CM1-1：Cheng-Li Lin

The treatment of facetogenic low back pain by full endoscopic lumbar rhizotomy: the systematic review of current literatures

Background: Chronic low back pain (CLBP) is a debilitating condition affecting millions worldwide, imposing a substantial healthcare burden. Traditional treatments have limitations, prompting the exploration of innovative interventions. Endoscopic rhizotomy (ER) has emerged as a promising option, particularly for facetogenic pain. We conduct a systematic review to offer a comprehensive examination of ER's historical evolution, contemporary practices, and outcomes in facetogenic CLBP management.

Methods: We conducted a thorough review of various literatures from different time periods to trace the historical development of ER and reveal how it's used today. Current practices, outcomes associated with ER in the treatment of CLBP, with a focus on efficacy, patient selection criteria, and anatomical considerations were explored to offer a comprehensive understanding of the clinical benefits of ER.

Results: ER, which involves directly visualizing and ablating the sensory branches of the dorsal ramus, has shown remarkable effectiveness, providing pain relief in as many as 80% of challenging cases of chronic lower back pain. The development of ER from its early 20th-century beginnings to its current prominence demonstrates its increasing acceptance within the medical community. Crucial to achieving positive results are patient selection criteria, which include confirmed diagnostic medial branch block and resistance to conservative treatments. Additionally, dealing with anatomical variations presents both challenges and opportunities in ER, demanding a customized approach.

Conclusion: ER stands as a notable advancement in addressing CLBP, especially when associated with facetogenic pain. Despite challenges, such as cost and procedural complexity, ER holds great promise in improving the quality of life for CLBP patients. This review offers a comprehensive understanding of ER's historical evolution and its contemporary significance in management of CLBP. Ongoing research and technological advancements are crucial to fully unlock ER's potential in addressing the global burden of CLBP.

CM1-2：Chun Tseng

Radiofrequency Techniques for Sacroiliac Joint Pain: A Review on the Efficacy, Feasibility, and Evolution of Treatment Methods

Abstract:
This review evaluates the efficacy and feasibility of endoscopic radiofrequency ablation (RFA) as a treatment for sacroiliac joint (SI joint) pain. This paper provides a comprehensive analysis of current literature, sheds light on the evolutionary trajectory of treatment techniques, and evaluates advancements in the domain.

1. Introduction:
Sacroiliac joint (SIJ) dysfunction is a prevalent source of chronic low back pain, constituting as much as 38% of lower back pain cases. This article offers insights into SI joint dysfunction, its history, diagnostic challenges, and therapeutic advances.
2. Description of SI Joint Dysfunction:
SIJ dysfunction, stemming from various etiological factors like rheumatoid arthritis, trauma, or post-operative outcomes, leads to chronic back pain.
3. Importance of SI Joint Dysfunction:
SI joint pain's significant impact underscores the need for effective treatment modalities. The high prevalence of SI joint dysfunction and its association with surgical outcomes emphasizes its clinical significance.
4. Diagnostic and Treatment Approaches:
Diagnosing SIJ dysfunction remains challenging. Various treatments, from conservative approaches to surgical management, are available, but their efficacies vary.
5. Evolution of Treatment Methods:
Historically, treatment methodologies ranged from pharmacotherapy to surgical fusion. However, advancements have now directed attention towards more specialized treatments, particularly radiofrequency ablation, which offers a minimally invasive yet effective solution.
6. Feasibility Evaluation:
The introduction of the Biportal Endoscopic Radiofrequency Ablation (BERA) technique and endoscope-guided RFA has brought about significant changes in the management of SIJ pain. These methods offer superior outcomes, fewer complications, and longer pain-free periods for patients.

7. Formative Evaluation:
The domain of SIJ pain management is witnessing rapid technological advancements, which, coupled with patient awareness, could significantly influence clinical practices and research trajectories. A potential avenue for research might include integrating RFA with bioengineered solutions for enhanced therapeutic outcomes.

8. Conclusion:

Endoscopic RFA offers promising outcomes for SI joint pain management, as evident from the available literature. The constant evolution in treatment strategies and advancements in this field holds promise for more refined, effective, and less invasive techniques in the future.

CM1-3

The experiences of full-endoscopic spine surgery under local anesthesia for chronic low back pain due to degenerative disc disease.

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Objective:
Degenerative disc disease (DDD) ranks among the most common causes of chronic low back pain. However, a standardized treatment has not yet been established. As such, our study aims to assess the efficacy of full-endoscopic spine surgery (FESS) in addressing chronic low back pain arising from degenerative disc disease.

Methods:
Patients with enduring low back pain persisting for several months or more, accompanied by a high intensity zone (HIZ) evident on MRI or reproducible pain during discography, were diagnosed with DDD. Thermal annuloplasty was performed for patients whose pain did not improve with conservative treatment. All patients underwent FESS using a transforaminal approach under local anesthesia. Following the administration of local anesthesia for the surgical trajectory, foraminoplasty was performed to expand Kambin's triangle. Subsequently, the endoscope was inserted into the disc space, allowing for disc removal and coagulation of the annulus fibrosis. Additionally, neovascularization within the annulus fibrosus on the ventral side of the dural sac was observed and adequately coagulated.

Results:
Since December 2021, thermal annuloplasty was performed on four patients. All procedures were completed under local anesthesia with no reported complications. The outcomes using modified Macnab criteria were as follows: excellent in one case, good in one, and fair in two.

Conclusion:
Fusion surgery is often performed for DDD, but it is desirable to preserve a range of motion because patients are often younger. And despite various treatments are performed for DDD, the long-term outcomes are unclear. Furthermore, the diagnosis is often difficult. On the other hand, many patients complain of long-term back pain, so it is considered that thermal annuloplasty using FESS under local anesthesia may be useful in the treatment of degenerative disc disease.

Update on treating discogenic LBP

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Objective: This review aims to provide an overview of the most recent advancements and understandings surrounding discogenic low back pain (DLBP), including therapeutic options.

Background: Discogenic low back pain, stemming from intervertebral disc degeneration or injury, is one of the primary contributors to chronic low back pain. Despite its prevalence, DLBP remains a challenge for clinicians due to its complex etiology and the intricate anatomy of the lumbar spine.

Methods: A literature search was conducted utilizing major databases to identify relevant studies and reviews published within the last five years. This article synthesizes key findings to present an updated perspective on DLBP.

Conclusion: With advances in our understanding of DLBP, both in terms of its underlying pathophysiology and its treatment options, we are better positioned to address this pervasive clinical challenge. Clinicians and researchers should continue collaborative efforts to further refine diagnostic criteria and validate innovative therapeutic approaches, ensuring more effective and individualized care for patient suffering from DLBP.

CM1-5

Short-term outcomes of full-endoscopic disc cleaning surgery for chronic low back pain due to Modic change

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Introduction. Modic changes of the vertebral endplates detected by magnetic resonance images are associated with low back pain. The several causes of Modic changes are reported to be intervertebral disc degeneration, excessive stress due to intervertebral instability, or minor infection. Conservative treatments such as oral administration of anti-inflammatory agents, discoblock, and wearing trunk brace are usually performed. However, conservative treatments are sometimes ineffective and lumbar interbody fusion surgeries are indicated in those cases. The objective of this study are to report the short-term outcomes of full endoscopic disc cleaning (FEDC) surgery for intractable low back pain and to investigate the factors that affect the clinical outcomes.

Methods. A total of 26 patients with 30 lumbar intervertebral discs accompanied Modic change who underwent FEDC at our department from September 2019 were enrolled in this study. 20 males and 6 females with mean age of 52.3 years and mean duration of 7.6 years with chronic low back pain are enrolled. All patients were diagnosed with Modic change-induced low back pain after discography and by confirming effective discoblock. During FEDC surgery, intradiscal cleaning by perfusing with saline and radiofrequency ablation were performed at the affected disc levels through transforaminal approach under local anesthesia. Low back pain was evaluated using visual analog scale (VAS: mm) at preoperative period, postoperative 1 and 3 month, and final follow-up. Patients whose postoperative VAS values was 20mm less than that before operation were defined as good outcome. We examine the factors associated with postoperative outcomes.

Results. The mean duration of postoperative follow-up was 12.7 months (3-24 months). The mean VAS values was 65mm at preoperative period, and 33, 37, and 36 mm at postoperative 1, 3 month, and the final follow-up, respectively. The mean VAS values significantly decreased at every postoperative period. There were 15 effective patients (57.5%) at final follow-up. Compered with non-effective patients, 15 effective patients were younger (48.4 vs 56.9 years), and included less females (6.6 vs 45.4 %), less high disc levels above L3/4 (13.3 vs 54.5 %), and less Modic type 3-like change (13.3 vs 36.4 %), and more pain concordance during discography (73.3 vs 54.5%).

Conclusion. FEDC is a new less invasive optional surgery for Modic change-induced chronic low back pain. Particularly good postoperative outcomes can be expected in the younger male patients with Modic type 1 or 2 changes in lower lumbar levels who detect pain concordance during discography.

Pathophysiology and endoscopic treatment of sinuvertebral and basivertebral neuropathic spinal pain

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Abstract

Chronic lower back pain is a leading cause of disability in musculoskeletal system. Degenerative disc disease is one of the main contributing factors of chronic back pain in the aging population in the world. It is postulated that sinuvertebral nerve and basivertebral nerve main mediator of the nociceptive response in degenerative disc disease as a result of neurotization of sinuvertebral and basivertebral nerve. A review in literature is done on the pathoanatomy, pathophysiology and pain generation pathway in degenerative disc disease and chronic back pain and management strategy is discussed in this review to aid understanding of sinuvertebral and basivertebral neuropathy treatment strategies.

CM2-1：Ta-Li Hsu

Diagnosis and endoscopic decompression for far-out syndrome

Abstract

Introduction:
Extraforaminal compression at L5/S (far-out syndrome) usually caused by far-lateral herniated disc, ligamentous, bone compression (surrounding anatomy as transverse process, the sacral ala, and a bony spur) or combined pathology. Lumbosacral transitional vertebra (Bertolotti syndrome) has numerous presentation which also related to the far-out syndrome.
In this manuscript, we reviewed and focused on the diagnosis and endoscopic decompression for far-out syndrome.
Method:
We reviewed the data base of PubMed and cochrane library from 2013-2023 by searching key words as lumbosacrao transitional vertebra, extraforaminal stenosis, endoscopic, diagnosis, injection. Totally 17 studies were reviewed.
Result:
The diagnosis method for extraforaminal stenosis including new electrophysiological method, three dimensional proset MR images, and quantification of magnetic resonance myelography (cutoff value of 6.5mm for L5 DW, and 1.2 times sweller than the healthy subject in L5 DRG). The positive predictive value of diagnostic epidural steroid infection was also mentioned (>50% reduction of the expected VAS score is considered a valuable diagnostic tool). Also, Surveying the DTI images before patients suspected double-crush lesion is helpful in preventing failed back surgery syndrome.
In recent years, treatment choice as endoscopic decompression is thriving including full-endoscopic, and biportal endoscopic methods via different approach were widely discussed. Both showed good clinical outcomes with little complication.
In addition, the extraforaminal area pathology can be identified clearly via endoscopic system such as pseudoarthrosis between transverse process and ala, disc building with osteophytes and thickened lumbosacral ligament.

Conclusion:
There are many tools as electrophysiological method, MRI images, magnetic resonance myelography and diagnostic epidural steroid infection can help us to diagnose the far-out syndrome. And full-endoscopic, and biportal endoscopic methods are both good alternatives treatment choice for symptoms relief with little complication.

CM2-2

Full-Endoscopic Translaminar Decompression for Lumbar Foraminal Stenosis using a 5.2mm Working Channel Endoscope: A Short-term Clinical Report

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Introduction:

Lumbar foraminal stenosis can be treated through full-endoscopic spine surgery (FESS) using the posterolateral approach (PLA) or the translaminar approach (TLA). Initially, TLA with a 4.1 mm working channel endoscope presented challenges, including longer operative times due to significant bone removal and difficulties in resecting the yellow ligament with limited tools. To address these issues, we started to use a slightly thicker scope with a 5.2mm working channel for intervertebral foramen decompression via TLA. This report presents the short-term clinical outcomes of this modified approach.

Method:

We retrospectively investigated 8 cases of TLA for lumbar foraminal stenosis using the 5.2mm working channel endoscope. The study period spanned from January to July 2023. Parameters, including operative time, hospital stay, pre- and postoperative leg pain (assessed using the Numeric Rating Scale - NRS), and complications, were evaluated.

Result:

The mean age of the cohort was 71.2 years, with 7 males and 1 female. TLA was performed at L4/5 in 2 cases and L5/S1 in 6 cases. The mean operative time was 59.5 minutes, significantly shorter than the 74 minutes required with the 4.1 mm working channel. Hospital stays averaged 3.6 days. Pre- and postoperative leg pain showed marked improvement, with the mean NRS score decreasing from 6.6 to 1.0 postoperatively.

No complications, such as dural injury, hematoma, or iatrogenic instability, were observed.

Conclusion:

The short-term clinical results of full-endoscopic translaminar decompression for lumbar foraminal stenosis using a 5.2mm working channel endoscope were promising. The modified approach demonstrated advantages, including reduced operative time and improved pain relief. Care should be taken during bone resection to avoid potential complications. Further studies are needed to validate the long-term efficacy and safety of this technique. Nonetheless, the preliminary findings suggest that utilizing a 5.2mm working channel endoscope in the TLA technique is a promising option for lumbar foraminal stenosis treatment.

CM2-3

Treatment of lumbar foramen stenosis with uniportal endoscopic decompression only or endoscopic fusion? A literature review and case sharing

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Introduction:
Endoscopic foraminoplasty has shown effective treatment for acquired lumbar foraminal stenosis resulting from degenerative issues, stable spondylolisthesis, and intervertebral disc herniations. However, in case of complex foraminal stenosis, such as stenosis caused by focal scoliosis with a herniated disc, combined foramen and lateral recess stenosis with Modic type I disc changes, or stenosis in an adjacent segment following lumbar fusion the long-term success of foraminoplasty remains uncertain. The paramedian endoscopic approach presents a modified version of the full endoscopic transforaminal approach, aiming to minimize irritation to the exiting nerve root throughout the procedure. It also series as an optimal approach for uniportal endoscopic transforaminal lumbar interbody fusion (endo-TLIF). This study retrospectively examines the clinical outcomes with foraminal stenosis caused by both simple and complex factors. These patients underwent using either full endoscopic foraminoplasty or uniportal endo-TLIF.

Material and Methods
From 2019 Aug to 2023 Aug, 62 patients with lumbar foraminal stenosis caused by simple or complex factors were treatment by paramedian endoscopic foraminoplasty, combined paramedian and interlaminar approach for multiple stenosis or uniportal Endo-TLIF. The information on patient's characteristics, clinical and image results, peri-operative and post-operative complications were collected.

Results
Patient suffering from lumbar foraminal stenosis due to a herniated disc alongside with a stable spinal column, stable spondylolisthesis, hypertrophic facet join, or ligamentum flavum conditions, and without disc disorders, tend to experience positive outcomes with treated with endoscopic foraminoplasty with or without interlaminar decompression. Conversely, less favorable results are observed in patients with foraminal stenosis resulting from focal kyphosis accompanied by a herniated disc on the concave side, as well as in cases of foraminal stenosis occurring in adjacent segment post-spinal fusion. These patients lean toward opting for fusion surgery as their initial option. Endo-TLIF has showed positive outcomes for patients with foraminal stenosis resulting from complex factors. The fusion itself generally proceeds well, but complication such as cage

migration, bone graft migration, cage sinking, and adjacent segment disorders may still concern.

Conclusion

The treatment of lumbar foraminal stenosis under stable spinal column conditions using foraminoplasty combined with interlaminar decompression for cases of multiple stenosis has proven effective. However, when dealing with foraminal stenosis in an unstable spinal column, particularly when accompanied by disc disorders or occurring in adjacent segments after fusion surgery, an alternative approach is needed. Endo-TLIF might off a distance and optimal solution in such situation.

CM2-4

Full-endoscopic spine surgery treatment for foraminals stenosis: foraminotomy or fusion?

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Lumbar Foraminal Stenosis is a prevalent cause of lower leg radicular symptoms, characterized by the narrowing of the intervertebral foramen due to degenerative changes in intervertebral discs, zygapophyseal joints, ligaments, and bony structures [1].

Traditionally, the primary treatment for this condition was open spinal surgery, such as Transforaminal Lumbar Interbody Fusion (TLIF) after facetectomy. However, open spinal surgery involves sacrificing the paravertebral muscles by stripping them, which can negatively impact postoperative outcomes, leading to increased pain and atrophy of paraspinous muscles.

More recently, a technique called Full Endoscopic Lumbar Foraminoplasty (FELF) has been introduced for treating foraminal stenosis. FELF, a modified version of Full Endoscopic Lumbar Discectomy (FED), involves enlarging the lumbar spine's foraminal stenosis high-speed drills. Our facility was one of the pioneers in applying FELF to treat foraminal stenosis.

Over the past few years, some patients experienced treatment failure or a recurrence of leg radicular symptoms after undergoing FELF and were subsequently treated with interbody fusion. To gain a better understanding of the outcomes, we conducted a retrospective review of patients who underwent either FELF from January 2021 to March 2023. In total, our study included fifty patients who underwent 51 surgeries.　Finally, based on the data, we would like to state the indication of FELF for the foraminal stenosis.

CM2-5

Lumbar foraminal stenosis treated by UBE

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Lumbar radiculopathy caused by lumbar foraminal or extraforaminal stenosis is a common pathology of degenerative lumbar spine disease. Traditionally, microsurgical decompression of foraminal lesions using a paraspinal approach, introduced by Wiltse, has been considered as the gold standard for the surgical treatment of lumbar foraminal stenosis. In addition, a combination of total facetectomy and spinal fusion surgery has generally been performed for lumbar foraminal stenosis. However, excessive manipulation of the dorsal root ganglion can cause postoperative leg pain or dysesthesia, and the deep location of the foraminal lesions makes the surgery technically challenging and more invasive.

Extraforaminal stenosis in L5–S1, or far-out syndrome (FOS), was initially reported by Wiltse et al. in 1984, who demonstrated that an L5 nerve could be compressed by the transverse process (TP) of the L5 and the ala of the sacrum. A preoperative diagnosis of extraforaminal stenosis at L5–S1 is important becausea lack of diagnosing extraforaminal stenosis at L5–S1 can result in failed back surgery syndrome. In the past, using a paraspinal approach for microsurgical decompression of foraminallesions had been considered the gold standard for surgical treatment of lumbar foraminal or extraforaminal stenosis. But, access to the L5–S1 extraforaminal region is difficult for 2 reasons: (1) the distance between the L5 TP and sacral ala is short, and (2) the iliac crest generally makes the operative corridor very narrow. Furthermore, significant manipulation of the dorsal root ganglion can result in postoperative leg pain or dysesthesia, and the surgery is technically challenging and more invasive due to the deep location. As a result, some studies report a high rate of chronic or recurrent radiculopathy following FOS microsurgical decompression.

Lately, due to advancements in endoscopic spine surgery, the unilateral biportal endoscopic (UBE) technique has been applied in the cervical, thoracic and lumbar spine. For lumbar foraminal stenosis or extraforaminal stenosis at L5–S1, the UBE technique, which can go further into the foraminal for extraforaminal lesion less invasively, is becoming widespread and surpassing microscopic surgery in popularity. The purpose of this presentation is to describe the surgical decompression of lumbar foraminal or extraforaminal stenosis with the biportal endoscopic paraspinal approach.

Physical properties of UBE-TLIF

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Lumbar spine fusion has been widely implemented for various spine pathologies. Minimally invasive spine surgery can minimize damage to normal anatomical structures. As a part of the MISS, the MIS-TLIF with tubular retractor has been implemented in fusion surgery. In recent years, UBE spine surgery has been attempted in the lumbar fusion surgery. Basically biportal endoscopic TLIF is almost similar to MIS-TLIF using a tubular retractor. This presentation is intended to describe the technique of BE-TLIF.

BE-TLIF has the advantage of minimally invasive fusion surgery. Neural decompression can be performed with laminectomy and facetectomy using BE-TLIF, just like conventional TLIF. There are 3 options for cage insertions, TLIF cage insertion, 2 PLIF cage insertion and large cage (like OLIF cage) insertion. After interbody fusion procedure, percutaneous pedicles screw fixation was performed.

There have been many studies about the utility of UBE spine surgery. In addition, BE-TLIF has the advantage of being able to achieve a safer and more complete endplate preparation using magnified endoscopic view. It is supposed to be a good option for alternating open lumbar fusion and MIS fusion.