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Cauda Equina syndrome rehabilitation strategies post decompression- Discectomy – A case report

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ABSTRACT

Cauda equina syndrome (CES) is a unique clinical entity which leads to various neurological dysfunctions due to entrapment of lumbosacral nerve roots. It mainly occurs after a significant herniation, prolapse, or sequestration of the lower lumber disc. In the case of spinal stenosis, small prolapses may cause CES. In this case report we present a case of 60 years male patient having complaint of mild low back pain since1 year back which progressively got severe 1.5 month back. The pain was radiating bilaterally in both the lower limbs along with weakness and tingling sensation Loss of urination and bowel sensation. With this complaints patient came to AVBRH were investigations like X-ray and MRI was done and diagnosed with cauda equina syndrome with neurodeficit with bowel and bladder involvement. Next day patient got operated for decompression and discectomy at L4-L5 level. Post-operative physiotherapy treatment was started and it shows significant improvement and used to prevent secondary complications.

Keywords: Cauda equina syndrome (CES), decompression and discectomy, bowel bladder involvement, Rehabilitation, case report.

1. INTRODUCTION

The spinal cord runs from medulla oblongata and ends as the conus medullaris. Cauda equina is a bundle of spinal nerves and spinal nerve roots that begins from the medullary cone. The compression of the conus medullaris leads to Cauda Equina syndrome (CES), an unusual and severe clinical manifestation of the lumbar and sacral nerve roots. Among the various causes of compression of nerve root, the commonest is the lumbar disc herniation (LDH) (Gardner et al., 2011). CES is a very uncommon condition caused by a prolapsed lumbar disc (3%). Back aching, pain radiating unilaterally or bilaterally in legs, sensory or motor impairment, absent Achille's tendon reflex, loss of perianal sensation, and altered sphincter function are common symptoms that, if left untreated, can result in permanent disability (Dias et al., 2017).

According to BASS (British Association of Spine Surgeons) guidelines, CES is categorised into three types: suspicious (CESS), incomplete (CESI), and full (or CES with true retention; CESR). BASS classification is a safe system with prognostic benefits (Germon et al., 2015). Patients with CESI have motor and sensory abnormalities, as well as saddle anaesthesia, but have not yet developed full bowel or bladder retention or incontinence. Patients have already established genuine retention in CESR. Painless urine retention and subsequently overflow incontinence are experienced as a result of the lack of the visceral neurologic signal to the central nervous system. Similarly, bowel dysfunction might also present as a problem.

To get relief from the symptoms and to prevent further damage to the spinal cord and nerve roots operation has to be done. Laminectomy is a common procedures for decompressing the spinal canal by removing the lamina—the back part of the vertebra that covers the spinal cord—in cases of narrowing caused by a variety of conditions including degenerative stenosis, fracture, spinal tumours, abscess, and deformity (Duncan and Bailey, 2011). The surgical removal of part or all of a spinal disc is referred to as a discectomy. A discectomy is used to treat herniated (prolapsed, bulging, or slipping) or ruptured discs in the spine. After the surgery Physical therapy is essential as it promotes healing and helps restore strength ad range of motion in the spine. Research indicates that people who do exercise after back surgery have better outcomes compared to those who do not (Shivji and Tsegaye, 2013).

2. CLINICAL PRESENTATION

Patient Information

We are presenting case of 60 years male patient with right hand dominance, farmer by occupation. With a 1year history of intermittent low back pain for which he took medicines, he used to get relief from pain till the course of medicines. 1.5 month back that is in January 2022 he started experiencing severe low back pain which was radiating into bilateral lower limbs, along with that weakness increased in both the lower limbs with tingling sensations, and with loss of urine control and bowel sensations. His son took him to private hospital on 22/01/ 22, there investigations like X-ray was done and told them to do MRI and catheter was applied. Medications were given and referred them to orthopedic doctor were MRI and sonography was done and they told the patient that there is a compression of nerve in the low back region for which operation has to be done. After this for the period of 15 days they took medications and were at home. In the month of February, they went to another doctor who suggested them to go AVBRH for the operation. On 27/2/22 patient came to AVBRH were on the same day X-ray (Figure 1) and MRI (Figure 2) was done and was operated on 28/2/22 for Decompression and Discectomy at L4- L5. Patient was in ICU for three days with O2 mask only on 1st day after operation, IV line and Foley's catheter was present. On 2/3/22 he was shifted to male orthopedic ward and physiotherapy call was given on same day and since continuing the treatment.

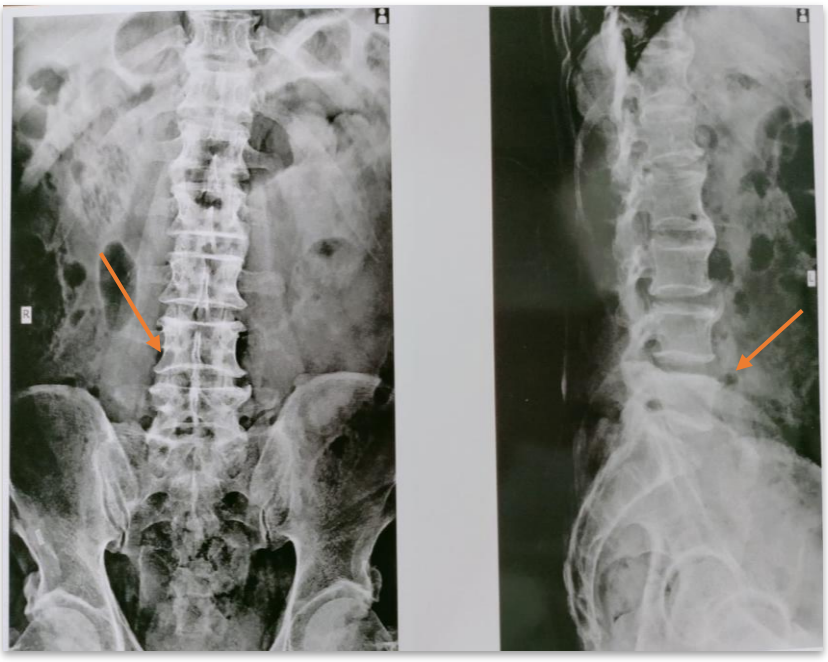

Figure 1 Pre-operative X-ray of Lumbar-spine in AP view and lateral view, showing reduced joint space at L4-L5 level and multiple over growth of bony spurs are seen at the edges of vertebral bodies.

3. CLINICAL FINDINGS

A verbal consent was taken from the patient before performing physical examination. Patient was assessed on post-operative day 3. Dull aching pain over suture site according to NPRS on movement was 5/10 and was 1/10 on rest. On observation, bandage was present over the operation site. On bandage palpation around the suture site tenderness grade 3 was present. Superficial sensation i.e., light touch and pin prick was diminished over Dorsum of foot L4 and L5 dermatome level and absent over S3 at gluteal region, anal tone absent. Deep sensation i.e., proprioception of right greater toe was absent and Cortical sensation i.e., two-point discrimination and graphesthesia was absent bilaterally over dorsum of the foot. Bilaterally plantar reflex, knee jerk and Achilles reflex was absent. Bowel and bladder sensation were absent.

Radiological Investigations

Radiological investigations were done as the patient was admitted for clinically correlating the symptoms with a confirmative finding to proceed with surgical intervention. Figure 1-3 are X-rays and Magnetic resonance Imaging of the patient's lumbar spine.

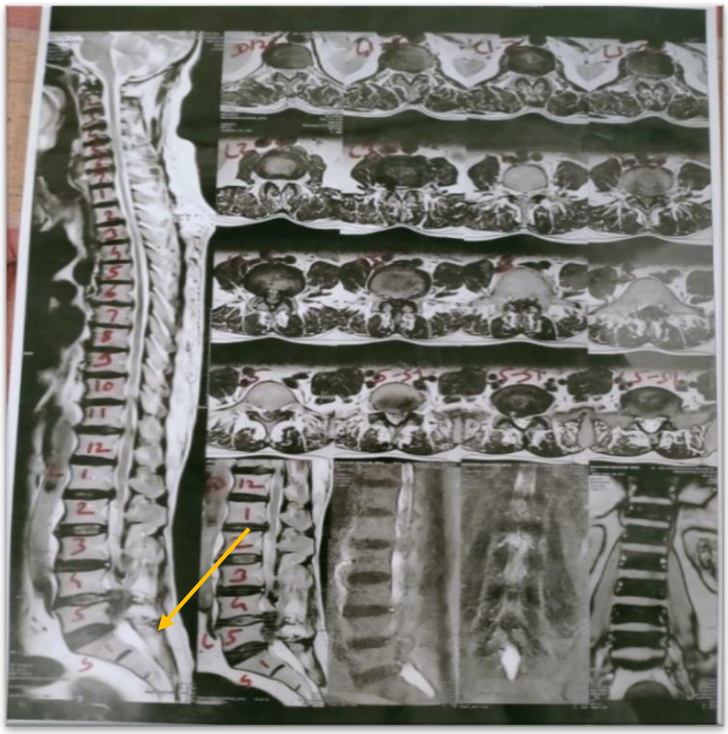

Figure 2 Pre-operative MRI of spine showing moderate changes of Lumbar spondylosis with disc prolapse and Lateral/ lumbar canal stenosis at L4-L5 level.

Surgical procedure

Patient operated on 28/02/22 for posterior decompression and discectomy at L4-L5

Steps of operation

Under general anaesthesia prone position given over bolster under all aseptic precautions cleaning, painting and draping done. 5 cm midline vertical incision given over L4- L5 Lamina of L4 completely and L5 partially removed. Ligamentum Flavum was hypertrophied which was removed and spinal cord was decompressed completely at L4 and partially at L5 Discectomy done at L4-L5 level. Thorough wash was given with normal saline. Closure was done in layers. Procedure uneventful Patient was extubated and shifted to ICU for observation. Skin closure- sutures – Ethilon 2-0 was done.

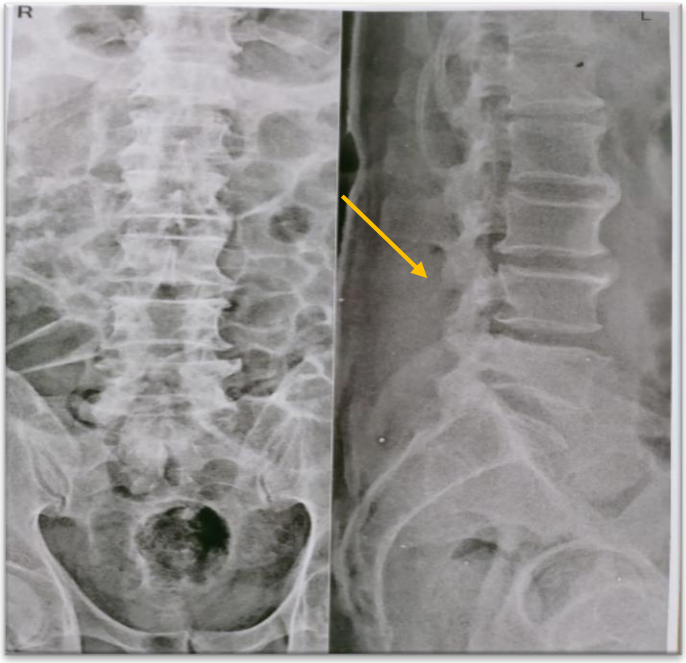

Figure 3 Post-operative X-ray of lumbar-spine in AP view and lateral view showing removal of Lamina and spinous process of L4 and L5 vertebral body.

Therapeutic intervention

Physiotherapy goals of management were as follow

The goals were to educate the patient, to prevent pulmonary and vascular complications, bowel and bladder care and management, independent functional mobility, to improve and maintain strength and endurance of bilateral upper and lower extremity, flexibility of lumbar spine, abdominal and back muscle strength.

During week 0-2 post operatively

Patient was educated about the precautions that he has to take now after the surgery. That is not to bend forward and twist, lift, push and pull 10 pounds or more for up to 3 months. Not to sit for more than 30 min at a time take standing or walking breaks in between. No extension range of motion, nor rotation exercises for eight weeks due to weekend bony arch.

Patient was taught to look for any sign of inflammation such as swelling, redness or non-closure of the wound and to avoid shower to prevent incision from getting wet until it is closed completely. To prevent vascular and pulmonary complications Ankle toe movements given with 10 repetitions for 3 times a day. Deep breathing exercises were given to the patient to prevent post-operative complications such as pneumonia or atelectasis. Log rolling was taught to the patient with pillow in between the legs to prevent excessive adduction (Figure 4). While sitting upright use lumbar roll at all times and frequently change positions. Sleeping position should be changed frequently from supine to side lying to prevent pressure sores. TENS was given to reduce pain around the suture which helps to reduce pain by pain gate mechanism.

Intermittent catheterization and Valsalva maneuver which is done by straining was explained to the patient to void the urine. Manual evacuation techniques and gentle Valsalva was explained to the patient. Along with that eat a diet with appropriate amounts of fibers, fluid intake, if required Stool softeners, laxatives and bulking agents were given for bowel care. Transversus abdominis Bracing exercise with normal breathing (without pelvic tilt) was given for 10 repetitions for 3 times a day. Static Back with normal breathing, static glutes, Static Quadriceps and hamstrings were given with 10 repetitions for 3 times a day.

Light stretching to quadriceps, hamstring, and gastrocnemius 10 sec holds with 5 repetition 3 times a day. Maintain strength and range of upper and lower extremity. Bed sides sitting for 10-15 min were done (Figure 5).

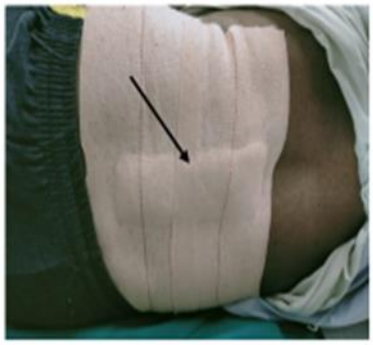

Figure 4 Patient in side lying with log rolling technique, making visible the post-operative bandage over the lumbar region. Arrow shows the 5cm midline incision covered with gauze piece and bandage over it.

Figure 5 Showing patient in sitting position with support of hand on post -operative day 4.

During Week 2-4 post operatively

Continuing the first 2 weeks precautions and exercise program along with that walking was progressed up to 30 min or more. Walking will help to increase blood circulation and reduces the chances of developing blood clots. Static abdominals and static back holds were increased to 15 sec 10 repetition 3 times a day. Gluteal activation initiated with side lying abduction, side lying clams 10 repetition of each. To stretch the hamstrings and to help mobilize the proximal sciatic nerve without get stretch to it Single knee to chest is done. Double knee to chest is given to stretch the lower lumbar spine (erector spinae) and hips.

Upper limbs and Lower limbs Strengthening exercise is started, once achieved proper transverse abdominis and glute activation. Step ups, mini wall squats were started. Balance exercises were given as standing on single leg to maintain balance, walking in a straight line with heel of front foot touching the toes of behind foot was done. Upper limb light resistive activities with free weights were done.

Follow up and outcome measure

Assessment was done post operatively on 3rd and 28th day, bladder sensation were gained bowel sensations were also gained, suture healing was adequate without any pus/infection at the incision site. Pain on Numerical pain rating scale pre-treatment was 5/10 on movement and 1/10 at rest and post-treatment on follow up was 2/10 on movement and 0/10, Barthel Index score on pod 3 was

30/100 and on POD 28 was 95/100, indicating a significant improvement. Ranges and strength of muscle bilaterally were measure for forming rehabilitation protocol and to assess the prognosis and the values were as given Table1 and 2.

Table 1 Represents Range of motion taken prior to initiation of rehabilitation and post operatively on day 28

Range Of Motion (in degrees)	RIGHT POD3 (02/03/22)	RIGHT POD 28 (30/03/22)	LEFT POD 3 (02/03/22)	LEFT POD 28 (30/03/22)
HIP				
Flexion	0 -72	0 -120	0 -70	0 -120
Extension	Not Assessed	0 -16	Not Assessed	0 -15
Abduction	0 -20	0 -28	0 -22	0 -30
Adduction	0 -20	0 -22	0 -18	0 -22
knee				
Flexion	0 -120	0 -125	0 -122	0 -125
Extension	120- 0	125- 0	122- 0	125- 0
Ankle				
Dorsiflexion	0- 17	0- 18	0-16	0-17
Plantarflexion	0- 40	0-42	0-40	0-42

Table 2 Represents Manual muscle Strength taken prior to initiation of rehabilitation and post operatively on day 28 for bilateral lower limb

Manual Muscle Testing (Grade 0-5)	RIGHT POD3 (02/03/22)	RIGHT POD 28 (30/03/22)	LEFT POD 3 (02/03/22)	LEFT POD 28 (30/03/22)
HIP				
Flexors	3/5	3+/5	3/5	3+/5
Extensors	2+/5	3/5	2+/5	3/5
Abductors	-3/5	3+/5	-3/5	3+/5
Adductors	-3/5	3/5	-3/5	3/5
KNEE				
Flexors	3/5	3+/5	3/5	3+/5
Extensors	3/5	3+/5	3/5	3+/5
ANKLE				
Dorsiflexors	3/5	3+/5	3/5	3+/5
Plantar flexors	3/5	3+/5	3/5	3+/5

4. DISCUSSION

Back discomfort that lasts longer than three months is referred to as chronic low back pain (Chitale et al., 2021). This can lead to disc herniation, with symptoms such as ache and numbness radiating to the glutes and lower extremities as a symptom of nerve root compression. There is sensory loss or weakening in the leg, resulting in a variety of symptoms. It can happen at any level, however it usually happens at L4/5 or L5/S1 in 95% of instances (Deshmukh, 2021). One of the most common causes of lumbar radiculopathy is disc herniation, which can be treated conservatively or surgically. When conservative treatment fails, surgery becomes essential. When compared to patients who are treated conservatively for a herniated disc, those who undergo surgery had better long-term treatment outcomes in terms of leg pain relief, improved function, and satisfaction (Yuan et al., 2019).

This case report is illustrating the incidence of chronic low back pain progressively leading to disc herniation at L4-L5 level causing cauda equina syndrome with bowel and bladder involvement managed with decompression and discectomy at L4-L5 level and showing physiotherapy week wise management in this case. Post-operative physiotherapy management after decompression and discectomy at L4-L5 is important for preventing secondary complications and make patient functionally independent.

5. CONCLUSION

In this case report we have given the 4 weeks physiotherapy management after decompression and discectomy at L4-L5 with bowel and bladder involvement. Physiotherapy management showed improvement in patient's quality of life and was helpful to prevent secondary complications.

Author's contributions

PSF came up with the idea of writing manuscript. PSF did the assessment and kept the follow up of patient. PAP and MVJ planned treatment protocol of the patient. All the author's read the manuscript before submission.

Informed consent

Written and Oral consent was taken from all individuals participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

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Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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