ONLINE DIGITAL VIDEO

Thoracoscopic Microdiscectomy

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THE THORACOSCOPIC APPROACH for the microsurgical removal of herniated thoracic discs is described, and perioperative management is also discussed. The microsurgical techniques used for decompression of the spinal canal in the thoracic spine are presented in detail. The diagnostic imaging, surgical positioning, approach, port placement, localization of the thoracic level, exposure of the surgical field, excision of the rib head, exposure with removal of the herniated disc, and postoperative management are outlined. Surgical and operative "pearls" in thoracoscopic spinal surgery for removing herniated thoracic discs when possible are described and illustrated.
(Neurosurgery 50:103–109, 2002)

Key words: Disc herniation, Endoscopy, Thoracic spine, Thoracoscopy

In 1910, Professor Hans Christian Jacobeus first used an endoscope to view the thoracic cavity for lysis of tuberculosis pleural adhesions as an alternative to open thoracotomy (14). Recently, endoscopic procedures in various applications have dramatically increased in most surgical disciplines (16–18, 33). The trend toward the use of minimally invasive procedures with endoscopic visualization of the thoracic cavity in thoracic spinal surgery has evolved similarly. The thoracoscopic approach can be used to allow the spine surgeon to gain adequate exposure of these anatomically challenging spinal lesions, which require specialized surgical techniques (7–9, 12, 15, 18, 21, 22, 24, 28–32).

Anterior approaches to the thoracic spinal column have become established as the standard for appropriate treatment of disc lesions primarily anterior to the spinal cord (4, 10, 26, 27, 34). Thoracotomy remains the standard open procedure that provides optimal ventral exposure of these anteriorly located spinal lesions (1–3, 5, 6, 10, 13, 21, 26, 27, 34). Alternatively, the costotransversectomy and transpedicular techniques provide posterolateral exposure that avoids opening of the patient's chest; however, direct visualization of the ventral spinal cord is not possible with these techniques (5, 11, 17, 19, 20, 23, 25, 35, 36). With the exception of the lateral extracavitary and transpedicular approaches that describe a posterior trajectory along the rib or the pedicle, respectively, to the disc, the thoracotomy remains the gold standard for ventral midline lesions that compress the spinal cord (25, 26). Furthermore, the lateral extracavitary and transpedicular approaches do not provide direct visualization of lesions directly ventral to the spinal cord, which cannot always be removed safely without possible injury to the spinal cord. This is particularly true with midline calcified disc lesions that require an anterior transthoracic approach (26, 27).

THORACOSCOPIC SPINE SURGERY (see video at web site article)

The early maximally invasive thoracotomy and posterolateral paraspinal procedures provided the impetus for the development of minimally invasive thoracoscopic techniques for operating on patients with thoracic spinal lesions (7, 9, 15, 21, 28–30, 32, 33). We emphasize the skill in using specific, unique endoscopic techniques that can be developed through repetition and experience. In this article, we describe our surgical experience and technical "pearls," with particular emphasis on the important nuances in each step of the procedure that need to be understood to obtain optimal surgical and clinical results.

Preoperative imaging studies

Magnetic resonance imaging (MRI) is an excellent method by which to visualize soft tissue architecture, but computed tomography with myelography is superior for the imaging of vertebral bodies, bony spinal anatomy, and calcified lesions such as ossification of the posterior longitudinal ligament, calcified disc herniations, or osteophytes. Preoperatively, we also obtain plain anteroposterior and lateral thoracic and lumbar x-rays on every patient to determine the number of ribs and thoracic vertebral bodies for baseline comparison of intraoperative localizing x-rays. The ribs and the vertebrae can