Percutaneous Endoscopic Lumbar Discectomy Case Series

A retrospective study was performed on patients with L4/5 lumbar disc herniation treated using MED (n = 249) or FED (n = 124). A 16-mm tubular retractor and endoscope was used for MED, while a 4.1-mm working channel endoscope was used for FED. Patient background and operative data were collected. The Oswestry Disability Index (ODI) and European Quality of Life-5 Dimensions (EQ-5D) scores were recorded preoperatively and at 1 and 2 years postsurgery.

The background data of the two groups were similar. The mean operation times for MED and FED were 59.3 and 47.7 min (respectively), and the mean volumes of removed nucleus pulposus were .65 and 1.03 g, respectively. These differences were significant (P < .001). Six dural tears and one postoperative hematoma were observed in the MED group; none were observed in the FED group. During the follow-up period, 16 MED and 7 FED patients required re-operation due to recurrence (P = 1.00). Although the ODI and EQ-5D scores significantly improved at 1 and 2 years postsurgery in both groups, the differences were not statistically significant.

Operative outcomes were almost identical in both groups. We did not observe any operative or postoperative complications in FED. We, therefore, recommend FED as the first option for the treatment of L4/5 LDH since it has a better safety profile and is minimally invasive [1)].

2021

33 patients underwent FED under local anesthesia. Clinical assessments and MRI examinations were performed preoperatively and immediately (within 1 week) and late (at 3 and 12 months) postoperatively. Residual disk bulging after surgery was classified into four grades compared with preoperative MRI findings: none (grade A), <25% (grade B), 25-75% (grade C), and >75% (grade D).

MRI at postoperative week 1 showed grade B residual disk bulging in 9 patients, grade C residual disk bulging in 8 patients, and grade D residual disk bulging in 16 patients. Improvement was seen at postoperative month 3 (grade A in 18 patients, grade B in 10 patients, and grade C in 5 patients) and at postoperative month 12 (grade A in 29 patients, grade B in 3 patients, and grade C in 1 patient). Visual analog scale scores and the Japanese Orthopaedic Association scores showed significant differences at 1 week, 3 months, and 12 months after surgery.

Conclusion: Postoperative MRI findings within 1 week of FED showed grade C or D residual disk material in 24 of 33 patients (73%). Clinical symptoms improved in the early postoperative period, even though residual disk bulging was present. Persisting residual bulging in the early stage following surgery may not correlate with clinical symptoms [2)].

2020

Full endoscopic lumbar discectomy (FELD) for lumbar disc herniation (LDH) has become popular in recent years. Previous studies have proven the efficacy, but few have discussed the possible risk factors of poor outcome. Chen et al. reviewed patients who underwent FELD at Changhua Christian

Hospital in the past 10 years and sought to identify factors associated with poor surgical outcomes and re-operations.

They retrospectively reviewed records from mid-2009 to mid-2018. Patients had undergone FELD and follow-up for ≥1 year were included. Factors included in the outcome evaluations were age, sex, surgical time, body mass index, surgical methods, disc herniation type, extension of herniation, degree of canal compromised, disc degenerative grade, smoking and alcohol use, surgical lumbar level, symptom duration, Oswestry low back disability index, and visual analog scale score. We had evolved from inside-out methods to outside-in methods after 2016, thus, we included this factor in the analysis. The primary outcomes of interest were poor/fair MacNab score and re-operation.

From mid-2009 to mid-2018, 521 patients met our criteria and were analyzed. The median follow-up was 1685 days (range, 523-3923 days). Thirty-one (6.0%) patients had poor surgical outcomes (fair/poor MacNab score) and 45 (8.6%) patients required re-operation. Prolapsed herniated disc ($P < 0.001$), higher disc degenerative grade ($P = 0.047$), higher lumbar level ($P = 0.026$), longer preoperative symptoms ($P < 0.001$), and surgery before 2017 (outside-in technique, $P = 0.020$) were significant factors associated with poor outcomes in univariate analyses. In multivariate analyses, prolapsed herniated disc ($P < 0.001$), higher disc degenerative grade ($P = 0.030$), and higher lumbar level ($P = 0.046$) were statistically significant. The most common adverse symptom was numbness. Factors possibly associated with higher re-operation rate were older age ($P = 0.045$), alcohol use ($P = 0.073$) and higher lumbar level ($P = 0.069$). Only alcohol use showed statistically significant re-operation rates in multivariate analyses ($P = 0.035$).

For treating LDH by FELD, they concluded that prolapsed disc, higher disc degenerative grade, higher lumbar level, and longer preoperative symptom duration were possibly associated with unsatisfactory surgical outcomes (poor/fair MacNab score). The outside-in technique might be superior to the inside-out technique. Older age and alcohol use might be associated with a higher re-operation rate [3].

The medical records of patients admitted for LDH from September 2016 to December 2018 were collected, and the patients were followed up for 3 months to evaluate the relief of their clinical symptoms. Preoperative and postoperative total scores and subitem scores of SBI were compared to evaluate the relief of pain, numbness, and weakness. Surgical outcomes of PELD were evaluated by the Nakai score, and patients were divided into two groups accordingly, which were the relief group (excellent and good in the Nakai score) and the less relief group (fair and poor in the Nakai score). Risk factors for PELD outcomes and preoperative presence of numbness and/or weakness were analyzed by the logistic model, and a p-value of less than 0.05 was considered significant.

A total of 86 patients met the inclusion criteria and acquired 3 months follow-up. Relief extent of pain, numbness, and weakness, was 82%, 41%, and 21%, respectively. There were 71 cases in the relief group and 15 cases in the less relief group. Results of the logistic regression analysis showed that the preoperative pain score of SBI (p=0.002; OR: 1.647 (1.199-2.261)) was a relatively independent risk factor for PELD outcomes, and multiplicativity of duration of preoperative symptoms and imaging grade [p=0.004; OR: 1.015 (1.005-1.026)] was a relatively independent risk factor for preoperative presence of numbness and/or weakness.

PELD had a good curative effect in the treatment of LDH. Patients of LDH recovered best from pain, followed by numbness and weakness after PELD. A higher level of patients self-reported preoperative pain indicated a better surgical outcome for LDH patients, and preoperative long duration of

symptoms together with severe compression of nerve root significantly increased the risk of presenting numbness and/or weakness [4].

Seventeen patients were treated with PELD for 11 lumbar disk herniations and 6 lumbar spinal stenoses. Preoperative back and leg visual analog scale (VAS-B and VAS-L, respectively) scores and the Oswestry Disability Index (ODI) were recorded and compared with corresponding values on final follow-up. Results There was an average follow-up of 14 months. For the disk herniation group, preoperative VAS-L (7.8750 ± 1.24) and ODI (51.73 ± 18.57) was significantly different from follow-up postoperative VAS-L (0.87 ± 0.64, p = 0.000) and ODI (9.37 ± 4.83, p = 0.001). For the stenosis group, preoperative VAS-B (6.17 ± 1.94), VAS-L(7.83 ± 1.47), and ODI (63.27 ± 7.67) were significantly different from follow-up postoperative values (2.5 ± 1.04, p = 0.022; 2.00 ± 1.67, p = 0.001; 24.00 ± 6.45, p = 0.000, respectively). One patient underwent revision microdiskectomy for incomplete decompression.

BELD can achieve a similar decompression effect as microdiskectomy and unilateral laminotomy for bilateral decompression with a smaller incision than tubular diskectomy [5].

In one report [6] of 326 patients with L4–5 HLD, only 8 (2.4%) met study criteria (no previous operation, failure of conservative treatment, imaging study proving disc protrusion followed by discography to R/O “disc perforation”) for PELD. Of these 8, only 3 were reported as having a good result. This study is not adequate for evaluating the technique.

1)
Fujita M, Inui T, Oshima Y, Iwai H, Inanami H, Koga H. Comparison of the Outcomes of Microendoscopic Discectomy Versus Full-Endoscopic Discectomy for the Treatment of L4/5 Lumbar Disc Herniation. Global Spine J. 2022 Sep 22:21925682221127997. doi: 10.1177/21925682221127997. Epub ahead of print. PMID: 36134544.
2)
Terai T, Chikawa T, Henmi T, Sairyo K. Magnetic Resonance Imaging Findings and Clinical Outcomes in the Early Postoperative Period after Full Endoscopic Diskectomy for Lumbar Disk Herniation. J Neurol Surg A Cent Eur Neurosurg. 2021 May 24. doi: 10.1055/s-0041-1725953. Epub ahead of print. PMID: 34030188.
3)
Chen CM, Sun LW, Tseng C, Chen YC, Wang GC. Surgical outcomes of full endoscopic spinal surgery for lumbar disc herniation over a 10-year period: A retrospective study. PLoS One. 2020 Nov 5;15(11):e0241494. doi: 10.1371/journal.pone.0241494. PMID: 33152001.
4)
Wang Y, Gao F, Zou H. Numbness and Weakness Recovered at a Less Extent in Patients with Lumbar Disc Herniation after Percutaneous Endoscopic Lumbar Discectomy. Pain Res Manag. 2019 Dec 23;2019:4642701. doi: 10.1155/2019/4642701. eCollection 2019. PubMed PMID: 31949548; PubMed Central PMCID: PMC6942906.
5)
Eun SS, Eum JH, Lee SH, Sabal LA. Biportal Endoscopic Lumbar Decompression for Lumbar Disk Herniation and Spinal Canal Stenosis: A Technical Note. J Neurol Surg A Cent Eur Neurosurg. 2016 Sep 21. [Epub ahead of print] PubMed PMID: 27652804.
6)
Kleinpeter G, Markowitsch MM, Bock F. Percutaneous Endoscopic Lumbar Discectomy: Minimally Invasive, But Perhaps Only Minimally Useful? Surg Neurol. 1995; 43:534–541