Spine
Wolters Kluwer Health | Lippincott Williams & Wilkins

20 April 2008 - Volume 33 - Issue 9 - pp 931-939
doi: 10.1097/BRS.0b013e31816c8af7
Randomized Trial

Full-Endoscopic Interlaminar and Transforaminal Lumbar Discectomy Versus Conventional Microsurgical Technique: A Prospective, Randomized, Controlled Study

Ruetten, Sebastian MD, PhD; Komp, Martin MD, PhD; Merk, Harry MD; Godolias, Georgios MD

Abstract

Study Design: Prospective, randomized, controlled study of patients with lumbar disc herniations, operated either in a full-endoscopic or microsurgical technique.

Objective: Comparison of results of lumbar discectomies in full-endoscopic interlaminar and transforaminal technique with the conventional microsurgical technique.

Summary of Background Data: Even with good results, conventional disc operations may result in subsequent damage due to trauma. Endoscopic techniques have become the standard in many areas because of the advantages they offer intraoperatively and after surgery. With the transforaminal and interlaminar techniques, 2 full-endoscopic procedures are available for lumbar disc operations.

Methods: One hundred seventy-eight patients with full-endoscopic or microsurgical discectomy underwent follow-up for 2 years. In addition to general and specific parameters, the following measuring instruments were used: VAS, German version North American Spine Society Instrument, Oswestry Low-Back Pain Disability Questionnaire.

Results: After surgery 82% of the patients no longer had leg pain, and 14% had occasional pain. The clinical results were the same in both groups. The recurrence rate was 6.2% with no difference between the groups. The full-endoscopic techniques brought significant advantages in the following areas: back pain, rehabilitation, complications, and traumatization.

Conclusion. The clinical results of the full-endoscopic technique are equal to those of the microsurgical technique. At the same time, there are advantages in the operation technique and reduced traumatization. With the surgical devices and the possibility of selecting an interlaminar or posterolateral to lateral transforaminal procedure, lumbar disc herniations outside and insidethe spinal canal can be sufficiently removed using the full-endoscopic technique, when taking the appropriate criteria into account. Full-endoscopic surgery is a sufficient and safe supplementation and alternative to microsurgical procedures.

Introduction

In spine surgery, the open interlaminar access has been described since the early 20th century.[1-6] Thirty years after its introduction, alternative methods for operating disc pathologies were developed.[7] The posterolateral access for vertebral body biopsies was described in the late 1940s.[8] Percutaneous operations have been performed since the early 1970s.[9-14] In the late 1970s, a microsurgical procedure involving a microscope was developed to gain interlaminar (IL) access.[9,15-17] Endoscopes have been used since the early 1980s to inspect the intervertebral space after completed open surgery.[18] The full-endoscopic (FE) transforaminal (TF) operation with posterolateral access evolved out of this.[19-34] Endoscope-assisted IL procedures were reported in the literature in the late 1990s.[2,35-38] The lateral access in FE TF surgery to optimize the route to the spinal canal under continuous visualization has been performed since the late 1990s.[39] The development of the FE IL access was seen at the same time.[40-42]

Conventional surgeries have been associated with good results.[43-50] Nonetheless, 1 operative consequence is scarring of the epidural space,[43,51-55] which may be apparent on magnetic resonance imaging[43,56] but

becomes clinically symptomatic in 10% or more of cases[51,52,55] and makes revision surgery more difficult. An analysis of study results revealed the occurrence of operation-induced destabilization due to the necessary resection of spinal canal structures.[1,47,57-62] The point of access influences the stabilization and coordination system in the innervation area of the dorsal nerve roots of the spinal nerves.[53,63,64] The combination of these parameters may explain poor revision-related results.[52,65,66] The use of microsurgical techniques has reduced tissue damage and its consequences.[38,67,68] Although conditions of postoperative pain are treatable,[54,69,70] continuous technical optimization should be attempted. The goal of a new procedure must be to achieve results that commensurate with current results[71] while minimizing traumatization and its negative long-term consequences.

Minimally-invasive techniques can reduce tissue damage and its consequences.[38,67,68] Endoscopic operations have become the standard in many areas. The most widely used FE procedure in patients with lumbar disc disease is TF surgery.[19-23,26-34,72] Laser and bipolar current may be applied.[73-75] Removal of the intra- or extraforaminal sequestered material is technically possible.[26,76] Resection of the sequestered nucleus pulposus material within the spinal canal-that is, a retrograde resection performed intradiscally through the existing anular defect-has been described.[19-21,31,32,34,77-79] Nonetheless, difficulty in achieving an adequate resection of herniated discs within the spinal canal cannot always be excluded.[20,39,80-82] With the lateral approach, the spinal canal can be reached more sufficiently under continuous visualization,[39] But the osseous perimeter of the foramen and the exiting nerve can limit the working mobility and excision of dislocated herniated material.[20,31,39] Moreover, the pelvis and the abdominal structures may block access. Thus, there can be limitations to the TF procedure.[39,40-42] The FE IL access has been developed to enable the extirpation of pathologic entities not successfully achieved using the TF technique.[40-42]

The goal of this prospective, randomized, controlled study was to compare the results of lumbar discectomies in FE technique via IL and TF approach with those of the conventional microsurgical technique.