Neurosurgical Techniques

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Surgical Treatment of Diastematomyelia

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DIASTEDEMORYELIA, a form of spinal dysraphism, is characterized by a division of the spinal cord or cauda equina resulting from a bony or cartilaginous spur which transfixes the neural elements and dura. Occasionally a complete septum may exist, rather than a spur, dividing the spinal canal into two separate bony compartments for a short distance (Fig. 1).

The cause of diastematomyelia is not known, but the frequency with which it is encountered in association with various forms of spina bifida and other congenital anomalies of the vertebral column suggests that it is due to a mal-arrangement of mesenchymal cells protruding into the ventral neural tissue in the early period of differentiation of the neural tube.

Transfixion of the neural tissues by the projecting spur results in a low anatomical position of the cord and impairs the normal ascent of the cord, which, by continued growth against the spur, results in a cleft or division of the dura and the neural parenchyma over a distance of several segments.

Occurring in the spinal areas from the mid-thoracic to the low lumbar segments, diastematomyelia is most frequently located in the lumbar area (Fig. 1). The disorder should be suspected in those individuals harboring any of the cutaneous signs of spina bifida occulta (midline dimpling of the skin, areas of local hypertrichosis, lipomatosus masses over the spine, and midline cutaneous vascular nevi). Neurologically, there may be disturbances of sphincter control, weakness of the distal musculature, deformities of the feet, and the absence of deep tendon reflexes in the legs. Sensory loss may be detected in the sacral (saddle) area in some patients.

The diagnosis may be made by the disclosure of a midline area of calcific density in the anteroposterior projection by x-ray, which also may indicate widening of the canal in this local area. With the use of myelography, the septum or spur can be graphically demonstrated as a central filling defect in the canal at its widest portion. Diastematomyelia must be distinguished from diplomyelia. In diplomyelia true doubling of the cord occurs, and each portion is invested with its own pial covering but shares a common arachnoid and dura; moreover, each cord is rotated approximately 90° so that the ventral columns face each other (Fig. 1). This condition has been thought to represent an incipient form of twinning. Obviously, many variations can occur, so that an individual patient may show salient features of each disorder, such as diplomyelia with intervening spur formation and separate dural compartmentation.

The surgical correction of diastematomyelia is recommended as a prophylactic measure against further progressive neurological damage. It should not be performed with the mistaken concept that dramatic reversal of the existing neurological deficits will occur, although there may be continuing improvement over a long period of time. It should also be emphasized that the neurological dysfunction which develops latest in the preoperative period is likely to show the earliest clinical improvement.

Incision

The surgical correction of diastematomyelia requires a generous exposure through a midline incision that provides access to the spinous processes and laminae for one or two segments above and below the site of the lesion (Fig. 2).

Extradural Exposure and Removal of Spur

The paraspinal muscles on each side are freed and retracted laterally as in any standard laminectomy. The spinous process and lamina at the site of the bony spicule are removed and the dura, dural cleft, and bony spur exposed. The laminectomy is then