showed the typical clinical picture of lateral sclerosis. There was no subjective history of pain or involvement of the upper extremities. Spastic paralysis of the lower extremities with numbness and tingling had progressed gradually over a period of 14 months until the patient was no longer able to walk. There recently had been noted difficulty in voiding while standing but none while lying down.

Examination. There was marked spastic paralysis of both lower extremities with bilaterally positive Babinski’s sign. Tactile and pain sense were entirely normal including the sensation of heat and cold in the bladder. Vibratory sense was diminished bilaterally, more marked on the right leg. Both sense of motion and position of the toes were normal. The upper extremities were normal. Blood studies, including Kahn test, were negative. X-rays of the cervico-dorsal spine, although not very satisfactory, were thought to be negative except for arthritic changes. Review at a later date when the diagnosis was established showed evidence of calcification in the intervertebral disc between the 6th and 7th cervical bodies.

Lumbar puncture revealed no block but a total protein of 118 mg. per 100 cc. Spinal fluid Kahn test was negative. A myelogram disclosed a suggestive defect between the 6th and 7th cervical bodies. Operation was advised with the diagnosis of a midline herniation of the nucleus pulposus.

Operation. On Dec. 19, 1945, the 5th through the 7th cervical spinous processes and laminae were removed. An extradural approach revealed a marked posterior protrusion of the intervertebral disc in the midline between C-6 and C-7. The dura was opened. The cord was found to be firmly anchored to the anterior mass by the dural attachments of the dentate ligaments. These attachments were divided, mobilizing the cord. The cord was retracted laterally and an incision made through the anterior dura and posterior longitudinal ligament into

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† Subjective numbness may be complained of if either tactile or pain and temperature, or even articular or vibratory sense, has been diminished or lost (Elsberg)."
the herniated disc. Only a small amount of calcified nucleus pulposus was removed, and this with difficulty. It was thought that the cutting of the dentate attachments alone, thus decompressing the cord backward, would relieve the patient's symptoms.

Course. Immediately postoperatively the patient was very much worse and both hands were extremely weak. The strength of the hands improved rapidly but improvement of the legs was slow. A perineal prostatectomy was performed on Feb. 22, 1946, for benign prostatic hypertrophy. Examination 14 months after operation revealed improvement in that he could stand alone and walk with crutches, neither of which was he able to do preoperatively.

Discussion. Nothing was accomplished in the removal of this small amount of calcified disc substance, and the cord was traumatized during the procedure. Had the mass been the usual soft midline herniated nucleus pulposus, its excision would have been indicated. Excision of a calcified nucleus pulposus from in front of the cord is fraught with danger. Some years ago the author removed such a disc from the dorsal region of a man, who promptly developed a permanent incontinence with increase in his spastic paralysis. Freeing the dentate attachments and allowing the cord to escape backward might have resulted in cure, as the calcified mass would never have expanded farther.

Case 2. A woman aged 36 entered the University Hospital Aug. 20, 1946, with a chief complaint of weakness of the hands and legs. The patient had been well until October 1945, when she noted numbness and tingling in the hands. In November 1945, weakness of the hands developed. In March 1946, weakness and numbness of the legs were noted, with difficulty in walking. There was never any pain or urinary disturbance. Examination elsewhere at that time revealed a hemoglobin of 65 per cent and lumbar puncture was said to be normal. She was treated with liver extract with some improvement.

Past history revealed that 8 years previously she had struck her head in diving. A month later severe stiff neck developed and was said to have been relieved by a chiropractor. Shortly after, stiff neck again developed but disappeared after a series of chiropractic manipulations, never to occur again.

Examination. She was an obese woman walking with a markedly spastic gait. There was weakness in both hands with a suggestion of atrophy. Hoffmann's sign was bilaterally present. Biceps and triceps jerks were active. The abdominal reflexes were obtained. The knee and ankle jerks were hyperactive. Babinski's sign was present bilaterally and there was marked spasticity of the legs.

Sensory examination revealed normal pain and temperature sense. Touch and sense of motion and position of the toes were normal. Vibratory sense was diminished bilaterally. There was astereognosis of the hands, though sense of motion and position of the fingers was normal. No definite sensory level could be established.

X-rays of the cervical spine were essentially negative. Lumbar puncture revealed no evidence of block. The spinal fluid protein was 67 mg. per 100 cc. A myelogram was carried out using 2 cc. of lipiodol. A block was present between the 4th and 5th cervical vertebral bodies. Lateral x-ray studies with the patient in the head-down, prone position suggested that the compression arose anteriorly.

Operation. On Sept. 23, 1946, under intratracheal anaesthesia, the laminae of the 3rd, 4th and 5th cervical vertebrae were removed. There was no abnormality seen on exposure or palpation of the dura. The dura was opened leaving the arachnoid intact. There was the usual amount of fluid visible in the subarachnoid space, beneath which the cord could be seen. The dentate ligament was identified on the right and two attachments cut. No abnormality was seen on the right, lateral or anterior to the spinal cord. On the left the dentate ligament was firmly attached to the dura, and fixed to a soft extradural swelling. The dentate attachment was divided, allowing the cord to be easily mobilized posteriorly and to the right. This