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Management of Cauda Equina Syndrome by Full Endoscopic Interlaminar Decompression : A Case Report

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Abstract:- Cauda equina syndrome (CES) is a rare condition that occurs most frequently as a result of a large central lumbar disc herniation, prolapse or sequestration. It is a serious medical emergency that requires prompt diagnosis and treatment by a suitably experienced surgeon. On presentation, around 50-70% of patients with CES have urinary retention (CES-R), while 30-50% have an incomplete syndrome (CES-I). To start with, patients present with motor weakness and sensory deficit. The latter group, especially if the history is less than a few days, usually requires emergency MRI to confirm the diagnosis followed by prompt decompression. It is crucial to avoid CES-I progressing to CES-R while under medical supervision, either before or after admission to hospital, as CES-R has a worse prognosis. The degree of urgency of early surgery in CES-R is still unclear, but it is widely accepted that the earliest possible decompression is essential to remove the mechanical and perhaps chemical factors causing progressive neurological damage. Before surgery, it is essential to provide the patient with a full explanation of the procedure and obtain informed consent. This is important in reducing the likelihood of misunderstanding and litigation in the event of a persistent neurological deficit. Overall, CES is a rare but serious medical emergency that requires prompt diagnosis and treatment by a suitably experienced surgeon. Early surgery is crucial to prevent progressive neurological damage, and a full explanation and consent procedure prior to surgery is essential to reduce the likelihood of misunderstanding and litigation.

Keywords:- *Cauda equina syndrome, Central disc prolapse, Bilateral sciatica, Urinary retention, Perineal hypoaesthesia Sexual dysfunction.*

I. INTRODUCTION

CES is a condition that is often accompanied by a specific set of symptoms, commonly referred to as "red flags." These symptoms include severe low back pain, sciatica (which may be bilateral or absent), saddle and/or genital sensory disturbance, and bladder, bowel, and sexual dysfunction.

It is essential to identify, document, and appropriately respond to any or all of these red flag symptoms in a timely manner, both from a clinical and medico-legal perspective. Failure to do so can result in serious harm to the patient and may also give rise to legal claims. Therefore, healthcare professionals must remain vigilant and take prompt action when these symptoms are present to ensure the best possible outcome for the patient.

The onset of CES can be either acute within hours or gradual over weeks or months. Symptoms can also vary from complete with painless incontinence to incomplete with some sphincter function. However, the critical distinction in both medico-legal and clinical terms is whether CES is complete or incomplete at any given time in relation to urinary function and perineal sensation. A useful but not widely known test is the trigone sensitivity test, which involves gently pulling an inflated Foley catheter to elicit the urge to urinate.[1]

In CES-Incomplete, the patient experiences urinary difficulties of neurogenic origin, including altered urinary sensation, loss of desire to void, poor urinary stream, and the need to strain to urinate. Saddle and genital sensory deficit are often unilateral or partial, and trigone sensation should bepresent.[1]

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In contrast, the complete syndrome, CES-Retention, is characterized by painless urinary retention and overflow incontinence, where the bladder is no longer under executive control. Extensive or complete saddle and genital sensory deficit with deficient trigone sensation is usually present.[1]

It is well-established that the prognosis for patients with CES-I at the time of surgery is generally favorable. On the other hand, patients who have deteriorated to CES-R when the compression is relieved have a poorer prognosis. However, around 70% of CES-R patients have a socially acceptable long-term outcome.[1]

Cauda equina syndrome is a relatively uncommon condition, accounting for approximately 2-6% of lumbar disc operations. [1,2,3] The incidence of this condition in the general population is estimated to be between 1 in 33,000 to 1 in 100,000. [4] In Slovenia, the incidence of CES caused by a lumbar disc prolapse was found to be 1.8 per million population in a retrospective review. [5] Due to its rarity, mostgeneral practitioners in the UK are unlikely to encounter a true case of CES caused by intervertebral disc herniation in their entire career. [6]

Prompt and appropriate surgical treatment is generally considered necessary for a confirmed diagnosis of CES. [1,7,8,9]

The conventional treatment of CES has been open decompression and discectomy. Recently the minimal invasive spinal decompression surgeries like tubular decompression, microscopic decompression and full endoscopic decompression are becoming increasingly popular and have gainedmomentum.

Full Endoscopic decompression provides various advantages over the conventional surgical technique such as, Minimal invasive approach, less post operative pain, less blood loss, less damage to the paraspinal muscles, less hospital stays, early mobilization and functional recovery and thus early return to work and better quality of life.

II. CASE REPORT

A 37-year-old female presented with severe lower back pain radiating to bilateral lower limbs and left sided foot drop for 4 months. Patients also presented with painless urinary retention and overflow incontinence where the bladder was not under her voluntary control since 2 days. There was no history of trauma, significant weight loss, fever, no contact history with TB.

On examination saddle anaesthesia was present, power atL5 and S1 myotome was 1/5 with numbness at L5 and S1 dermatome. on the left side straight leg raise test was positive at 10 degrees.

Routine Lab investigations like HB, WBC count, ESR, CRP, LFT, RFT were within normal limit.

MRI of Lumbosacral Spine done

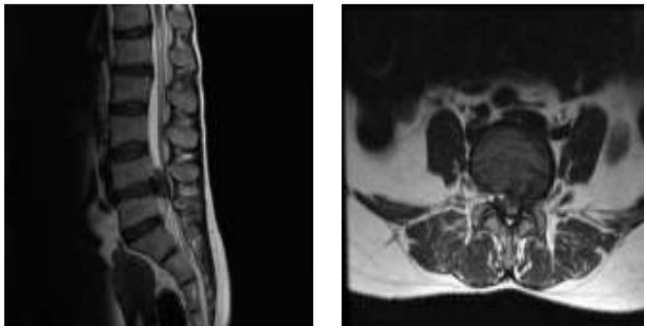

Fig 1. Pre op MRI T2 Sagittal and axial images showing large paracentral disc at L4 L5 level.

III. OBSERVATION AND DISCUSSION

After the confirmed diagnosis of CES due to large disc herniation, Full Endoscopic decompression and discectomy was planned. Full informed written and oral consent was taken. Intraoperatively, decompression was done by drilling the superior and inferior lamina at L4-L5 and large central disc was removed with the help of rigid 25-degree endoscope.

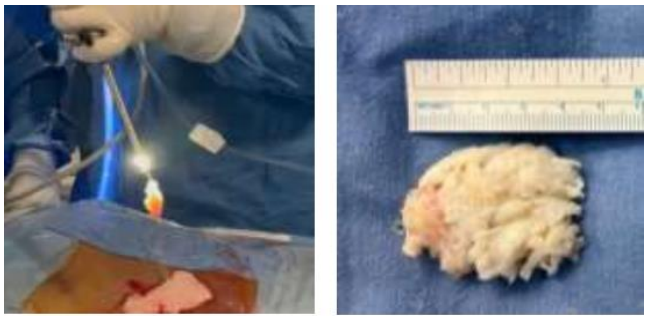

Fig 2. Removal of a large disc fragment with the help of endoscope

The procedure was completed, and post operative functional outcome was measured in terms of clinical neurological assessment and VAS score for leg and back pain.

VAS score of leg and back pain was significantly reduced immediate postoperatively as compared to preoperative VAS.There was no change in the motor power or bladder function. Immediate post operative MRI was done for the assessment ofthe procedure.

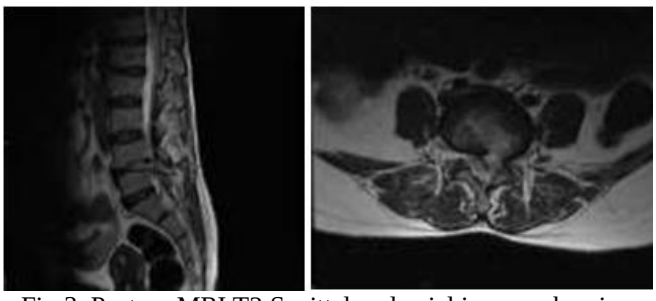

Fig 3. Post op MRI T2 Sagittal and axial images showing decompression status at L4 L5 level.

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The patient was discharged on Day 5 and mobilized with walker support and AFO brace.

The patient was followed up every month. During 3 months of post operative period, patient had gained +2 power and was able to do full range of motion at L5 and S1 against the gravity and was able to walk without support. The urinary sensations were present but the voluntary control to hold the urine was still absent.

The authors Gleave and Macfarlane conducted a retrospective review of 33 cases of cauda equina syndrome (CES) with bladder paralysis and found that the mean duration of bladder paralysis was 3.6 days. [10] They reported that 79% of their patients claimed full recovery of bladder function, but only 22% were left without any perineal or limb sensory deficit. The prognosis for an individual with established complete CES with no bladder sensation or control is probably not time-dependent to the same extent as CES with incomplete symptoms, but surgery should still be carried out as soon as possible for patient morale and comfort, as any delay in treatment can worsen neurological recovery and cause continuing damage to sciatic nerve roots. [13,14]

The authors confirmed that early surgery is best for CES with incomplete symptoms, as those series tend to show a favorable outcome. They also noted that urodynamic studies can reveal serious bladder function disturbance even without symptoms, and that recovery of bladder and sexual function can continue for years after the initial insult. [11] The authors emphasized the importance of follow-up and the correlation between sphincter and sexual function outcome, particularly in women. [15,16]

Gleave and Macfarlane recommended full laminectomy rather than microdiscectomy for surgical exposure and cautioned against excessive manipulation of the dura. [12]They also noted that nerve ischemia for more than 6 hours is irreversible in experimental work and other clinical situations, suggesting that the outcome of CES with bladder paralysis has likely been decided by the time the patient is admitted to the hospital. [1]

Based on the available information, it is difficult to make a definitive prognosis for this complex condition. However, some general observations can be made:

- About half of CES cases present with CES-R upon admission to the hospital. [16,17,18]
- Evidence suggests that patients with CES-I at thetime of surgery have a better prognosis than those with CES-R. [1,19,20,21]
- Around 75% of CES patients will eventually regain acceptable urological function, although chronic back pain and some motor and sensory deficits in the perineum and lower limbs may persist. [10]
- About 20% of CES patients will have a poor outcome, often requiring ongoing treatment such as management of sexual dysfunction, self- catheterization, colostomy, urological and gynecological surgery, spinal injuries rehabilitation, and psychosocial support.

IV. CONCLUSION

CES is a condition with severe consequences, including bowel, bladder, sexual, and lower limb dysfunction, which makes it a significant concern in the medico-legal field. While delay until the next operating list may not be a significant factor in the causation of CES, clinicians should aim to relieve neurological compression within approximately 48 hours of onset, with earlier intervention leading to better results, especially in cases of CES-I with signs of progression. Early surgical intervention may reduce chronic sciatica but the functional disability with bladder bowel dysfunction has variable outcomes in terms of recovery. [14]

In our case, we conclude that sufficient decompression can be achieved with the help of full endoscopic interlaminar decompression and discectomy. The complications of conventional open decompression like post operative residual pain, post operative instability due to excessive resection of the lamina can be avoided. Patients will have less post operative pain; less hospital stay and better cosmesis.

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