

Anterior Cervical Discectomy without Fusion or Instrumentation: 25 Years' Experience

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Abstract

Objective: To assess a minimalist approach to anterior cervical discectomy without instrumentation or bone grafting.

Method: A total of 530 operations performed during a 25-year period were evaluated in terms of technique and patient outcome.

Results: Advantages included minimal blood loss, little tissue swelling, less narcotic requirement, fewer days in the hospital, and earlier return to customary activity. During the 2-year follow-up period, a repeat surgical procedure was required in only 2% of the group.

Conclusions: Eliminating spinal fusion from anterior cervical discectomy shortened the operation, reduced the number of surgical instruments needed, and eliminated complications associated with obtaining a graft from the iliac crest or maintaining the bone *in situ*. **Key Words:** Intervertebral disc, cervical vertebra, microsurgical technique.

CLOWARD (1) AND SMITH AND ROBINSON (2) performed anterior discectomy, employing grafts from the ilium, without microsurgical technique for magnification and illumination of the structures of the intervertebral disk space. Fusion was counted upon both to encourage absorption of existing osteophytes and to discourage future osteophyte formation in the foraminal areas. In 1975, Hankinson and Wilson (3) removed herniated cervical discs with the operating microscope but without fusion; the results without a bone graft were entirely comparable. More recently, instrumentation with plates and screws has been used in addition to bone grafts for early stabilization (4). The purpose of this paper is to report a series of 530 anterior cervical discectomies performed over a 25-year period without fusion or instrumentation.

Materials and Methods

The ages of the patients ranged from 19 to 82. A total of 302 men and 228 women came to surgery (Table); 30% were compensation cases. The cases with 4 separate herniated discs underwent separate operations for the 2 superior and 2 inferior levels.

The surgical technique (Figs. 1A and 1B) has previously been published (5). All the patients referred for surgery had radicular pain unrelieved by conservative treatment including traction for at least 6 months, and/or objective findings on neurological examination, such as motor or reflex deficits. MRI (Fig. 2) was performed in every case; over the 25 years, fewer and fewer patients underwent preoperative study by CT as well. Review of the neuroradiologic studies accurately predicted the operative findings.

With the advent of managed care, discharge following surgery has occurred most often on the day following surgery, as long as the dysphagia was minimal and oral intake was adequate. With continuous wearing of a soft collar, the patient

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TABLE
530 Patients with Herniated Cervical Discs

One Level	n	Two Levels	n	Three Levels	n	Four Levels	n
C3-4	11	C4-5+C5-6	70	C4-5,C5-6,C6-7	10	C3-4,C4-5,C5-6, C6-7	2
C4-5	110	C5-6+C6-7	82				
C5-6	153						
C6-7	92						

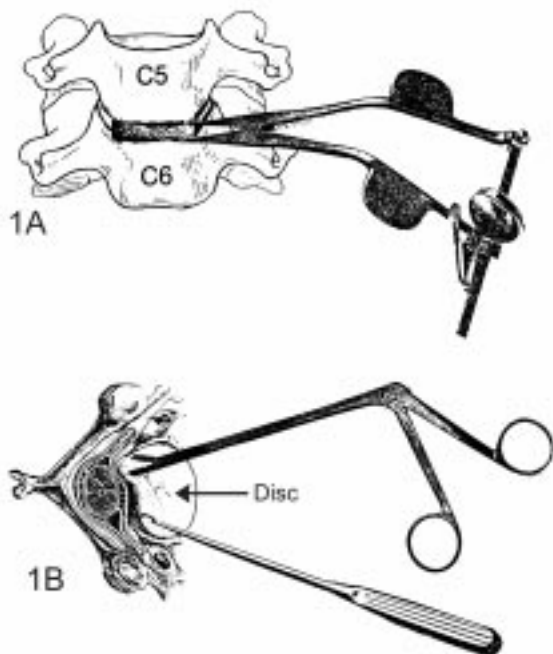


Fig. 1. (A) Artist's drawing of Cloward vertebra spreader in place. (B) Axial view of Cloward forceps and microcurette within a disk space containing a herniated nucleus pulposus.

was not confined to bed rest. Advice was given about performing normal activity, showering, and avoiding driving. A follow-up visit was scheduled after 3 weeks of convalescence at home. Wearing of a collar was tapered over another month. Instruction in corrective exercises was offered, and regular evaluation was done at 2-month intervals for at least one year.

Results

No complication of increased neurological deficit, wound infection, cerebrospinal fluid fistula, direct damage to the esophagus or trachea, or hemorrhage requiring transfusion occurred in my series of 530 anterior cervical discectomies. Three cases of Horner's syndrome were observed, but all resolved within 3 months. Two cases of thrombophlebitis were diagnosed; readmission and prolonged hospitalization with anticoagula-



Fig. 2. Preoperative MRI shows disc herniation (arrow) at the C5-6 level.

tion therapy were prescribed without further complications. One 68-year-old woman who underwent surgery at the C5-6 level developed discitis; with prolonged immobilization in a plastic, molded, posted collar, her pain resolved after fusion took place.

One 48-year-old man who was discharged within 24 hours developed shortness of breath after an episode of prolonged coughing at home; CT (Fig. 3) on readmission documented a prevertebral hematoma causing tracheal and carinal compression. Even though his oxygen saturation never dropped below 98%, tracheostomy and reexploration for evacuation of the 50 cc hematoma were necessary because of stridor and

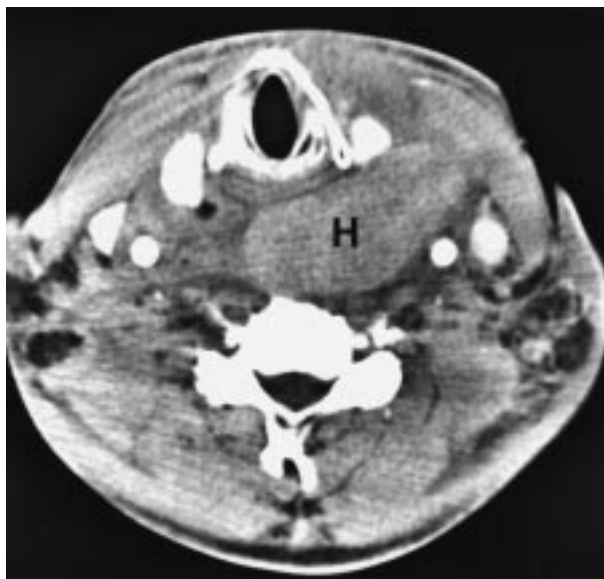


Fig. 3. Postoperative CT of the cervical spine shows the prevertebral hematoma (H) compressing the trachea.

anxiety. The patient was extubated and able to return home in less than 7 days after his original surgery.

Preoperatively, almost all of the patients were debilitated by muscle spasm in their neck and shoulder girdle. Postoperatively, every patient was ambulatory and able to be evaluated at an office visit. In each case, the question was asked, "Are you better?"; 490 replied affirmatively, and 40 said, "No."

The patients who were not improved were reevaluated by MRI; the neuroradiologic imaging revealed postoperative changes at the appropriate level. Twelve patients were reexplored. The fusion and scar made dissection technically difficult. The incision was made to the right of the midline, and disarthrodesis was accomplished with a small power drill. Re-formed osteophytes were found to compromise the foramina. Eight of the 12 patients who underwent second surgery improved symptomatically after reexploration.

Discussion

Eliminating spinal fusion from anterior cervical discectomy has shortened the time required for surgery, reduced the number of surgical instruments needed, and eliminated complications associated with obtaining a graft from the iliac crest or maintaining the bone *in situ*. Microscopic technique involves careful study of the preoperative neuroradiologic studies, planning small incisions and precise anatomical

approaches, and optimal use of magnification and illumination. Operations requiring 60 minutes or less are associated with very low rates of postoperative complications.

The incidence of discitis in the cervical spine (Fig. 4) is far less than in the lumbosacral area, even though the cartilaginous plates of the disk space are regularly scraped with curettes. Horner's syndrome results from manipulation and traction on the cervical sympathetic chain. Some settling of the vertebral bodies, anterior rather than posterior, occurs after discectomy without fusion. The neural foramina may become narrower unless adequate foraminotomy has been performed bilaterally. Spontaneous arthrodesis of the adjacent vertebrae can be verified by flexion and extension x-rays 8–12 weeks postoperatively (Fig. 5A and 5B).

In 1995, Gaetani et al. (6) retrospectively analyzed the clinical long-term results in 153 patients who underwent discectomy without fusion. Excellent or good results were recorded in 91% of the 108 cases with radiculopathy and 58% of the cases with myelopathy. The authors concluded that presentation with pure radicular signs was the most important factor in predicting the surgical result.

In 1998, Savolainen et al. (7) reported a prospective randomized study on the surgical results of 91 patients with single-level cervical root compression. The clinical outcomes were



Fig. 4. Postoperative MRI. Note area of increased signal density (arrow) representing inflammatory process of disc space.

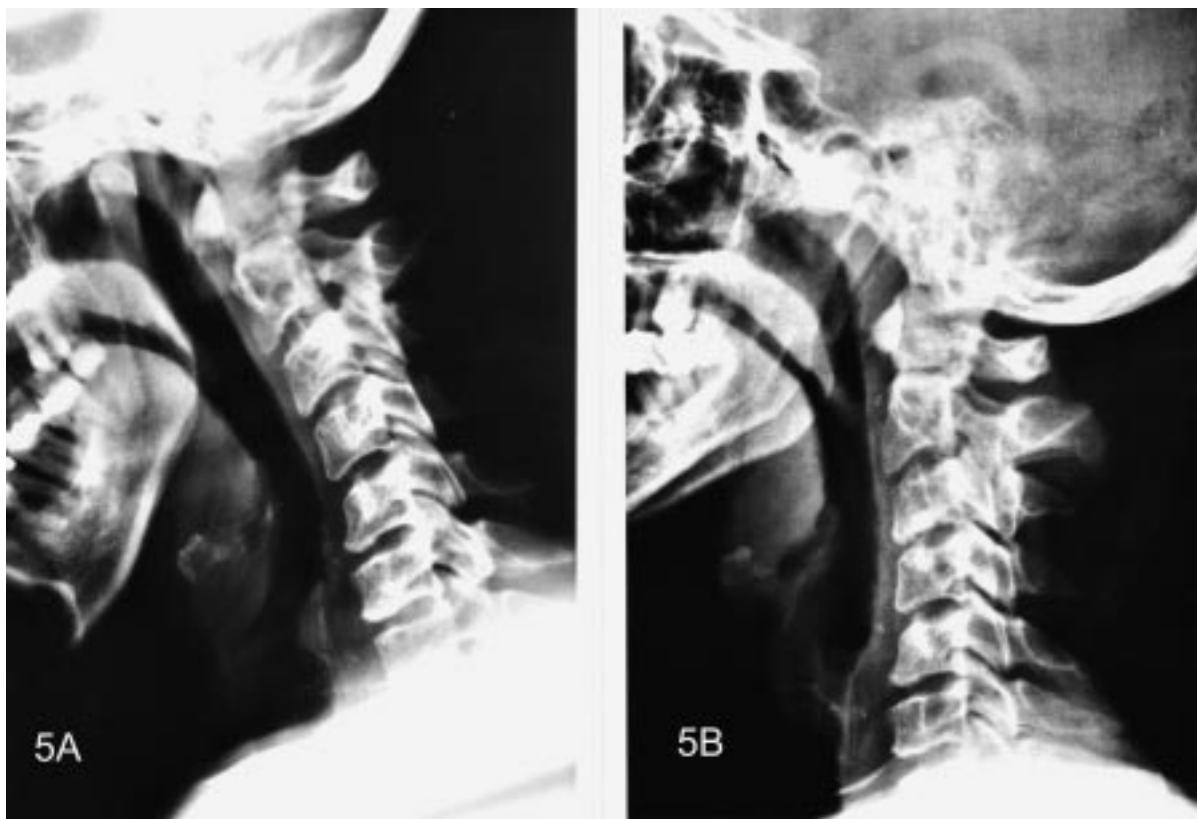


Fig. 5. (A) Lateral flexion and (B) extension x-rays demonstrating postoperative changes and lack of motion at the C5-6 level.

good in 76% of patients treated by simple discectomy, 82% of patients who received bone grafts, and 73% of those who underwent fusion plus plating. Poor results were observed in 0%, 4%, and 4% respectively. They concluded that satisfactory outcomes could be achieved by simple anterior discectomy without fusion or instrumentation.

The most recent retrospective research into the long-term benefit following cervical disc surgery with and without bone graft placement was conducted by questionnaires. In 1998, Thorell et al. (8) reported evidence that patients who underwent fusion did better in terms of pain and normal function. Nevertheless, the published reviews at the end of the article did not agree with these authors' conclusions.

Summary

The minimalist approach to cervical discectomy requires a small number of Cloward instruments, a power drill, fiberoptic headlight, and binocular loupes. The issue of the role in outcome of the use of a bony intervertebral spacer continues to be investigated. Good results (92%) and low

rate of second surgery (2%) were recorded in a series of 530 patients who underwent neurosurgical intervention without fusion over a 25-year period.

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