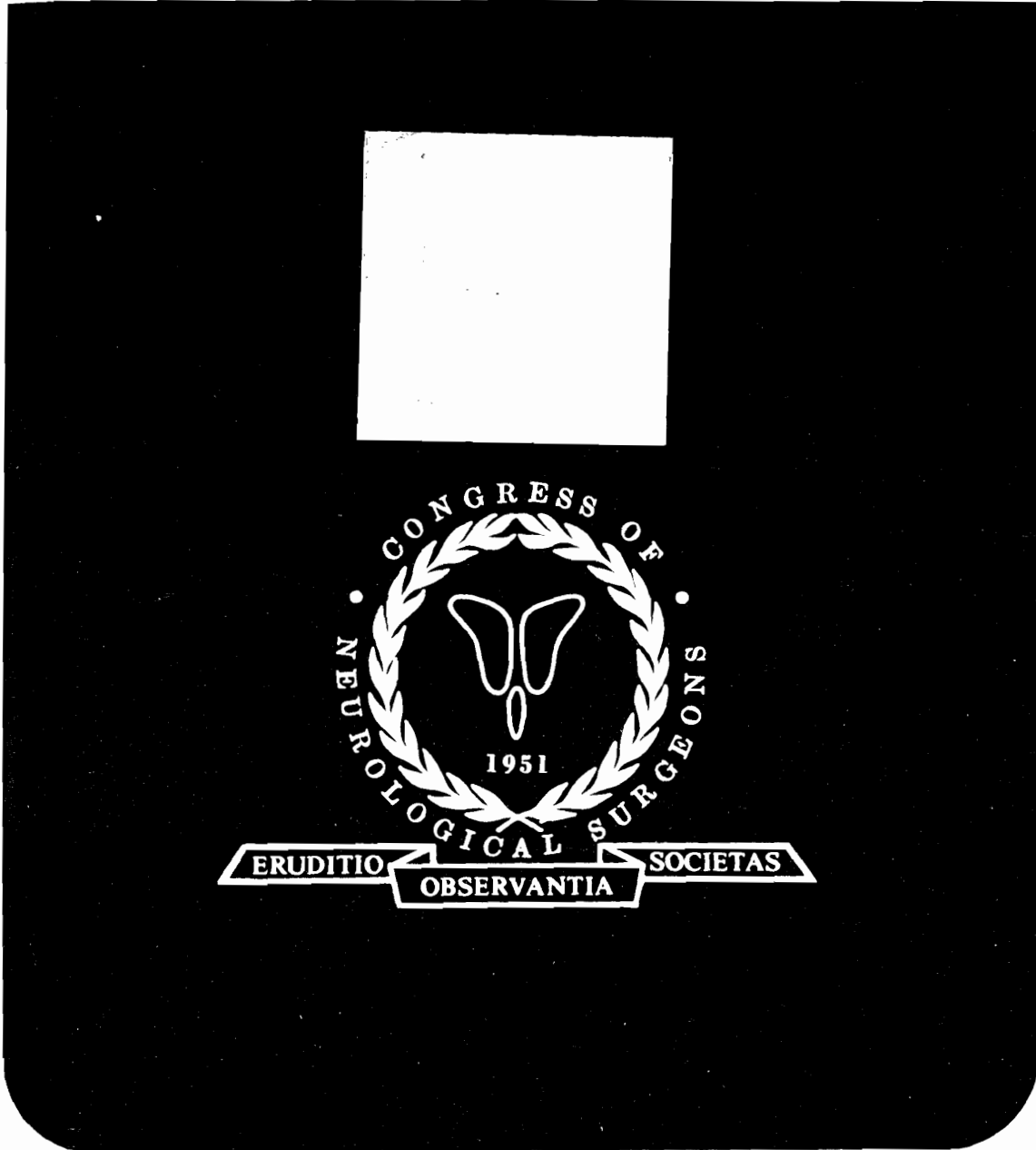


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Percutaneous Discectomy: An Alternative to Chemonucleolysis?

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At the University of Florida, a new technique for lumbar disc removal, called percutaneous discectomy, has been explored. This procedure may be performed under general or local anesthesia, frequently takes less than 15 minutes, and is generally bloodless. The patient selection process and the surgical technique are presented in detail. A total of nine patients have undergone percutaneous discectomy. Seven had clear radiculopathies with appropriate radiographic findings, and they all have had excellent relief of symptoms. Two patients presented with intractable low back pain, bilateral mechanical findings, and central disc herniations on radiographic examination. One experienced good relief and one did not. Three patients had several days of paraspinous spasm after the procedure, and one complained of a lower extremity dysesthetic sensation that persisted for several weeks after operation. Our early experience with percutaneous discectomy suggests that it is a technically easy procedure that may prove, in carefully selected cases, to be a viable alternative to other discectomy techniques. (*Neurosurgery* 13:542-547, 1983)

Key words: Back pain, Chemonucleolysis, Disc herniation, Intervertebral disc displacement, Lumbar disc surgery, Percutaneous discectomy, Radiculopathy

INTRODUCTION

Recent months have witnessed a resurgence of interest in less invasive methods of treating lumbar disc disease, most notably chemonucleolysis. At the University of Florida, an alternative technique, called percutaneous discectomy, has been utilized on a small group of patients. The methods of patient selection, details of operative technique, and early clinical results are reported.

METHODS

Patient selection

All patients considered for this procedure presented with complaints of low back or extremity pain, refractory to conservative therapy. Additionally, all had neurological or mechanical signs consistent with lumbar disc disease. As it was thought unlikely that this technique would be of benefit to patients with disc fragments no longer in continuity with the disc space, efforts were made to exclude this possibility radiographically (2, 7). All patients underwent lumbar computed tomographic (CT) scanning and metrizamide lumbar myelography. If these studies suggested vertical migration of the herniated disc, either under or through the posterior longitudinal ligament, the patient underwent a routine laminotomy and discectomy. No patient with a prior history of lumbar disc operation was considered for this study.

A further goal of the screening process was the identification of aberrant retroperitoneal structures that might lie in the projected surgical path. Of primary interest were the courses of the abdominal great vessels (aorta, vena cava, and iliac vessels) and the large bowel (8). Patients were given Gastrografin (diatrizoate meglumine and diatrizoate sodium; E. R. Squibb & Sons, Princeton, New Jersey) and, 4 hours later, were placed in their projected surgical position within a body scanner. A single transaxial scan, performed at the level of the upper iliac crest, readily delineated the course of these structures (Fig. 1). One patient was denied percutaneous discectomy because his abdominal CT scan revealed that his

ascending colon lay directly in the surgical path (Fig. 2). Of course, no patient with a prior history of retroperitoneal operation was considered for this procedure.

Operative technique

This procedure can be performed under either general or local anesthesia. Although our initial experience has involved

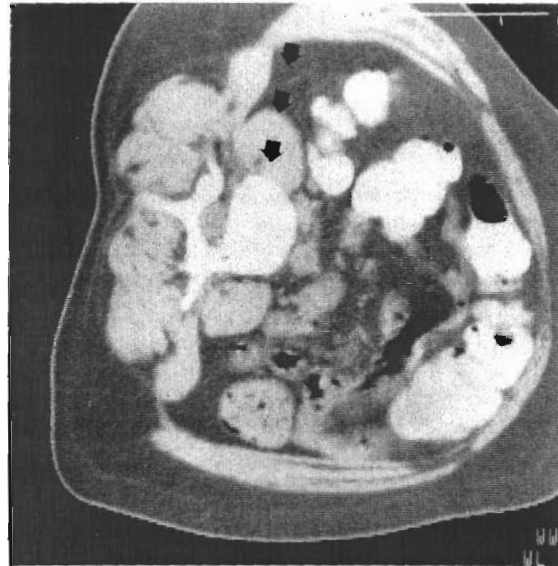


FIG. 1. A CT scan was performed just above the level of the iliac crest 4 hours after the oral administration of Gastrografin. The projected retroperitoneal surgical path is well visualized and unobstructed (arrows). The ascending colon, filled with contrast agent, is seen well anterior. The aorta and vena cava are identified in their usual locations, immediately anterior to the vertebral body.

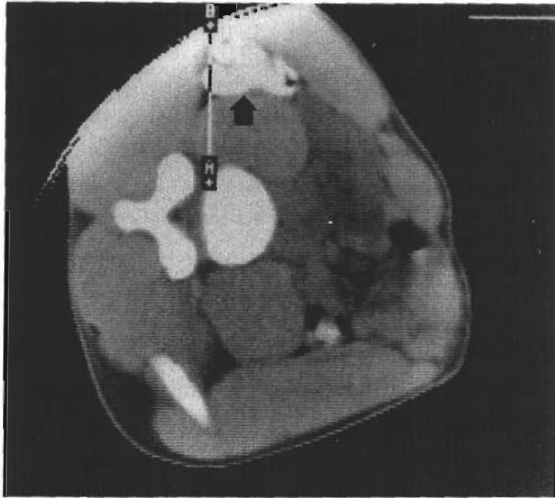


FIG. 2. This CT scan, performed in an identical fashion but in a very muscular patient, shows the ascending colon (*arrow*) clearly in the projected surgical path. A large psoas muscle lies between the colon and the lateral aspect of the vertebral body.

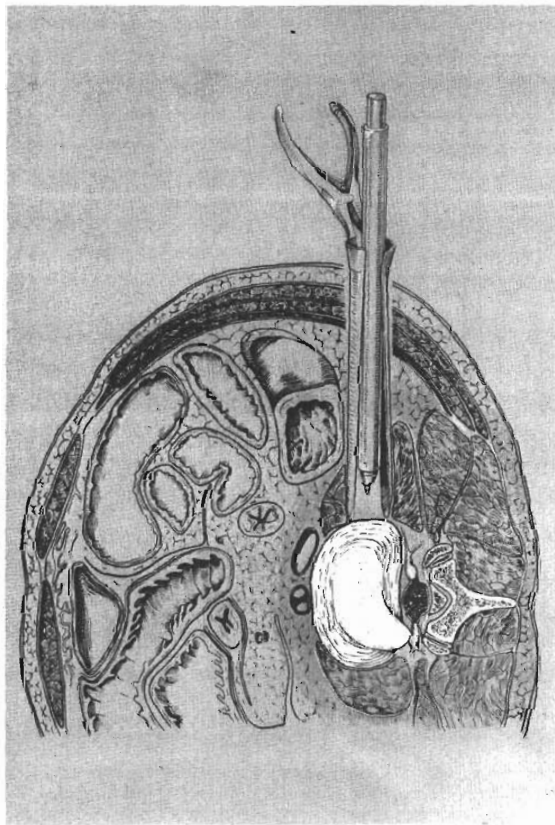


FIG. 3. Artist's rendition shows a special speculum positioned at the lateral aspect of the pathological interspace. Note that the side of the herniation is down. A 40 French chest tube, with trocar in place, is inserted.

general anesthesia, others report very satisfactory results using local anesthetic supplemented with intravenous Innovar (Critikon, McNeilab, Inc., Irvine, California) (Jacobson RE: Personal communication, 1983). After the induction of satisfactory anesthesia, the patient is placed in the lateral decubitus position, with the painful leg down. A roll is placed under the dependent flank to rotate the superior iliac crest out of the projected surgical path. A C-arm fluoroscope with image intensification is positioned for lateral lumbar spine radiography. The appropriate interspace is identified with fluoroscopy, and a 1-in. skin incision is marked at that level, just over the iliac crest. The field is then prepared and draped.

After the skin is incised, a specially designed speculum is inserted, under x-ray control, through the psoas muscle to the midpoint of the lateral surface of the desired interspace (Fig. 3). The speculum is opened and a 40 French chest tube, with trocar in place, is inserted. The speculum and trocar are then removed, leaving the chest tube in position. An 18 gauge K-wire is then passed through the chest tube and popped through the annulus of the disc space. This wire, which prevents migration of the chest tube, is then bent downward and cut, so that it is out of the way. Utilizing specially lengthened instruments, the surgeon incises the annulus of the disc with a #15 blade, and the disc is removed piecemeal with pituitary rongeurs (Figs. 4 and 5). With the pathological side inferior, a downbiting rongeur reaches very easily into the posterolateral aspect

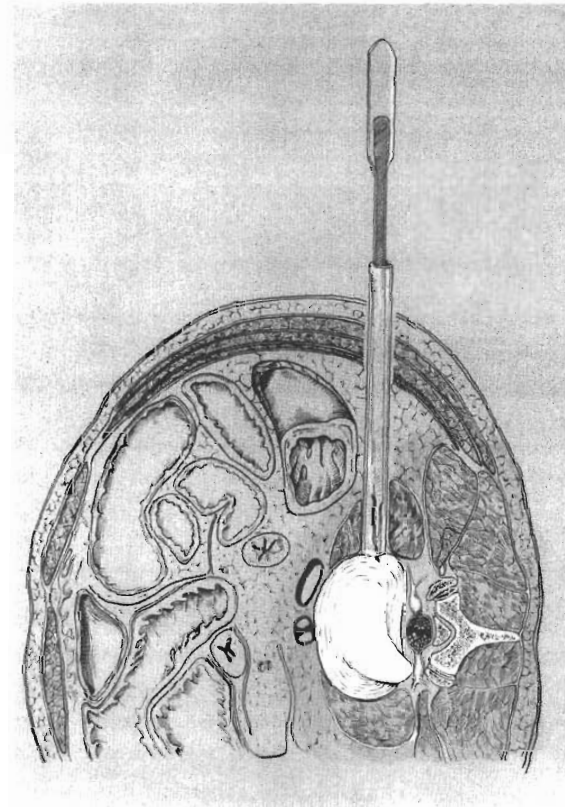


FIG. 4. After the trocar and speculum are removed, the disc annulus is incised. The previously inserted K-wire is not shown (for greater clarity).

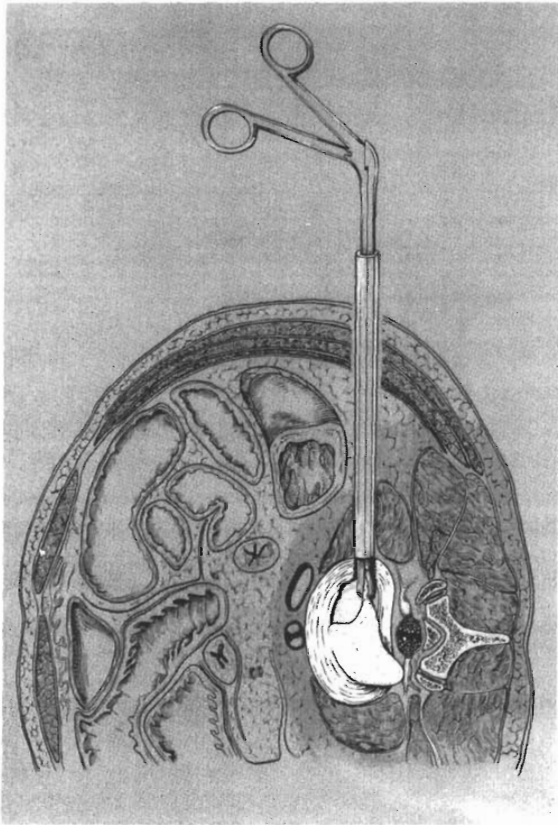


FIG. 5. The nucleus pulposus is removed in a piecemeal fashion.

of the disc space, completing the discectomy (Fig. 6). Fluoroscopic control is used to prevent the rongeur from biting too far anterior (great vessels) or posterior (epidural space). The wound is then thoroughly irrigated, the chest tube is withdrawn, and the subcutaneous tissue and skin are closed. The operative time ranges from 15 to 30 minutes.

ILLUSTRATIVE CASE REPORTS

The following brief case reports are presented to further illustrate the principles of patient selection and surgery.

Case 1

This 52-year-old man presented with a 2-year history of low back pain and a 2-month history of left sciatica, refractory to conservative therapy. Physical examination disclosed a positive left Lasègue's maneuver at 45° and a positive crossed straight leg raising test. The neurological examination was significant for a -2 left extensor hallucis longus (EHL), absent ankle jerks bilaterally, and hypalgesia over the dorsal and lateral left foot. A CT scan and a metrizamide myelogram were consistent with a left-sided herniated L-4, L-5 disc in continuity with the disc space (Fig. 7). On November 3, 1982, he underwent a percutaneous discectomy (L-4, L-5). Three days later he was discharged with no pain, negative mechanical findings, and an unchanged neurological examination. Follow-up at 6 months disclosed that he was working full-time and had no low back or leg pain.

Case 2

This 58-year-old man presented with a 15-year history of low back pain. In addition, he had previously suffered a traumatic amputation of his right leg and a subsequent reflex sympathetic dystrophy, which was totally relieved by a right lumbar sympathectomy. He complained of a 3-week history of severe left sciatica, unrelieved by conservative therapy. Physical examination disclosed a markedly positive left Lasègue's maneuver. The neurological examination was significant for a -1 left tibialis anterior, a -2 left EHL, an absent ankle reflex, and hypalgesia of the left foot (stocking pattern). A CT scan and myelogram suggested the presence of a large L-4, L-5 disc fragment no longer in continuity with the disc space (Fig. 8). Furthermore, his previous retroperitoneal operation had rendered him a high risk for the percutaneous procedure. Consequently, he underwent a left L-4, L-5 laminotomy, with the removal of a large free fragment disc that had migrated inferior to the interspace. At the time of discharge, his pain and mechanical findings had resolved, although his neurological examination was unchanged.

RESULTS

At the time of this writing, a total of nine patients have undergone percutaneous discectomy at the University of Florida. The pertinent patient data are listed in Table 1. Of the seven patients who presented with complaints of sciatica, all

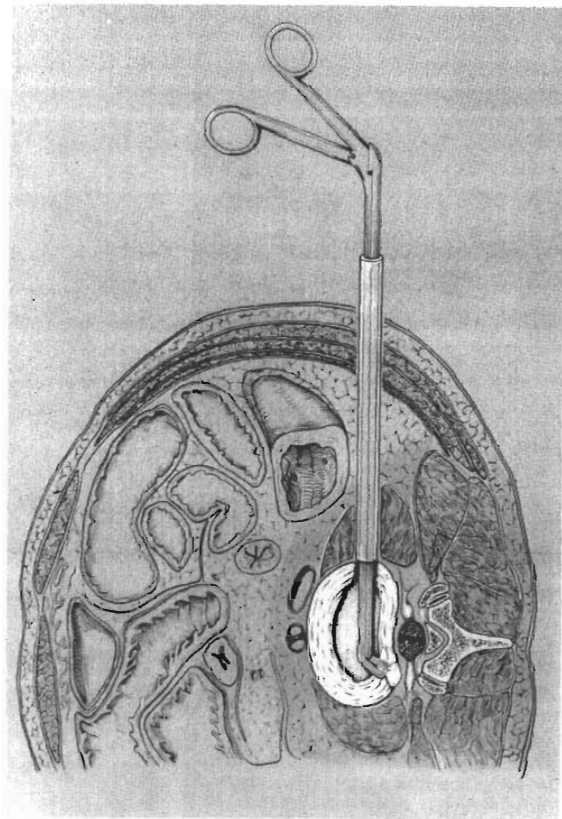


FIG. 6. A modified "down-biting" pituitary rongeur is utilized to remove the offending posterolateral portion of the disc.

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