INVASION OF THE SPINAL CORD BY MALIGNANT SCHWANNOMA

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The spinal cord is subject to a variety of lesions that come under the classification of tumors. These may be primary tumors that originate within the spinal cord, or arise from implantation of tumor cells that are transplanted by the circulating cerebrospinal fluid, a situation not uncommon with medulloblastoma, but apparently occurring less frequently with other brain tumors. In addition, the spinal cord may be compromised by vascular malformations, hemangiomas, intramedullary cysts, and extradural lesions, such as metastatic tumors, abscesses, extradural cysts, intervertebral discs, and granulomatous lesions. Direct invasion of the spinal cord by tumor spreading by way of the peripheral nerves is a most unusual and relatively rare situation.

CASE REPORT

V.L., a 50-year-old male, was examined on Mar. 19, 1953. He complained of pain in the right side of the neck, right upper chest and shoulder, and in the right phantom arm. In 1944 an inflamed, dark mole near the right elbow had been cauterized. Three months later subcutaneous nodules appeared at the same site. During the next 6 years local recurrent tumor nodules in the subcutaneous tissues were excised on six different occasions. The successive recurrences progressed higher and higher on the right arm and were little affected by repeated courses of roentgen-ray therapy. Pathological diagnosis up to 1950 was recurrent fibrosarcoma. Dr. Arthur Purdy Stout believed the tumor was a recurrent leiomyosarcoma of the skin or subcutaneous tissue, although malignant melanoma could not be excluded.

By 1952 a tumor mass had appeared in the right axilla. Exploration revealed that the tumor had invaded and surrounded the brachial plexus; consequently the entire right upper extremity, including the shoulder girdle, was amputated. Following this operation a right Horner's syndrome developed and the patient experienced intermittent pain in the right side of the neck, right upper chest, shoulder and in the right phantom arm. The pain was aggravated by turning of the head to right or left. The phantom pain felt as if an ice pick were being driven through the back of his hand, or as if his fingers were being stretched or caught in a vise. On occasions he experienced a burning sensation which radiated from the right phantom elbow into the hand.

Examination. A mass was present in the right supraclavicular region. There were extensive surgical scars in the region of the right axilla. Positive neurological findings were a right Horner's syndrome, and anesthesia to pin prick over the right anterior aspect of the chest to the level of the nipple line. Pressure in the right supraclavicular region produced pain. Roentgenogram of the chest showed only minimal thickening of the pleura at the right apex.

Course. The patient's pain was well controlled with Empirin and codeine, and surgical measures for its relief did not seem justifiable.

In May, 1953 the patient was reexamined because weakness of the right leg had developed, followed by weakness in the left leg, associated with difficulty in emptying his bladder and controlling bowel movements. The pain in the neck, chest and phantom arm was unchanged.

The superficial abdominal and epigastric reflexes were now absent. Deep reflexes were moderately active and equal throughout, and there were no definite pathologic toe signs or

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ankle clonus. There was moderate weakness of both lower extremities, more marked on the right. Position sense and vibratory sensibility were slightly impaired in the right lower extremity. Light touch was preserved everywhere. There was hypesthesia to temperature and pain below the 1st dorsal cord segment on the left, and anesthesia, as before, was present to the level of the nipple line in the right anterior chest wall. The spinous processes of the 7th cervical and 1st dorsal vertebrae were tender.

A Pantopaque study on May 26, 1953 showed a nearly complete block opposite the 7th cervical vertebra, only a small amount of oil being able to pass on the left side. The spinal fluid was clear and colorless, and contained a total protein of 25 mg. per cent and 6 white blood cells.

Operation. On May 27, 1953, laminectomy from the 3rd cervical to the 2nd dorsal vertebra revealed no evidence of extradural tumor. The right laminal arch of the 1st dorsal vertebra was softer than normal. At the level between the 6th and 7th cervical vertebrae the spinal cord was greatly swollen. The dentate ligaments were cut bilaterally. The 7th and 8th cervical roots on the right side were swollen to about four times their normal size. The 6th and 7th intervertebral foramina on the right were widened and tumor could be seen growing into the substance of the spinal cord through the dural sleeve. The right 7th and 8th cervical roots were cut in the hope of giving the patient some relief from his pain.

Pathological Study. Sections of the nerve roots showed tumor. On comparison with material from previous operations, it was found to be generally identical in structure. Despite the numerous recurrences, the pattern was that of a fairly mature spindle-cell sarcoma in most places. The tumor was within the nerve sheath, and suggested sarcoma of nerve-sheath origin (malignant schwannoma). Hence it seemed that the principal spread of the lesion had been along nerve trunks. The morphologic structure of the tumor was compatible with such an origin. The tumor had presumably arisen as a peripheral nerve neurofibrosarcoma in the skin or subcutaneous tissue and had shown a predilection to spread along nerve trunks, a well known method of extension for tumors of this group.

The tumor was composed of fairly uniform spindle cells forming many interlacing bundles. The individual cells showed fairly distinct cell borders, pale and faintly fibrillary cytoplasm, and elongated, evenly stained nuclei. Nucleoli were not prominent in many cells, while other cells showed large, evenly stained nucleoli. Mitotic figures were infrequent. A mild leukocytic infiltration was present.

Postoperative Course. The patient tolerated the operation reasonably well, but increasing paresis and finally paraplegia confined him to bed, with inability to void. During the next 5

Fig. 1. Gross appearance of transverse section of lower cervical cord. (×1½)