VARIATIONS IN THE SPINOthalamic TrACT
IN MAN*

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This is a report of two cases that illustrate the variability of the pain pathways in the spinal cord of some individuals.

Standard textbooks of neuroanatomy\textsuperscript{3,5,6} give descriptions and present diagrams indicating that the pain pathway in the spinal cord in man is a discrete bundle of fibers, known as the spinothalamic tract, located in the anterolateral funiculus and consisting of afferent neurons of the second order. Finely myelinated or unmyelinated dorsal root fibers that serve as pain conductors terminate in the gray matter almost at once after entering the cord. From cells in the posterior column of the gray matter fibers arise which, in man, cross to the opposite side of the cord in the anterior white commissure and ascend in the lateral spinothalamic tract to end in the thalamus. Unilateral section of this tract produces complete loss of pain and temperature sensations on the opposite side of the body, extending upward to a level one segment below the level of the lesion, because of the oblique crossing of the spinothalamic fibers.

These and similar statements are the result of piecing together fragmentary bits of clinical and experimental facts obtained over a period of many years. Unfortunately, our knowledge of the pain pathways in the spinal cord is still far from exact and the dogmatic statements and diagrams to be found in most textbooks cannot be substantiated by clinical observations. White and Sweet\textsuperscript{9} in their extensive monograph on pain have reviewed the knowledge accumulated to date on the pain pathways in man.

CASE REPORTS

Case 1. Mrs. L.K. was the subject of a brief report before the Chicago Neurological Society 6 years ago. This was published in abstract form a year later.\textsuperscript{8} During the course of a left unilateral anterolateral cordotomy on a 46-year-old white woman with intractable pain of the right lower extremity, it was discovered that there was analgesia to pin prick below the umbilicus on the left although there was no demonstrable sensory loss on the right side. Thirty-eight days later right unilateral anterolateral cordotomy was carried out and was eventually extended to section of the right anterior quadrant of the cord. This produced analgesia to pin prick between the umbilicus and the anterior aspect of the knee on the right (T11 to L2 dermatomes), with preservation of pain sensation in the lower lumbar and sacral dermatomes. The analgesia on the right later receded to hypesthesia but the

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analgesia on the left was maintained at the level of the umbilicus up to the time of dismissal from the hospital, 103 days after the section on the left and 65 days after the cordotomy on the right. She died at home 2 years later. No necropsy was obtained.

Case 2. Mrs. A.P. was a 51-year-old white woman who had had pain in the right lower extremity for 9 months, caused by recurrent adenocarcinoma of the uterus. High thoracic left anterolateral cordotomy was carried out without incidence under local anesthesia. A sensory level between the costal margin and the nipple (T6 dermatome) was obtained. The patient was relieved of her pain in the right lower extremity and left the hospital 11 days after operation.

Five months later the pain had returned with its former severity. There was loss of sensation to pin prick to the level of the costal margin (T8 dermatome). Careful examination failed to reveal any “islands” of sensation below this level.

The patient continued to complain of the pain in the right lower extremity. There was no change in her sensory level. Thirteen months after the first cordotomy the previous incision was reopened and the previous laminectomy was extended to include the next lowest vertebra. Then right anterolateral cordotomy was carried out, making an incision 5 mm. deep anterior to the dentate ligament and extending medially to the anterior roots. A level of anesthesia to pin prick below the costal margin on the left was obtained. This level receded in 10 days to the level of the umbilicus (T10 dermatome). The patient was relieved of the pain in her right lower extremity and left the hospital 13 days later.

She was readmitted 2 months later and died 72 hours after admission, 15 months after unilateral cordotomy and 69 days after right unilateral cordotomy. The spinal cord was removed 4 hours after death and fixed in formalin.