OBJECTIVE: We compared the intra- and postoperative differences, as well as the final outcome of patients with herniated lumbar discs who underwent either open discectomy (OD) or microendoscopic discectomy (MED).

METHODS: We performed a prospective controlled randomized study of 40 patients with sciatica caused by lumbar disc herniations nonresponsive to conservative treatment who underwent OD or MED with a 24-month follow-up period. Pre- and postoperative neurological status, pain, and functional outcome were evaluated. Other studied variables were the duration of the procedure, blood loss, time of hospital stay, and time to return to work. Statistical analysis with a P value less than 0.005 was carried out.

RESULTS: The only statistically significant differences found were for size of the incision, length of hospital stay, and operative time. The former two were greater in the OD group (P < 0.01 and P = 0.05, respectively), and the latter was greater in the MED group (P < 0.01).

CONCLUSION: The few parameters that were found to be statistically significant between the groups did not affect the overall outcome. In the current series, the final clinical and neurological results were similarly satisfactory in both the OD and the MED groups.

KEY WORDS: Comparative study, Lumbar disc herniation, Microendoscopic discectomy, Open discectomy, Surgery

Lumbar disc herniations are a common cause of sciatica (16). More than half of the affected patients respond to conservative treatment (10, 13). Surgical discectomies, either through an open approach or using the more modern microscopic or endoscopic approaches, are indicated for those patients with persistent incapacitating low back pain and sciatica after at least 6 weeks of treatment or in those with early or progressive neurological impairment (8, 10).

In 1934, Mixter and Barr (9) first described laminectomy and discectomy to treat herniated lumbar discs. Surgical results using these techniques were often poor, especially with pain, mostly because of the extensive muscular dissection required for the open approach (3, 20). To address these issues, Caspar (2), Yasargil (20), and Williams (19) described the microsurgical discectomy technique that involved a monosegmental, minimally invasive approach using specially designed instrumentation and a surgical microscope. In 1971, Simeone (15) described the use of a surgical telescope (loupe) to substitute the microscope, acquiring similar results.

Thus, “microsurgical discectomy” is a term currently used to describe a surgical technique involving a small incision with minimal paravertebral muscle dissection using magnification, which may be either microscopic (19) or using a loupe (16). This is considered the “gold standard” for the treatment of disc herniations.

In 1997, Foley and Smith (7) developed an endoscopic approach as a minimally invasive surgical alternative for the treatment of lumbar disc herniations. The herniated tissue is resected endoscopically through a posterior
approach using a small incision and a tubular retractor (16 or 18 mm in diameter). This microendoscopic discectomy (MED) is thought to cause less tissue damage than standard open microdiscectomy with a marked reduction in postoperative pain and muscle spasm, allowing the procedure to be performed in an outpatient setting and enabling patients to return to their activities sooner (7, 8, 11). It also allows direct vision of the nerve root and bone decompression (12).

Despite all of the technical refinements, surgical treatment of herniated discs still remains controversial (18). Although excellent results have been reported after discectomy, relief of low-back pain has been less predictable (1, 4, 16, 18). Only a small number of studies have compared the outcome of patients using the open discectomy (OD) and MED techniques (14, 16). The objective of the current prospective randomized study was to compare the outcome of patients with persistent sciatica secondary to lumbar disc herniation treated with either OD or MED technique.

**MATERIALS AND METHODS**

After institutional review board approval, patients with sciatica caused by herniated lumbar discs who did not respond to conservative treatment were randomly enrolled in the treatment protocol to undergo either OD or MED between June 2001 and September 2004. The inclusion criteria were the presence of a posterolateral herniated lumbar disc observed on magnetic resonance imaging scans and the persistence of sciatica after 4 to 8 weeks of conservative treatment with rest, analgesia, nonsteroidal anti-inflammatory drugs, and physical therapy. The exclusion criteria were as follows: age older than 60 years, previous surgery, associated lumbar spine stenosis, foraminal or extraforaminal disc herniations, spondylolisthesis, and workers’ compensation payments. Only those patients with a final postoperative follow-up period of at least 2 years were included in this study.

After the inclusion criteria were met and informed consent was obtained, patients were allocated randomly into one of two groups: Group 1 underwent OD; and Group 2 underwent MED. The surgical procedures were performed under general anesthesia with the patient in the prone position. Prophylaxis with a first-generation cephalosporin was introduced 1 hour before anesthesia and kept for 8 hours after the procedure.

Patients in Group 1 underwent OD following Caspar’s technique modified only by the use of a surgical magnifying loupe of ×2.5 (Designs for Vision, Inc., Ronkonkoma, NY) and a halogen headlight (Designs for Vision, Inc.), instead of the surgical microscope (3). In this technique the paravertebral muscles are swept laterally from the lamina in a subperiosteal plane, using the lamina as a landmark. A self-retaining retractor is placed, and the discectomy is performed using a magnifying surgical loupe. Patients in Group 2 underwent MED following the technique described by Foley and Smith (7).

The surgical variables analyzed were the level and side of the herniated disc, side of root compression, duration of the procedure, blood loss, presence of complications, duration of hospital stay, opioid administration, and incision size. Postoperative braces were not used, and the patients were kept in the hospital until adequate pain control was achieved.

Pre- and postoperative evaluation consisted of a neurological examination, the Visual Analogue Scale (VAS), and the Oswestry Disability Index (5, 6, 17). The surgical wound pain was assessed 12 hours after surgery by using the VAS. The VAS scores the intensity of pain from 0 (absence of pain) to 10 (worst pain ever experienced) (17). Clinical neurological status was evaluated using the Lasegue test, motor assessment by muscle strength, and testing of the reflexes and sensibility. Functional outcome was evaluated using the Oswestry Disability Index (6). The patients were reevaluated 1, 3, 6, 12, and 24 months after surgery. The time required for patients to return to work was also registered.

Data were analyzed using the χ² and Fisher exact tests, as well as Student’s t and Mann-Whitney tests when applicable, with a significance level established at 95% (P < 0.05) and statistical power established at 90% (β = 0.10).

**RESULTS**

A total of 40 patients were enrolled, 19 in Group 1 and 21 in Group 2 (Table 1). The mean postoperative follow-up period was 36 months in Group 1 (range, 24–46 mo) and 36.2 months in Group 2 (range, 25–56 mo).

In Group 1 (OD), there were 13 men and 6 women, with a mean age of 46 ± 12.4 years. The vertebral level affected was L4–L5 in 11 patients (57.9%) and L5–S1 in eight patients (42.1%); the left side was most commonly affected (12 patients [63%]). All patients in Group 1 presented with preoperative neurological impairment; 100% had a positive Lasegue sign (19 out of 19), 100% had motor deficits (19 out of 19), 74% had sensory deficits (14 out of 19), and 63% had impaired or absent reflexes (12 out of 19). After 6 months of follow-up, 37% had motor deficit, 42% had sensory deficit, and 63% had altered reflexes. After 12 months, these percentages changed to 26, 42 and 63%, respectively, and after 24 months, they changed to 26, 37, and 58%, respectively. One patient presented recurrence of the herniation 24 months after surgery and underwent another operation.

Group 2 (MED) was composed of 10 men and 11 women with a mean age of 42.0 ± 10.7 years. The vertebral level affected was L2–L3 in one patient (4.8%), L3–L4 in one patient (4.8%), L4–L5 in 11 patients (52.4%), and L5–S1 in eight patients (38.1%). The left side was most commonly affected (13 patients, 61.9%). All patients in this group presented with preoperative neurological impairment; 90% with a positive Lasegue sign (19 out of 21), 100% with motor deficits (21 out of 21), 91% with sensory deficits (20 out of 21), and 86% with impaired or absent reflexes (18 out of 21). After 6 months of follow-up, 67% had motor deficit, 67% had sensory deficit, and 62% had altered reflexes. After 12 months, these percentages changed to 38, 48, and 57%, respectively, and after 24 months, they changed to 33, 38, and 48%, respectively (Table 2). Opioid therapy was used in three patients (14%). The complications observed in this group were a recurrence of the disc herniation after 18 months requiring surgical treatment in one patient, a seroma that resolved spontaneously with complete recovery in one patient, and a dural tear that resolved with conservative treatment prolonging hospital stay to 48 hours in one patient.

When comparing Group 1 (OD) with Group 2 (MED), the only statistically significant differences found were for the following variables: the size of the incision, length of hospi-
The two former variables were greater in the OD group \((P < 0.01\) and \(P = 0.05\), respectively), and the latter two were greater in the MED group \((P < 0.01\) in both) (Tables 1 and 3).

The VAS score (Fig. 1) and Oswestry Disability Index (Fig. 2) improved significantly in Groups 1 and 2 postoperatively, and there was only one statistically significant difference in VAS after 12 hours of surgery (Table 3). The mean time to return to work and normal activities was 21 days in both groups, ranging from 7 to 60 days in Group 1 and from 4 to 45 days in Group 2. The difference between the groups was not found to be statistically significant \((P = 0.79)\).

### DISCUSSION

The demands of modern society create the need for faster recoveries, allowing patients to resume their normal activities sooner. Technical developments in the past decades have made the treatment of herniated discs safer and less invasive. By using microsurgical or microendoscopic approaches through small incisions, nerve root decompression is achieved with minimal risk of complication and preserving normal anatomy (19). Foley and Smith (7) believe that MED is superior to other percutaneous techniques for combining the standard lumbar microsurgical technique with endoscopy, allowing the surgeon...
to address free-fragment disc pathology and lateral recess stenosis through an even smaller incision than OD and with less trauma. The improved optical conditions allow better differentiation of the anatomic structures with gentler manipulation of the nerve root and dural sac (2, 3).

The high rate of early neurological deficits reported in the current series may reflect the greater number of acute cases and the volume of the herniation. Although no statistically significant differences were found regarding neurological recovery between the groups, the OD group recovered both motor and sensory functions earlier than the MED group. However, after a 24-month follow-up period, both groups presented similar results.

The operative time was greater in the MED group, but within the average reported by surgeons experienced with the technique (2, 3, 11, 19). The hospital stay was longer in the OD group, but only by an average of 2 hours, which represents little significant clinical or economical difference. Clinical outcome was satisfactory and comparable in both groups.

The superiority of microdiscectomy over traditional discectomy has been widely proven (7, 10, 11, 20). However, there is no randomized clinical study comparing the OD and MED techniques. To our knowledge, this is the first prospective randomized clinical study to compare the clinical outcome and technical aspects of both techniques.

CONCLUSION

The few parameters that were found to be statistically different between the groups (incision size, length of hospitalization, operative time, and VAS at 12 hours) did not affect the overall outcome. Up to the present, the current study included, the technical superiority of the videoendoscopic technique has not been proven, but it may become an interesting alternative for those patients who require faster recoveries.

REFERENCES