THE ANTERIOR APPROACH FOR REMOVAL OF RUPTURED CERVICAL DISKS*

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In the surgical treatment of ruptured lumbar intervertebral disks, the operation of vertebral-body fusion following subtotal removal of the disk with partial laminectomy has been employed since 1943.2 This operation has been performed on over 600 patients and in the writer's experience has proven to be superior to any other operative procedure employed for relief of pain in the back and leg caused by ruptured lumbar disks. The high percentage of permanent cures, the rapid rate of spinal fusion, short period of hospitalization and convalescence, and the early ability of the patient to return to heavy work are the factors upon which these conclusions were drawn.4

The poor results obtained in the treatment of disease of intervertebral disks in the cervical region, both from conservative therapy and surgical treatment, has been the concern of surgeons for many years. In an attempt to overcome some of these problems encountered with ruptured cervical disks, the methods used in the treatment of lumbar disks were considered.3 If the symptomatic lesion of the cervical disk not demonstrated by a myelogram could be identified by diskography and if the pathological joint could be treated surgically by an interbody fusion as is done for lumbar disks, the results from the treatment should be greatly improved. These criteria have been realized by an anterior approach to the cervical disk.

The technical difficulties encountered in the operations currently in use to expose and remove a ruptured cervical disk and/or the osteophytes on the margins of the vertebral bodies may be one reason for the poor results obtained by surgical treatment. The obstacles are primarily anatomical. A comparison between the conventional cervical and lumbar disk operations from a technical standpoint probably explains the excellent results obtained in treating the lumbar disk compared to the poor results for the cervical lesion. The surgical approach to the lumbar disks through the spinal canal is facilitated by the retractability of the long lumbar nerve roots and the dural sac which contains only the cauda equina and cerebrospinal fluid. This approach for performing lumbar vertebral-body fusion is greatly facilitated by use of special self-retaining retractors designed for this operation. With these instruments both the spinal canal and the intervertebral space are

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widely exposed and the danger of injury to structures of the nervous system is minimized. In the cervical region, the protruded intervertebral disk is concealed beneath the large, short, cervical nerve root and/or the spinal cord. The surgical approach used by most surgeons for removal of the disk consists of a complete laminectomy, hemilaminectomy or a facetectomy. The operation is more difficult if the disk has herniated in a dorsolateral position lying entirely beneath the nerve root. There is always danger of injury to the nerve root in obtaining an exposure through the solid bone that overlies it. A Hudson drill or an electrically driven burr is employed for this purpose, as described by Frykholm. The nerve root is also surrounded by large epidural veins, the removal of which may pose a considerable problem in hemostasis before the nerve root can be sufficiently freed and retracted to expose the disk. If the herniated disk or bony osteophytes protrude near the midline, they are exposed by a complete laminectomy. The lesion is removed either by a transdural approach with retraction of the spinal cord, or extradurally working blindly beneath the cord as described by Mayfield. These operative procedures are long and difficult and are frequently fraught with considerable danger and complications. Injury to the nerve root by retraction or hemorrhage may result in serious neurological deficit in the upper extremities. The midline lesions are notorious for the universally poor results obtained by attacking them through the spinal canal.

The anterior approach to the intervertebral disk was suggested while the technique of diskography for lesions of cervical disks was being developed. The radiographic visualization of the intervertebral disk by injecting a radiopaque solution into the disk has long been used to demonstrate the pathological anatomy of the interior of lumbar disks. Lumbar diskography is performed by inserting the needle through the dural sac and into the disk from its posterior surface. The same approach would be impossible for the cervical intervertebral disks since the needle would pass through the spinal cord. The technique of cervical diskography by inserting the needle into the anterior surface of the disk between the carotid sheath and trachea was first performed by Dr. Exum Walker of Atlanta, Georgia and has proven to be a safe, technically simple and yet very valuable diagnostic procedure.

The ease with which the cervical disk could be entered from its anterior surface led to experiments carried out on cadavers to develop a method of removing the disk by this route. A modification of the Wiltberger instruments used in the interbody fusion for the lumbar spine was employed. Wiltberger modified the writer’s original operation for interbody fusion of the lumbar spine by designing an instrument which drills a round hole in the intervertebral space into which is inserted a prefit cylindrical dowel of bone. The use of this instrument was found to be an excellent method of exposing the cervical intervertebral disk through the vertebral body (Fig. 1). Accordingly, the instrument was redesigned for this purpose, with an appropriate guard and an adjustable depth gauge. This was necessary to prevent the drill from going too deep, plunging into the spinal canal and damaging the