

SURGICAL TREATMENT OF CERVICAL INTERVERTEBRAL DISC HERNIATIONS USING
POSTERIOR ENDOSCOPIC DISCECTOMY

Shatursunov Shokhaydar Shaaliyevich - DSc, Professor-Consultant, Department of Traumatology and Orthopedics, Tashkent State Medical University

Musaev Rustam Siddikovich - PhD in Medicine, Orthopedic Trauma Surgeon, Head of the Vertebrology Department, Republican Specialized Scientific Research Center of Traumatology and Orthopedics of the Republic of Uzbekistan, Tashkent, Uzbekistan.

Farrukh Rustamovich Maxamatov - PhD Student, Republican Specialized Scientific Research Center of Traumatology and Orthopedics of the Republic of Uzbekistan, Tashkent, Uzbekistan.

Umidbek Alisherovich Dusmatov - Clinical Resident, Republican Specialized Scientific Research Center of Traumatology and Orthopedics of the Republic of Uzbekistan, Tashkent, Uzbekistan.

Abstract. Relevance. Cervical intervertebral disc herniation is a common cause of cervical radiculopathy, pain, sensory and motor deficits, and reduced quality of life. Posterior endoscopic discectomy represents a minimally invasive alternative to conventional anterior cervical surgery, allowing neural decompression while minimizing surgical trauma.

Objective. To evaluate the clinical efficacy of posterior endoscopic discectomy in patients with cervical intervertebral disc herniation during a 12-month follow-up period.

Materials and Methods. The study included 30 patients with cervical intervertebral disc herniations who underwent posterior endoscopic discectomy between 2021 and 2025. There were 19 men (65%) and 11 women (35%). All patients underwent MRI, radiography, and MSCT. The most commonly affected levels were C5–C6 (35%), C4–C5 (28%), C6–C7 (20%), and C3–C4 (17%). Operative time ranged from 30 to 45 minutes, with a mean blood loss of 15 ± 3 ml. Clinical outcomes were assessed using the Visual Analog Scale (VAS) during a 12-month follow-up.

Results. Preoperative VAS scores ranged from 6 to 8 points and progressively decreased to 0–1 points at 12 months. No neurological or other significant postoperative complications were observed. Recurrent disc herniation occurred in 2 patients (6.7%) during the follow-up period.

Conclusion. Posterior endoscopic discectomy is an effective minimally invasive technique for selected patients with cervical intervertebral disc herniation. It provides adequate neural decompression with minimal surgical trauma, short operative time, low blood loss, and sustained clinical improvement during the first postoperative year.

Keywords: cervical spine, intervertebral disc herniation, cervical radiculopathy, posterior endoscopic discectomy, minimally invasive surgery, VAS.

Аннотация. Актуальность. Грыжи межпозвонковых дисков шейного отдела позвоночника являются одной из распространённых причин радикулопатии, болевого синдрома, неврологических нарушений и снижения качества жизни пациентов. Задняя эндоскопическая дискэктомия представляет собой малоинвазивную альтернативу традиционным хирургическим вмешательствам.

Цель. Оценить клиническую эффективность задней эндоскопической дискэктомии при грыжах межпозвонковых дисков шейного отдела позвоночника.

Материалы и методы. В исследование включены 30 пациентов (19 мужчин и 11 женщин), которым в период с 2021 по 2025 год была выполнена задняя эндоскопическая дискэктомия. Грыжи локализовались на уровнях C3–C4 (17%), C4–C5 (28%), C5–C6 (35%) и C6–C7 (20%). Продолжительность операции составила 30–45 минут, средняя

интраоперационная кровопотеря — 15 ± 3 мл. Клинические результаты оценивали по визуально-аналоговой шкале (ВАШ) в течение 12 месяцев наблюдения.

Результаты. До операции интенсивность болевого синдрома по ВАШ составляла 6–8 баллов и постепенно снизилась до 0–1 балла через 12 месяцев. Неврологических и других значимых послеоперационных осложнений не отмечено. Рецидив грыжи межпозвонкового диска выявлен у 2 пациентов (6,7%).

Заключение. Задняя эндоскопическая дискэктомия является эффективным малоинвазивным методом хирургического лечения отдельных форм грыж межпозвонковых дисков шейного отдела позвоночника, обеспечивающим адекватную декомпрессию невралных структур при минимальной хирургической травме, низкой кровопотере и стойком клиническом улучшении.

Ключевые слова: грыжа межпозвонкового диска шейного отдела, шейная радикулопатия, задняя эндоскопическая дискэктомия, малоинвазивная хирургия, ВАШ.

Annotatsiya. Dolzarbligi. Umurtqa pog'onasi bo'yin qismi umurtqalararo disk churrallari radikulopatiya, og'riq sindromi, nevrologik buzilishlar va bemorlar hayot sifatining pasayishiga olib keluvchi keng tarqalgan sabablardan biridir. Orqa endoskopik disektomiya an'anaviy jarrohlik usullariga nisbatan kam invaziv muqobil usul hisoblanadi.

Maqsad. Umurtqa pog'onasi bo'yin qismi umurtqalararo disk churrallarini davolashda orqa endoskopik disektomiyaning klinik samaradorligini baholash.

Materiallar va usullar. Tadqiqotga 2021–2025-yillarda orqa endoskopik disektomiya bajarilgan 30 nafar bemor (19 erkak va 11 ayol) kiritildi. Disk churrallari C3–C4 (17%), C4–C5 (28%), C5–C6 (35%) va C6–C7 (20%) segmentlarida joylashgan. Operatsiya davomiyligi 30–45 daqiqani, o'rtacha intraoperatsion qon yo'qotish 15 ± 3 ml ni tashkil etdi. Klinik natijalar 12 oylik kuzatuv davomida vizual analog shkala (VAS) yordamida baholandi.

Natijalar. Operatsiyadan oldin VAS bo'yicha og'riq intensivligi 6–8 ballni tashkil etgan bo'lsa, 12 oydan so'ng bosqichma-bosqich 0–1 ballgacha kamaydi. Nevrologik va boshqa ahamiyatli operatsiyadan keyingi asoratlar kuzatilmadi. Umurtqalararo disk churrasining qaytalanishi 2 nafar bemorda (6,7%) aniqlandi.

Xulosa. Orqa endoskopik disektomiya umurtqa pog'onasi bo'yin qismi umurtqalararo disk churrallarining ayrim shakllarini jarrohlik yo'li bilan davolashda samarali kam invaziv usul bo'lib, minimal jarrohlik travmasi va kam qon yo'qotish bilan nevrал tuzilmalarning yetarli dekompressiyasini hamda barqaror klinik yaxshilanishni ta'minlaydi.

Kalit so'zlar: bo'yin qismi disk churrasi, servikal radikulopatiya, orqa endoskopik disektomiya, kam invaziv jarrohlik, VAS.

Introduction. Degenerative diseases of the cervical spine are one of the most frequent causes of chronic pain in the neck and upper extremity, restriction of physical activity and reduced quality of life. Herniation of the intervertebral disk with nerve root compression, leading to cervical radiculopathy, is one of the most clinically significant degenerative changes. The clinical presentation may include severe pain radiating into the upper extremity, paresthesia, sensory disturbances, decreased muscle strength and limitation of functional activity [1,2].

Conservative therapy is the initial treatment for most patients with cervical radiculopathy. Persistent severe radicular pain, progressive neurological symptoms or failure to respond to conservative treatment may be an indication for surgical decompression. The current clinical guidelines highlight the significance of a customized approach to surgical decisions based on clinical symptoms, lesion morphology, and the characteristics of compression of neural structures [1].

Anterior cervical discectomy and stabilization has been one of the most commonly performed surgical procedures for the treatment of symptomatic cervical intervertebral disk herniation for many years. This approach allows direct access to the intervertebral disk and adequate decompression of neural elements. However, anterior surgery involves dissection through the soft tissue of the anterior neck, and is associated with potential complications such as dysphagia, dysphonia, recurrent laryngeal nerve injury, postoperative hematoma, pseudarthrosis and others [3,4].

Minimally invasive spinal surgery has introduced alternative decompression techniques that seek to minimize injury to the paraspinal muscles and ligamentous structures while maintaining motion at the operated level. Posterior cervical foraminotomy has been one such traditional technique. Progress in endoscopic technology has resulted in the transition from open and microscopic foraminotomy to endoscopic decompression [5–7].

The development of posterior endoscopic surgery for the cervical spine was a major step in the evolution of this technology. Ruetten et al. reported the use of a posterior endoscopic approach for the treatment of lateral cervical intervertebral disk herniations and demonstrated the feasibility of effective nerve root decompression by a minimally invasive approach [7]. Since then, many studies have demonstrated the efficacy of this technique in the treatment of cervical radiculopathy [8–12].

There are a few possible benefits of the posterior endoscopic approach. When compared to anterior surgery, it avoids dissection of the tissues on the anterior aspect of the neck and obviates direct manipulation of the trachea, esophagus and recurrent laryngeal nerve. Moreover, when total disk removal and interbody fusion are not necessary, mobility at the corresponding spinal segment can be maintained [3,7,13].

Recent systematic reviews have confirmed the clinical efficacy of endoscopic cervical spine surgery. In a systematic review of 30 studies, significant reductions in neck pain and radicular pain as well as improvement in functional outcomes were reported based on standardized scales such as the Visual Analog Scale (VAS) and the Neck Disability Index (NDI) [14]. Furthermore, the authors reported high patient satisfaction rates, >85% in the majority of the included studies [14].

The meta-analysis of the efficacy and safety of percutaneous endoscopic cervical discectomy showed significantly lower VAS scores at one week after surgery and at the last follow-up compared with baseline values. The authors also reported low rates of postoperative recurrence of pain and adverse events [15].

The posterior endoscopic approach for lateral and foraminal disk herniations is of particular interest, because nerve root compression can be addressed directly at the site where it leaves the spinal canal. A study by Keorochana et al. demonstrated the importance of accurate identification of the relationships of bony landmarks, dural sac, nerve root and intervertebral disk in posterior endoscopic foraminotomy and discectomy [16].

However, the posterior endoscopic surgery is not free from possible complications. Transient sensory disturbances, nerve root injury, dural injury, epidural hematoma, persistent radicular pain and recurrent disk herniation may occur [17,18]. A recent review of complications of full-endoscopic posterior spinal surgery emphasizes the importance of careful pre-operative planning and strict adherence to decompression techniques to minimize the risk of injury to neural structures [17]. In this context, the analysis of clinical results after posterior endoscopic discectomy is of considerable interest.

The aim of this study was to evaluate the clinical effectiveness and to present the surgical technique of posterior endoscopic discectomy for cervical intervertebral disk herniation, assessing the changes in the intensity of pain and clinical status of patients during the 12-month postoperative observation period.

Material and Methods. The authors performed a clinical trial of the results of surgical treatment in 30 patients with cervical intervertebral disk herniations. All the patients were operated on between 2021 and 2025 with a posterior endoscopic approach.

The postoperative follow-up was 12 months. The main objective of the analysis was to evaluate the clinical results after surgical decompression, mainly concerning the intensity of pain. The study population was male dominated, with 65% of patients being male and 35% female. This was 19 men and 11 women in absolute numbers.

The study population was distributed by age as follows. One patient was <30 years old, representing 3% of the entire cohort. Five patients were between 30 and 40 years old (17%), eight patients were between 40 and 50 years old (25%), nine patients were between 50 and 60 years old (30%), six patients were between 60 and 70 years old (20%) and one patient was over 70 years old (5%).

Thus, most of the patients were in the age group of 50-60 years. The majority of the patients were in the 40 - 70year age group, which is the age in life when the degenerative changes of the cervical intervertebral disks become clinically significant.

Preoperatively, all patients underwent a thorough radiological evaluation including magnetic resonance imaging (MRI), standard radiography of the cervical spine and multidetector computed tomography (MDCT).

MRI was used primarily to assess the neural structures and intervertebral disks. The examination evaluated the presence and magnitude of disk herniation, its direction, the relation of the herniated fragment to the dural sac and nerve root, and the extent of degenerative changes.

Radiographs were obtained to evaluate the alignment and axis of the cervical spine, the state of the intervertebral spaces and to rule out significant instability. When clinically indicated, dynamic flexion-extension radiographs were obtained.

Detailed evaluation of the bony anatomy, including facet joints, interlaminar space and other relevant osseous structures, was performed with MDCT for planning a posterior endoscopic approach.

The use of MRI, radiography and MDCT in combination allowed not only the estimation of the intervertebral disk pathology but also the assessment of anatomical features relevant to the safety of the surgical approach.

The most common level of herniation of the cervical inter-vertebral disk was C5-C6, constituting 35% of the cases. The C4-C5 level was involved in 28% of cases. involvement was at C6-C7 level in 20% of the cases and C3-C4 in 17% of the cases.

The levels affected in the study group were distributed as follows: C3-C4 17%; C4-C5 28%; C5-C6 35%; C6-C7 20%; No cases of C2-C3 level were identified in the study cohort.

Interestingly, this distribution was generally similar to a large clinical series of degenerative cervical disk herniation patients, in which the most common level of herniation was C5-C6 (34.8%), followed by C4-C5 (28.1%), C6-C7 (18.9%), and C3-C4 (17.3%) [19].

These findings suggest that the distribution of affected levels in our cohort was not significantly different from what has been reported in the contemporary clinical literature.

Posterior endoscopic discectomy was performed as a surgical treatment. The patient was positioned on the operating table in a way which permitted safe access to the posterior structures of the cervical spine. The target spinal level was fluoroscopically identified after induction of anesthesia and stabilization of the head.

The target level was identified, and then a small skin incision was made over the interlaminar space. Next, the working channel and the endoscopic system were advanced sequentially thru the incision.

The posterior spinal elements were identified under direct endoscopic vision and the anatomical landmarks for safe decompression were identified. Depending on the degree of pathology and individual anatomic features, an interlaminar working window was created with the least required resection of the bony structures.

All patients were recommended to use a cervical collar for 1 month after surgery. The time of immobilization was determined by the need to prevent excessive loading of the operated part of the spine in the early postoperative period.

Patients were told to avoid heavy lifting, sudden neck movements and vigorous physical activity in the early postoperative period. The level of physical activity was gradually increased according to the clinical condition of the patient, after the period of wearing the collar has been over.

All the patients were regularly followed up for 12 months after the surgical treatment. Evaluation of Clinical Effectiveness. The primary clinical outcome was the change in pain intensity measured by the Visual Analog Scale (VAS). Before the operation, the pain intensity was 6–8 points, indicating the presence of pain of clinical relevance. After 1 week of surgery, VAS scores decreased to 4–6 points. Two weeks after the surgery, the pain intensity decreased to 3–4 points. VAS scores decreased to 2–3 points at 3-month follow-up. The intensity of pain at 6 months after the operation was 1–2 points. 12 months: VAS 0-1 point. During the first year after surgery, there was a progressive decrease in the intensity of pain.

Follow-up period	VAS score, points
Preoperative	6–8
1 week after surgery	4–6
2 weeks after surgery	3–4
3 months	2–3
6 months	1–2

The most significant improvement was observed in the first few weeks after surgery, and then the pain intensity gradually decreased further.

This trend is consistent with international studies' findings, where posterior endoscopic cervical discectomy was associated with a significant decrease in VAS scores in the early postoperative period, with sustained clinical improvement in the long-term follow-up [8,15].

Results. During the whole follow-up period, positive clinical outcomes were observed. The pain intensity before the surgical treatment was 6–8 points on the VAS. One week after the surgery the pain intensity decreased to 4–6 points. The score decreased to 3-4 points at two weeks, 2-3 points at three months, 1-2 points at six months and 0-1 points at 12 months.

Therefore, at the end of the follow-up period, most patients had either complete pain resolution or minimal residual pain.

Subjective gain in overall functional status and quality of life paralleled the gain in pain. The reduction in pain enabled patients to gradually return to their normal physical activities and daily routines.

However, note that in the present study, a separate validated quality-of-life instrument was not used. Thus, the improvement of quality of life was evaluated mainly on a clinical basis by changes in pain intensity and functional status. This should be viewed as one of the limitations of the study. No neurological postoperative complications were observed during the 12-month follow-up period.

There were no cases of clinically significant postoperative neurological deterioration, nerve root injury, dural injury, postoperative infection or other major surgical complications.

This finding is of practical importance, because injury of neural structure and injury of dura are among the most commonly discussed complications of posterior endoscopic cervical spine surgery [17,18]. In a systematic review by Ju et al., the most common complications of

posterior endoscopic approach included transient dysesthesia, dural injury, motor deficits of the upper extremity and persistent arm pain [18].

At the 12-month follow-up after surgery, recurrent intervertebral disk herniation was observed in two patients. The rate of recurrence was therefore 6.7%.

Recurrences were seen in patients of 55 and 63 years of age. Recurrence might be linked to ongoing intervertebral disk degeneration and increased mechanical loading of the cervical spine given the patients' age and factors associated with ongoing spinal degeneration and lifestyle characteristics.

However, the present study cannot determine any causal relationship between age, lifestyle and recurrence as this would require a dedicated risk factor analysis. Thus, this finding should be interpreted as a clinical observation and not as evidence of a causal relationship.

The observed rate of recurrence is comparable to the range reported in the literature. A review of complications related to posterior endoscopic surgery reported recurrence at the operated level in different surgical series with values around 3.4% in a large series and 4% in another [17]. The authors also noted a large range of recurrence rates across studies [17].

Thus, the recurrence rate of 6.7% in our small cohort does not allow us to conclude that the procedure has an increased risk of recurrence. However, it highlights the need for continued postoperative surveillance after endoscopic discectomy.

Discussion. The findings of this study show the clinical effectiveness of the posterior endoscopic discectomy for patients with symptomatic cervical intervertebral disk herniation. The main finding of the study was a progressive decrease in pain intensity. Baseline VAS scores were 6–8 points, whereas after 12 months of surgery they were 0–1 points. Thus, surgical decompression in most cases was associated with almost complete resolution of pain.

The clinical improvement observed corresponds to the results of international studies. Huan et al. assessed posterior endoscopic cervical discectomy in a prospective cohort study with VAS, NDI and MacNab criteria. The authors demonstrated the feasibility of the percutaneous endoscopic cervical discectomy (PECD) and proved the effectiveness of PECD as a treatment for cervical radiculopathy with significant postoperative improvement of clinical outcomes [8].

Zhang et al. conducted a systematic review and meta-analysis and found a significant reduction in VAS scores after percutaneous endoscopic cervical discectomy at 1 week and the last follow-up. The authors also noted low recurrence of pain and adverse events [15].

Similarly, a recent systematic review of 30 studies by Wongthawat Liawrungrueang also reported persistent improvements in neck and radicular pain and functional outcomes as measured by the VAS and NDI after endoscopic surgery [14]. In the majority of studies included in the analysis, patients satisfaction was above 85% [14].

A very low mean intra-operative blood loss of only 15 ± 3 ml was a striking finding in our series. Minimal loss of blood is one of the characteristic advantages of minimally invasive endoscopic procedures. The small skin incision and minimal detachment of the paraspinal muscles result in a reduced soft-tissue injury and allow the creation of the working channel directly in the surgical field of interest [13,17].

The operative time was 30 to 45 minutes. Despite discrepancies between studies, recent publications favor the feasibility of posterior endoscopic decompression with relatively short operative times, particularly after overcoming the initial learning curve [17].

However, operative time depends on the level of pathology, patient anatomy, characteristics of the disk herniation, degree of stenosis and surgeon experience. Therefore, one should interpret the comparison of the operative times in different studies with caution.

One of the main advantages of the posterior approach is the absence of complications specific to anterior cervical surgery. In an anterior discectomy the surgeon works very close to

the esophagus, trachea and recurrent laryngeal nerve. Therefore, dysphagia and dysphonia are well-known complications of anterior cervical surgery [3,4,18].

The posterior approach has different possible complications. Special attention should be given to the preservation of the nerve root, the dural sac and the stability of the posterior bony complex. A recent systematic review of the complications associated with endoscopic cervical spine surgery suggests that the most characteristic complications of the posterior approach are transient dysesthesia, dural injury and rare motor deficits, whereas dysphagia and dysphonia are more commonly associated with the anterior approach [18].

No neurological complications were observed in our study during the 12-month follow-up. Such an absence of complications in a cohort of 30 patients is a good outcome but does not allow us to conclude that the technique completely removes the risk of neurological injury. Larger series of patients would have to be presented to more confidently demonstrate the safety profile of the procedure.

Selection of patients is especially important. According to modern publications, the main indications for posterior endoscopic surgery are mostly lateral or foraminal pathological processes with radiculopathy, which persist despite conservative treatment [17]. "Severe instability, significant deformity, certain types of central compression and severe myelopathy may limit the applicability of this technique [17].

The success of posterior endoscopic discectomy is thus contingent on the technical quality of the procedure as well as correct patient selection.

Another important consideration is the preservation of the facet joint. In posterior endoscopic decompression, only the necessary amount of bone should be removed to gain safe access to the nerve root and herniated disk fragment. Extensive resection of the facet joints may threaten the stability of the spinal segment. Current recommendations for posterior endoscopic surgery are limited bone resection and constant identification of anatomical landmarks [17].

An anatomical study by Keorochana et al. also demonstrated the importance of the so called V-point anatomy during posterior endoscopic foraminotomy and discectomy. The authors studied the anatomical relationships between the V-point, dural sac, nerve roots and intervertebral disk, which may help to plan the surgical trajectory more accurately and reduce the risk of injury to the neural structures [16].

The comparison of the posterior endoscopic approach with anterior procedures is also of considerable interest. Previously, the posterior approach was mainly viewed as a secondary option for selected cases of lateral pathology. But modern comparative studies have greatly altered our perception of its function.

In the multicenter randomized FACET trial of 265 patients with unilateral single-level cervical radiculopathy, posterior foraminotomy was found to be noninferior to anterior cervical discectomy and fusion (ACDF) in terms of treatment success and reduction of arm pain at one year [20].

The same study's two-year follow-up results confirmed the noninferiority of the posterior surgical approach. The success rate of treatment and arm pain reduction were similar to anterior surgery.

These results are important for the interpretation of our data. The notable decrease in VAS scores noted in our study, even in the setting of a small sample size, is consistent with the current trend of considering posterior decompression as a legitimate surgical option when the underlying pathology is morphologically appropriate.

Even more relevant are the findings of a recent meta-analysis of 10 studies and 862 patients in 2026 directly comparing endoscopic posterior decompression with ACDF. In addition, no significant differences were observed in final NDI scores and arm pain, while posterior endoscopic surgery had an advantage in early functional recovery.

These findings imply that posterior endoscopic decompression should be regarded as a technical innovation and also as a potential alternative to anterior surgery in appropriately selected patients.

Another important consideration is the preservation of spinal motion. As opposed to ACDF, where interbody stabilization is usually done after removing the disk, in posterior endoscopic discectomy, removal of the intervertebral disk or interbody fusion is not always required. This may allow to preserve the natural motion of the operated segment and possibly avoid some risks related to implants and pseudarthrosis [13].

At the same time, the posterior approach should not be considered a universal replacement for ACDF. In cases of central disk herniation, severe axial neck pain, significant instability, marked deformity or certain types of myelopathy, anterior or combined surgery may still be preferred [17].

In the present study, two recurrences were observed 12 months after the first procedure, which means a recurrence rate of 6.7%. This rate is higher than some previously reported figures for individual series of posterior endoscopic surgery, but the small sample size has a major effect on the percentage represented by each individual event. For example, in a series of 30 patients, the addition of one more case changes the recurrence rate by 3.3%.

Thus, this recurrence rate should be interpreted with caution. The ages of 55 and 63 years cannot be directly involved in the recurrence. These cases may be better considered as a potential outcome of ongoing intervertebral disk degeneration and individual patterns of physical loading and lifestyle.

Contemporary evidence also suggests the importance of long-term follow-up following endoscopic discectomy. While the initial results are promising, there is a risk of recurrent disk herniation or progression of the degenerative process [17].

Post-Surgery: All the patients in the study group were asked to wear a cervical collar for one month after the surgery. It should be mentioned that there is no one standardized protocol in the international literature regarding the need and the duration of postoperative immobilization after posterior endoscopic discectomy. The length of orthosis use is dependent on the amount of bony decompression, status of the facet joints, stability of the spinal segment, and individual patient factors.

In the current series, use of cervical collar was included in the postoperative protocol and was prescribed to all patients. Once the immobilization was finished and no signs of instability were detected, the patients were gradually returned to their normal physical activities.

Conclusion. Posterior endoscopic discectomy is an effective minimally invasive surgical technique for the treatment of cervical intervertebral disc herniation in patients with appropriate clinical and radiological indications.

The study included 30 patients who underwent surgery between 2021 and 2025. Men accounted for 65% of the cohort, while women accounted for 35%. The largest age group consisted of patients aged 50–60 years, representing 30% of the study population.

The most frequently affected level was C5–C6 (35%), followed by C4–C5 (28%), C6–C7 (20%), and C3–C4 (17%). This distribution is consistent with data from published clinical series of patients with degenerative cervical intervertebral disc herniation [19].

All patients underwent MRI, radiography, and multidetector computed tomography (MDCT), allowing comprehensive assessment of the intervertebral discs, neural structures, bony anatomy, and spinal stability. The operative time ranged from 30 to 45 minutes, with a mean intraoperative blood loss of 15 ± 3 ml. These findings indicate minimal surgical trauma associated with the technique.

The principal clinical outcome was a marked reduction in pain intensity. Baseline VAS scores of 6–8 points decreased to 4–6 points at one week, 3–4 points at two weeks, 2–3 points at three months, 1–2 points at six months, and 0–1 points at 12 months after surgery.

No neurological complications or other major postoperative complications were recorded during the follow-up period. Recurrent disc herniation at 12 months was identified in two patients, corresponding to a recurrence rate of 6.7%.

Thus, posterior endoscopic discectomy enables effective decompression of the nerve root structures while minimizing tissue trauma, intraoperative blood loss, and operative time. The observed favorable VAS dynamics and absence of major neurological complications support the potential role of this technique in the surgical treatment of cervical intervertebral disc herniation.

LITERATURE

1. Bono CM, Ghiselli G, Gilbert TJ, et al. An evidence-based clinical guideline for the diagnosis and treatment of cervical radiculopathy from degenerative disorders. *Spine Journal*. 2011;11(1):64–72.
2. Kjaer P, Kongsted A, Hartvigsen J, et al. National clinical guidelines for non-surgical treatment of patients with recent onset neck pain or cervical radiculopathy. *European Spine Journal*. 2017;26:2242–2257.
3. Epstein NE. A review of complication rates for anterior cervical discectomy and fusion surgery. *Surgical Neurology International*. 2019;10:100.
4. Fountas KN, Kapsalaki EZ, Nikolakakos LG, et al. Anterior cervical discectomy and fusion associated complications. *Spine*. 2007;32(21):2310–2317.
5. Adamson TE. Microendoscopic posterior cervical laminoforaminotomy for unilateral radiculopathy: results of a new technique in 100 cases. *Journal of Neurosurgery*. 2001;95(1 Suppl):51–57.
6. Kim P, Murata H, Kurokawa R, Takaoka K. Myoarchitectonic spinolaminotomy: a new approach to posterior cervical spine surgery. *Technical note*.
7. Ruetten S, Komp M, Merk H, Godolias G. Full-endoscopic cervical posterior foraminotomy for the operation of lateral disc herniations using 5.9-mm endoscopes. *Spine*. 2008;33(9):940–948.
8. Huang JJ, Sun HH, Shao ZW, et al. Posterior full-endoscopic cervical discectomy in cervical radiculopathy: a prospective cohort study. *Clinical Neurology and Neurosurgery*. 2020;195:105948.
9. Wan Q, Zhang D, Li S, et al. Posterior percutaneous full-endoscopic cervical discectomy under local anesthesia for cervical radiculopathy due to soft-disc herniation: a preliminary clinical study. *Journal of Neurosurgery: Spine*. 2018;29(4):351–357.
10. Youn MS, Shon MH, Seong YJ, et al. Clinical and radiological outcomes of two-level endoscopic posterior cervical foraminotomy. *European Spine Journal*. 2017;26(9):2450–2458.
11. Zeidman SM, Ducker TB. Posterior cervical laminoforaminotomy and discectomy. Clinical and technical considerations.
12. Ruetten S, Komp M, Merk H, Godolias G. A new full-endoscopic technique for cervical posterior foraminotomy in the treatment of lateral disc herniations. *Spine*. 2007.
13. Cervical endoscopic spinal surgery: a review of the current literature. *Journal of Orthopaedic Surgery*. 2018. doi:10.1177/2309499018758520.
14. Wongthawat Liawrungrueang W, Cho ST, Sharma A, et al. Clinical outcomes and patient perspectives in full endoscopic cervical surgery: a systematic review. *Neurospine*. 2025;22(1):81–104. doi:10.14245/ns.2449086.534.

15. Zhang JJ, Zhou QJ, Yan Y, et al. Efficacy and safety of percutaneous endoscopic cervical discectomy for cervical disc herniation: a systematic review and meta-analysis. *Journal of Orthopaedic Surgery and Research*. 2022;17:519.
16. Keorochana G, et al. The anatomical relationship between the cervical nerve roots, intervertebral discs and bony cervical landmark for posterior endoscopic cervical foraminotomy and discectomy: a cadaveric study. *Global Spine Journal*. 2024. doi:10.1177/21925682231217251.
17. Kotheeranurak V, Lokhande PV, Tangdamrongtham T, et al. Complications in full-endoscopic posterior cervical surgery: a review of the literature and preventive strategies. *Global Spine Journal*. 2025;15(7):3379–3394. doi:10.1177/21925682251328615.
18. Ju CI, Kim P, Seo JH, Kim SW, Lee SM. Complications of cervical endoscopic spinal surgery: a systematic review and narrative analysis. *World Neurosurgery*. 2023;178:330–339. doi:10.1016/j.wneu.2023.07.058.
19. Degenerative cervical disc herniation: prevalence of affected cervical level in a Hispanic population in Puerto Rico. *PubMed-indexed clinical series*. 2023.
20. Broekema AEH, Simões de Souza NF, Soer R, et al. Noninferiority of posterior cervical foraminotomy vs anterior cervical discectomy with fusion for procedural success and reduction in arm pain among patients with cervical radiculopathy at 1 year: the FACET randomized clinical trial. *JAMA Neurology*. 2023;80(1):40–48. doi:10.1001/jamaneurol.2022.4208.