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Case report

Comprehensive Physiotherapy Management in PIVD Patient

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ABSTRACT

Back pain from prolapsed intervertebral disc is a common reason for physiotherapy management. Therefore, the objective of this case study was to define and address the use of electrotherapy modalities with the lumbar exercises and core stabilization workout with a lumbar herniated disc patient. Patient information and diagnosis**:** A 37 year old women patient consulted to the physiotherapy treatment with scan confirmed by MRI of prolapsed intervertebral disc (L5-S1). The key symptoms of the patient was pain in the back region and radiating ache in the right buttock followed by numbness and tingling sensation in the right leg. Therapeutic interventions: The first therapeutic initial weeks composed of modalities (TENS) with back muscles exercises and core stabilization exercises. As an addendum to the extension exercises, mechanical traction and strengthening and stability exercises were added for the following weeks. Outcome indicators include the functional scale for back pain and the numerical pain assessment scale (NPRS). Outcomes from initial assessment to discharge the functional back pain scale 34/60 to 58/60 and NPRS 7/10 to 0/10) showed that the patient no longer suffered from low back pain and enhanced functional status. The patient no longer worried of numbness and tingling in the right leg and the patient's objectives were achieved. The evidence from this case report indicates back muscles exercises and core stabilization exercises with modalities that encouraged the patient's pain improvement and return to the previous function stage.

Keywords: Lumbar disc herniation, back pain, TENS, lumbar exercises, core strengthening exercises

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INTRODUCTION

Prolapsed intervertebral disc is shift of nucleus pulposus outside the space of the intervertebral disc [1]. Prolapsed intervertebral disc is one of the widespread and expensive health conditions in India. Heavy lifting, twisting and trauma were the most common causes of prolapsed intervertebral disc, in which 52-60% are work related.

Prolapsed intervertebral disc is the most prevalent condition between the ages of 30 and 50, with male to female ratio of 2:1, and related to repetitive mechanical forces [2]. It may occur at any level, but in 95% of the cases it occurs at L4/5 or L5/S1 [3]. The clinical characteristics of the prolapsed intervertebral disc are pain and numbness radiating due to nerve root compression radiating to the buttocks and lower extremities [1]. There is sensory loss or weakness in the leg in prolapsed intervertebral disc, which results in multiple findings depending on a variety of factors, including the extent of the disc prolapse and the degree to which the spinal nerve is squeezed by it [4] when the nucleus pulposus reaches into the retaining ring of the disc without necessarily fracturing it, disc protrusion occurs [3].

One of the prevalent musculoskeletal disorders is prolapsed intervertebral disc and it is closely linked with functional disability of trunk muscles, such as back extensors and abdominal muscles. Disc herniation, as the key contributor to back pain, has a significant effect on the work, everyday life and quality of life of people, even persistent neurological disorders and incontinence for a lifetime due to syndrome of cauda equina [5]. There are various complications of lumbar disc herniation such as foot drop, sciatic nerve injuries, and lumbarplexopathies [6]. Foot drop can be caused byL4-L5 radiculopathy [7]. Physical exercises play important role to treat back pain in patient with prolapse intervertebral disc [8]. Physiotherapy treatment for back pain and radiating leg pain, electrotherapy modalities like traction, TENS, ultrasound can be given to the patient [9]. The goals of physiotherapy differ for each patient based on their unique signs and symptoms [10]. And recognize the precautions that must be taken during physical activity sessions [11].

Patient Information

Patient is a 37 years old female residing in Wardha district

and is housewife having right side as a dominant side. Patient presented with pain in low back region, tingling sensation in right leg and unable to stand erect. Patient was apparently alright 4 month back. While performing household activities, patient felt pain in the lumbar region which was progressive in nature.

After a few days, it worsened more and pain also starts radiating to the right lower limb and patient felt tingling sensation to the right limb and was even unable to stand erect with these complaints patient visited to hospital in Nagpur (11/10/2020) where investigation was done. Investigation revealed prolapsed intervertebral disc at L5-S1. After diagnosis, patient was on medication and physiotherapy management

Character of pain was described as sharp shooting situated at low back and radiating to right leg up to ankle. At NPRS the pain score was 6 with forward bending, sitting, standing, walking as a aggravating factors and medications and rest as an relieving factor. Her past history includes no history of hypertension, diabetes, asthma or thyroid. Her personal history includes her diet with adequate appetite, her sleep wake cycle and bowel bladder movement are regular with no disturbance with no addictions or habits.

Clinical Findings

The patient was examined in sitting position which concluded that the patient showed a forward head posture with rounded shoulders and the patient had a flat lumbar spine from a lateral view. To assessed the movement of the lower limb, goniometry was performed. To checked the strength of the muscles, manual muscle testing was performed. Abdominal muscles – 3 score, Back extensors muscle- 3 score.

Myotomes were applied to assess muscle power and look for signs of neurological weakness. Throughout the left lower extremity, the L2-S2 was normal. L5 (great toe extension) and S1 (ankle plantarflexion) myotomes in the right side showed weakness. The piriformis muscle was tested for tightness using the piriformis stretch test.

Special Tests

Straight leg raise test and slump test were performed on the patient to assessed the condition clinically.

SLR test value:

1st day of treatment - 60 degree Last day of treatment - 90 degree

Timeline

Patient experienced extreme pain on 10/10/2020 Came to hospital on 11/10/2020 and MRI was done. Physiotherapy treatment was initiated on 13/10/2020.

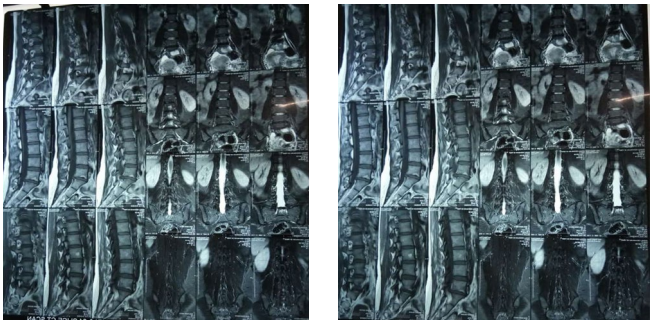
Diagnostic Assessment

The diagnosis of the patient was prolapsed intervertebral disc which was confirmed by radiological investigation (MRI) and patient's history and clinical findings.

MRI

Diagnosis: Prolapsed intervertebral disc (PIVD)

Figure 1: MRI Scan showing PIVD



Physiotherapy management

Day 1- 1 week

Correction of posture and movement and local assistance. Electrotherapy modalities to reduce pain included superficial heat. Used to suppress muscle spasm TENS: It helps to reduced pain and Traction- beneficial for alleviating compression of nerve root and radiculopathy. Posterior or posterolateral protrusion- Passive Extension- Lateral shift correction. Correction of lateral shift-Passive flexion. Active set of exercises to improved range of motion, stretching of piriformis muscle to decrease tightness. Maintain/ improve neural tissues versatility.

1 week - 4 week

Easy spinal movements in pain free areas. Isometrics of extensors. Promoting aerobic sports such as cycling, swimming.

Weeks 4- 12 weeks

Gentle active pain free motion range exercises. Exercises for stretching and flexibility: lumbar muscles stretch and hamstring stretch was given. Core stabilization exercises helps to increase the strength of the core muscles and reduces the back pain. A home workout program was recommended after 12 weeks. It includes patient education, strengthening exercises, stretching exercises, and flexibility exercises. Strengthening and flexibility exercises - 10 repetitions twice a day Stretching exercises - 10 seconds hold. As the frequency and duration of exercise progressed, addition of new exercises were prescribed.

Follow-up

Physiotherapy treatment was provided for three months and home exercise program was prescribed.

DISCUSSION

Herniated disc prolapse is provoked by the annulus fibrosus as the pulposus nucleus is torn into the spinal canal. According to Parker SL, Mendenhall SK, Godil SS, et al, 29% disc herniation are associated with nucleus pulposus [11]. According to Shin CH, Jeon KK, Functional exercise program for the strength of back muscles was effective which is similar to present study. According to Lee Y, Lee CR, Cho M, joint mobilization is effective to increase lumbar flexion and extension which is contradictory to this study [12]. After advanced

training in motor control for trunk muscles, there is substantial reduction in pain which is the limitation of the present study [13]. Lumbar stabilization treatment is effective to treat the patient of lumbar disc herniation which increases the strength of the muscles [14] and according to O'sullivan et.al, there is decrease in pain after 10 week core stabilization exercises program given to the patient [15] and is similar to the present study. According to Marchand S, Johnson MI, TENS is effective at reducing pain and helps to improve the physical functions [16] while some study shows no effect of TENS for recovery of patient with disc herniation [17]. The range of motion of the spine is almost always limited in prolapsed intervertebral disc which include flexion, ipsilateral bending and decreased lumbar lordosis. More than 90% of patients respond positively to the straight leg raise test [19]. As the disc loses elasticity and the forces acting on it become more eccentric, herniation becomes more common in middle age [20]. The growth of muscle strength for stabilization and integrated pain relief and rehabilitation exercises helps to preserve the joint motion and muscle strength.

CONCLUSION

The findings show that increasing the strength of the muscles and enhance the functions of the prolapsed intervertebral disc patient with the assistance of electrotherapy modalities and lumbar and core stabilization exercises. it helps to improve muscle functions and increase joint motion having a positive effect on physical stability.

CONFLICT OF INTEREST

None

Authors' Contribution

All authors did equal contribution and read the manuscript before submission.

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