ACTA SCIENTIFIC NEUROLOGY (ISSN: 2582-1121)

Volume 7 Issue 5 May 2024

Research Article

Uniportal Interlaminar Full Endoscopic Spine Surgery for Lumbar Facetal Cyst

Harshit Dave[1], Sukumar Sura[2]*, Abhinandan Reddy Mallepally[3], Dheeraj Manikanta[4], H CH V Tulasi Ram[4] and Rajendra Reddy[1]

[1]Clinical Spine Fellow, Department of Spine Surgery Asian Spine Hospital, Hyderabad, India

[2]Senior Neurosurgeon and Chief of Spine Surgery, Department of Spine Surgery Asian Spine Hospital, Hyderabad, India

[3]Consultant Spine Surgeon, Department of Spine Surgery Asian Spine Hospital, Hyderabad, India

[4]Associate Consultant Spine Surgeon, Department of Spine Surgery Asian Spine Hospital, Hyderabad, India

***Corresponding Author:** Sukumar Sura, Senior Neurosurgeon and Chief of Spine Surgery, Department of Spine Surgery Asian Spine Hospital, Hyderabad, India.

DOI: 10.31080/ASNE.2024.07.0733

Received: March 01, 2024

Published: April 23, 2024

Abstract

Objective: The purpose of this study is to share our experience in management of symptomatic lumbar facet cyst with uniportal interlaminar full endoscopic spine surgery technique.

Materials and Methods: Full endoscopic spine surgery through uniportal interlaminar approach was performed in 6 consecutive patients with lumbar facet cysts between 2020 and 2023 at our tertiary care centre. Demographic and clinical details were noted and functional assessment was done using VAS and MODI scores.

Results: Out of 6 patients, 3 were males and 3 were female. Mean age was 54 years and mean follow up period was 2 years. Mean surgical time was 90 minutes and there were no perioperative complications. The VAS score for leg pain improved from a preoperative mean score of 8.3 to a postoperative mean score of 1 and MODI score improved from a preoperative mean of 68% to postoperative mean of 6%. None of the patients had recurrence or required any additional revision surgeries.

Conclusion: Uniportal interlaminar full endoscopic spine surgery is a safe and effective surgical technique for treating lumbar facet cyst. It is a truly minimally invasive, causing minimal damage to lamina, facet joint and other stabilizing structures of the spine thereby reducing the risk of iantrogenic instability and recurrence while maximizing functional outcomes, facilitating early mobilization and an early return to work.

Keywords: Lumbar Cyst; Facet Cyst; Endoscopic Spine Surgery; Uniportal; Interlaminar Approach; Surgical Technique

Introduction

Lumbar facet cyst, also known as Juxtafacet cyst, or synovial cyst of the facet joint, is a fluid-filled sac originating in the facet joint of the spine. The cysts were first described in the literature in the late 1960s, with case reports depicting intraspinal, extradural ganglion cysts adjacent to the lumbar facet joint [1]. These cysts are relatively rare, occurring in up to 0.5% of the general population [2,3]. The lower lumbar spine is usually the most common site for facetal cysts with L4-L5 being the most common level followed by L3-L4 and L5-S1 levels [4]. These cysts have a slight female preponderance, and most often occur in the sixth decade of life [5]. They are often found incidentally, but occasionally increasing growth of the cyst into the spinal canal can impinge neural structures, and can cause radiculopathy and neurological dysfunction due to mechanical

compression of the neural structures. Patients may present with low back pain, radiating to the buttocks and leg and neurogenic claudiction.

Surgical management is indicated in patients with persistent symptoms despite conservative management. Traditional surgical techniques include open and tubular decompressive laminectomy with medial facetectomy and facet cyst excision; however, this invasive approach can predispose patients to further joint instability [6]. Minimally invasive spine surgery techniques may be best to effectively decompress the neural elements while preserving joint function and minimizing other iatrogenic morbidities. Endoscopic spine surgery (ESS) advances the principles of minimally invasive surgery, leaves a surgical footprint smaller than the minimally invasive tubular surgeries and has advantages like minimal tissue damage, decreased blood loss, faster recovery, shorter hospital stays and decreased risk of iatrogenic instability. The approach has been successfully employed across spine regions and surgical indications. While a limited number of reports have documented the safety and feasibility of treating lumbar facet cysts using endoscopic techniques, to our knowledge, there hasn't been any study highlighting the outcomes of uniportal interlaminar full endoscopic spine surgery technique in treating facet cysts with an average follow up period of two years [7-9]. Herein, we present our experience of treating 6 patients with lumbar radiculopathy secondary to facet cysts with uniportal interlaminar full endoscopic spine surgery technique.

Materials and Methods

Full endoscopic spine surgery through uniportal interlaminar approach was performed in 6 consecutive patients with lumbar facet cysts between 2020 and 2023 at our tertiary care centre.

All patients presented with low back pain with radiculopathy and neurogenic claudication and had a failed trial of conservative management. Radiological analysis with MRI and dynamic x-rays was done to confirm the diagnosis, to see the exact location and level of the facetal cyst and to exclude any instability. Demographic and clinical details of the patients including age, sex, back pain, leg pain, neurogenic claudication, neurological status, affected level and side, procedure details, surgical time and intraoperative and perioperative complications were noted (table 1). Functional assessment was done using preoperative and postoperative VAS scores (visual analogue scale) and MODI scores (modified Oswestry Disability index).

S. No.	AGE	SEX	Symptomatology	MRI findings	Procedure
1	69	M	LBP with left leg pain/Neurology intact	L4-L5 LF and facetal hypertrophy with left sided facetal cyst causing severe central canal and left more than right lateral recess stenosis	L4-5 FESS via left interlaminar approach with complete LF and facetal cyst excision
2	56	F	LBP with left leg pain/Neurology intact	L4-L5 LF and facetal hypertrophy with left sided facetal cyst causing severe central canal and left more than right lateral recess stenosis	L4-5 FESS via left interlaminar approach with complete LF and facetal cyst excision
3	25	M	LBP with left leg pain/Neurology intact	L4-L5 L5-S1 LF and facetal hypertrophy with L5-S1 left sided facetal cyst causing severe central canal and left more than right lateral recess stenosis	L4-5 L5-S1 FESS via left interlaminar approach with complete LF excision and L5-S1 left facetal cyst excision
4	56	F	LBP with left leg pain/Neurology intact	L4-L5 LF and facetal hypertrophy with left sided facetal cyst causing severe central canal and left more than right lateral recess stenosis	L4-5 FESS via left interlaminar approach with complete LF and facetal cyst excision
5	83	M	LBP with right leg pain/ Neurology intact	L3-4 LF and facetal hypertrophy with right sided facetal cyst causing severe central canal and right more than left lateral recess stenosis	L3-4 FESS via right interlaminar approach with complete LF and facetal cyst excision
6	35	F	LBP with left leg pain/Neurology intact	L4-L5 LF left sided facetal cyst causing lateral recess stenosis	L4-5 FESS via left interlaminar approach with left side unilateral decompression and facetal cyst excision

Table 1: Demographic and Clinical details. Abbreviations: LBP-Low back pain; LF-ligamentum flavum; FESS-full endoscopic spine surgery.

Procedure details

Under general anaesthesia, the patient was placed in the prone position with horizontal bolsters beneath the chest and pelvic region on a radiolucent table. An endoscope (9 mm of outer diameter, 5.5 mm of working channel, and 20° view angle) was inserted in the interlaminar space of the desired level under fluoroscopy guidance. Hemilamina, lamino facetal junction, lamino spinous junction, upper, and lower margins of interlaminar space and medial border of the facet were defined. Once the bony landmarks were clearly defined, the superior and inferior lamina and medial facet were burred using high-speed burr upto the attachments of ligamentum flavum to widen interlaminar space craniocaudally and mediolaterally and to expose the cranial, caudal and lateral attachment of ligamentum flavum. Ligamentum flavectomy was done and facet cyst was identified. Facet cyst was completely excised and facetal spur, if any, were removed. Adequate decompression of thecal sac and traversing nerve roots was achieved.

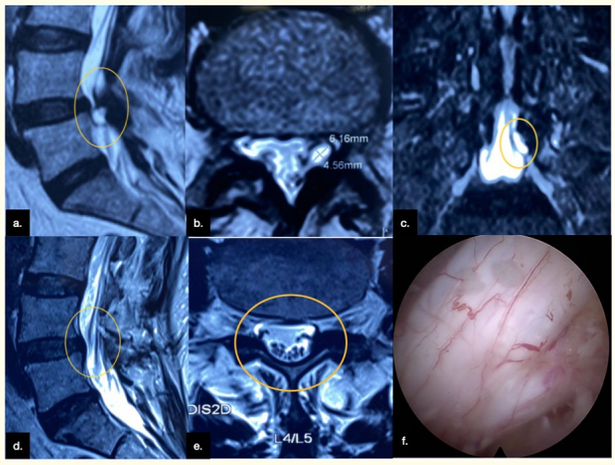

Figure 2: 56 years old female operated with uniportal interlaminar FESS for L4-L5 left sided large facetal cyst. Preoperative (figure a,b,c) AND postoperative (figure d,e) MRI images and endoscopic image (figure f) showing good decompression and complete excision of the facetal cyst.

Results

Out of 6 patients, 3 were males and 3 were female. The age range was 25-83 years with a mean age of 54 years. 5 patients presented with low back pain radiating to the left lower limb and 1 patient presented with low back pain radiating to the right lower limb. Leg pain and neurogenic claudication were predominant symptoms in all patients. All patients had undergone a failed conservative trial. 4 patients had left-sided facet cyst at L4-5 level and 1 patient had right-sided facet cyst at L3-4 level. 1 patient had severe ligamentum flavum hypertrophy causing significant canal stenosis at two levels (L4-5 and L5-S1) and left left-sided facetal cyst at L5-S1 level. All patients underwent full endoscopic spine surgery (FESS) through uniportal interlaminar approach as described above. The mean duration of surgery was 90 minutes. Follow-up ranged from 1 year to 4 years with a mean follow-up of 2 years. There were no perioperative complications.

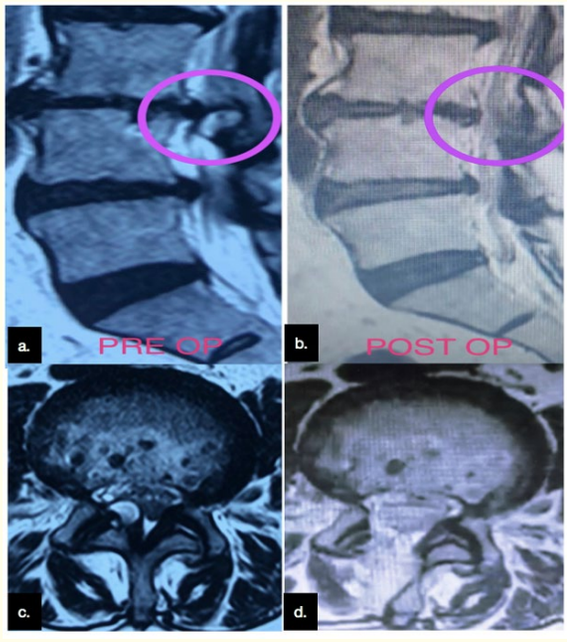

Figure 1: 83 years old male operated with uniportal interlaminar FESS for L3-L4 LCS with right sided facetal cyst. Preoperative (figure a and c) and postoperative (figure b and d) MRI showing good decompression and complete excision of the facetal cyst.

The VAS score for leg pain improved from a preoperative mean score of 8.3 to a postoperative mean score of 1 and MODI score improved from a preoperative mean of 68% to postoperative mean of 6%. None of the patients had any residual neurogenic claudication or increase in back pain or instability pain at the last follow. None of the patients had recurrence or any radiological signs of instability in x-rays done at 1 year. All patients started exercising regularly and all of them returned to their activities of daily living. llustrations in figures 1 and 2 depict preoperative and postoperative MRI images of two different cases with facet cyst, while figure 3 showcases endoscopic views of the facet, facet cyst wall, and the decompressed neural structure following facet cyst removal (Figure 1, 2 and 3).

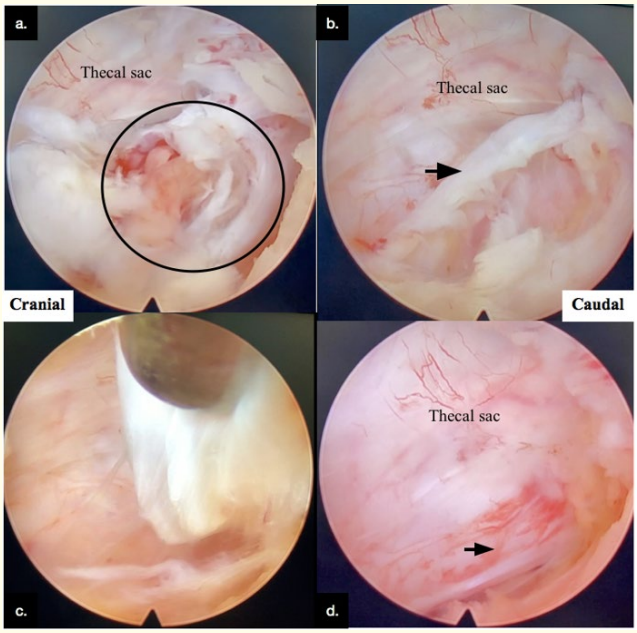

Figure 3: Intraoperative endoscopic images: (a). Showing lumbar facet cyst, (b) facet cyst wall (black arrow) , (c) facet cyst wall being removed, and (d) decompressed thecal sac and traversing root (black arrow) after facetal cyst removal.

Discussion

The etiology and natural history of intraspinal cysts is not clearly understood, and several theories have been discussed in the literature. These include osteoarthritis, degenerative spondylolisthesis, mechanical irritation of the facet joint due to hypermobility, chronical or direct trauma, and leaking synovial liquid followed by slime degeneration of the surrounding connective tissue [10]. The variability in nomenclature for facetal cysts reflects the heterogeneity in histologic findings, anatomic locations, and proposed pathogenesis of the disorder. The term cystic malformations of the mobile spine was proposed by Christophis et al to better describe the heterogeneous composition; they described 11 cysts with synovial linings, 21 ganglion cysts, and 19 flavum cysts [11]. In 1974, the term "juxta-facet cyst" was proposed by Kao to describe both synovial and ganglion cysts [12]. The precise histopathological differentiation of the juxtafacet cyst appears irrelevant since the clinical presentation and treatment approaches are similar.

In patients with facet cyst that doesnot cause significant neural compression, conservative management is typically the initial approach. This include short-term bed rest, physical therapy, short course of NSAIDS and selective nerve root blocks or epidural corticosteroid injections [13]. Although conservative care for lumbar facet cysts is a reasonable first-step approach in patients with symptomatic facetal cysts with significant compression of the neural structure, there is a high recurrence and conversion to operation rate (31%–54%) [14]. The surgical approach for symptomatic facet cyst has been debated for many years. Traditionally, lumbar facet cysts are treated with open laminectomy or hemilaminectomy and cyst excision with or without fusion. Although decompression alone is a reasonable initial procedure, several studies have been published demonstrating high recurrence and re-operation rate with decompression alone (0-15% with recurrence rate as high as 33 % in some studies [15]. Several studies have proposed the benefits of fusion procedures for patients with facet cyst to reduce the risk of instability but the procedure is inherently more invasive and carries a higher complication rate than that with decompression and cyst resection alone [16].

Previous literature has demonstrated that minimally invasive spine surgery approaches can effectively decompress the neural elements while preserving joint function and minimizing the risk of recurrence and iatrogenic instability [17,18]. In the present study, we demonstrated safe and effective treatment of lumbar facet cysts using interlaminar endoscopic decompression surgery. Our approach is a truly minimally invasive approach that allows direct access to the pathology through small incision with advantages like minimal tissue damage and blood loss, less-destabilizing surgical approach, low infection rate, low risk of neural injury and CSF leak, decreased hospital stay and early mobilisation and return to work.

In our series, none of the patient had any perioperative complications such as infection, neurological deficit, or incidental durotomy. Functuional outcome improved significantly with complete resolution of radiculopathy symptoms and neurogenic claudication and none of the patients had recurrence or required any additional revision surgeries at a mean follow up of 2 years, suggesting feasibility of uniportal interlaminar full endoscopic spine surgery as an effective surgical technique for management of lumbar facetal cysts.

Conclusion

Uniportal interlaminar full endoscopic spine surgery is a safe and effective surgical technique for treating lumbar facet cyst. It is a truly minimally invasive, causing minimal damage to lamina, facet joint and other stabilizing structures of the spine. This technique enables direct access and visualisation of facet cyst excision, thereby reducing the risk of iantrogenic instability and recurrence while maximizing functional outcomes, facilitating early mobilization and an early return to work.

Bibliography

1. Kao Chung C., *et al*. "Lumbar intraspinal extradural ganglion cyst". *Journal of Neurosurgery* 29.2 (1968): 168-172.

2. Doyle AJ and Merrilees M. "Synovial cysts of the lumbar facet joints in a symptomatic population: prevalence on magnetic resonance imaging". *Spine* 29.8 (2004): 874-878.

3. LEMISH WAYNE., *et al*. "Lumbar intraspinal synovial cysts: recognition and CT diagnosis". *Spine* 14.12 (1989): 1378-1383.

4. Bydon A., *et al*. "Recurrent back and leg pain and cyst reformation after surgical resection of spinal synovial cysts: Systematic review of reported postoperative outcomes". *Spine* 10.9 (2010): 820-826.

5. Khan Amir M and Federico Girardi. "Spinal lumbar synovial cysts. Diagnosis and management challenge". *European Spine Journal* 15 (2006): 1176-1182.

6. Akbary K., *et al*. "The feasibility and perioperative results of bi-portal endoscopic resection of a facet cyst along with minimizing facet joint resection in the degenerative lumbar spine". *Operative Neurosurgery* 18.6 (2020): 621-628.

7. Hagan MJ., *et al*. "Awake transforaminal endoscopic lumbar facet cyst resection: technical note and case series". *Journal of Neurosurgery: Spine* 1 (2022): 1-8.

8. Hellinger S and Lewandrowski KU. "Clinical outcomes with endoscopic resection of lumbar extradural cysts". *Journal of Spine Surgery* 6 (2020): S133.

9. Brown HL., *et al*. "Transforaminal endoscopic decompression of facet cysts by interventional pain physicians". *Cureus* 13.9 (2021).

10. Boody Barrett S and Jason W Savage. "Evaluation and treatment of lumbar facet cysts". *Journal of the American Academy of Orthopaedic Surgeons* 24.12 (2016): 829-842.

11. Christophis P., *et al*. ""Juxtafacet cysts", a misleading name for cystic formations of mobile spine (CYFMOS)". *European Spine Journal* 16 (2007): 1499-505.

12. Kao CC., *et al*. "Synovial cyst of spinal facet: case report". *Journal of Neurosurgery* 41.3 (1974): 372-376.

13. Bjorkengren AG., *et al*. "Symptomatic intraspinal synovial cysts: opacification and treatment by percutaneous injection". *American Journal of Roentgenology* 149.1 (1987): 105-107.

14. Martha JF., *et al*. "Outcome of percutaneous rupture of lumbar synovial cysts: a case series of 101 patients". *The Spine Journal* 9.11 (2009): 899-904.

15. Page PS., *et al*. "Comparison of decompression versus decompression and fusion for lumbar synovial cysts and predictive factors for cyst recurrence". *World Neurosurgery* 146 (2021): e378-383.

16. Khan AM., *et al*. "Lumbar synovial cysts of the spine: an evaluation of surgical outcome". *Clinical Spine Surgery* 18.2 (2005): 127-131.

17. Oertel JM and Burkhardt BW. "Endoscopic surgical treatment of lumbar synovial cyst: detailed account of surgical technique and report of 11 consecutive patients". *World Neurosurgery* 103 (2017): 122-132.

18. Sukkarieh HG., *et al*. "Minimally invasive resection of lumbar intraspinal synovial cysts via a contralateral approach: review of 13 cases". *Journal of Neurosurgery: Spine* 23.4 (2015): 444-450.