



## Intra-radicular Disc Herniation mimicking a Nerve Root Tumor

Suresh Sivadasan Pillai<sup>1</sup>

### ABSTRACT

**Introduction:** Intra-radicular disc herniations are rare disorders with only few cases reported in literature. In most of these cases there is evidence of some part of the disc in adjacent area. We present a case of completely intra-radicular disc which was misdiagnosed as nerve root tumor as there was no evidence of disc prolapse at the time of diagnosis.

**Case Presentation:** 51 year old male presented with history of severe back pain radiating to right lower limb since 11/2 month. MRI showed hypointense lesion completely inside the S1 root and a provisional diagnosis of nerve root tumor was done. At surgery, fluffy material was removed from the lesion which was histopathologically confirmed as intervertebral disc. Post operatively all symptoms of patient was relieved except dysesthesia in sole which lasted for a year post surgery. At 5 year follow up patient has no symptoms. **Conclusion:** A diagnosis of intra-radicular disc should be considered in differential of nerve root tumor. Surgical excision of intra-radicular disc gives good clinical and functional results.

**Keywords:** Intra-radicular disc, interdural disc herniation, nerve root tumor

### INTRODUCTION

Intervertebral disc herniations are very common although intra dural and intra radicular disc herniation are rare [1]. More than 100 intra dural disc herniations are reported till date but only 17 cases of intra

radicular disc herniations are reported [1-15] (Table 1). All the reported cases show some evidence of disc prolapse in the adjacent areas indicating sequestered disc that is then engulfed into the dural sac. The mechanism of dural penetration in these cases is unclear [14,15], however some indication of a disc disease is always visible on radiological investigations (Table 1). Many cases had history of prior spinal surgery, which may generate free disc material that was missed during surgery and cause intra-radicular herniation (Table1). This is the first case of intra radicular disc herniation mimicking a nerve root tumor without any evidence of disc prolapsed or any surgery in recent past. This case was suspected as a case of nerve root tumor and intraoperatively the lesion was completely intradicular with a clear space between the dura and the nerve root. Post operative histopathology confirmed the lesion to be intervertebral disc material. We report details of this unique case

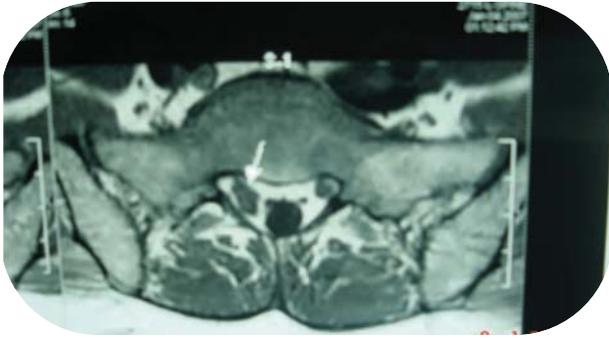
### CASE REPORT

51 year old male presented with low back ache with radiation of pain to the right lower limb for 1 ½ months duration. He had pain at rest which aggravated on walking. He walked with a limp. Patient was given epidural injection 3 weeks before he presented to us at another center. There was no relief of pain post injection. Currently he did not have relief with analgesics and physiotherapy and had no relief from epidural injection. There was no history of any previous interventions to the spine or bowel or bladder symptoms. Ankle jerk was absent on the right side. Plantar reflex was equivocal on the right side and down going on the left side. There was no motor power loss or sensory deficit. MRI done showed hypointense lesion that appeared intradicular in S1 root (arrow mark) with a clear layer of CSF all around the lesion (Fig. 1). Gadolinium MRI did not show any enhancement. There was a clear gap between the dura and the fusiform swelling in the nerve root with no evidence of disc prolapse. A diagnosis of nerve root tumor was made and surgery was advised. Surgery was done with a midline

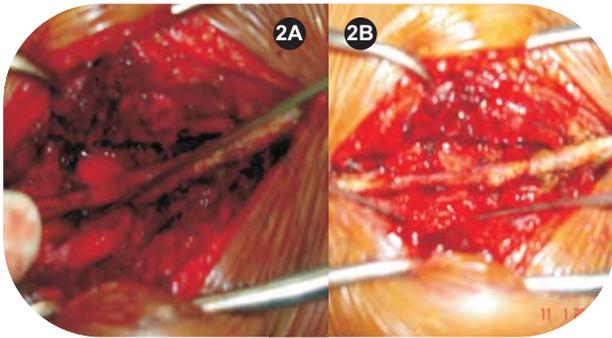
<sup>1</sup> Division of Spine Surgery  
Lakeshore Hospital and Research Center Ltd,  
Kochi, Kerala, India

**Address of Correspondence**  
Dr. Suresh Sivadasan Pillai  
Head Division of Spine Surgery  
Lakeshore Hospital and Research Center Ltd,  
Kochi, Kerala, India  
Email - sureshorth@gmail.com





**Figure 1:** Axial MRI image showing hypo-intense lesion in proximal nerve root.

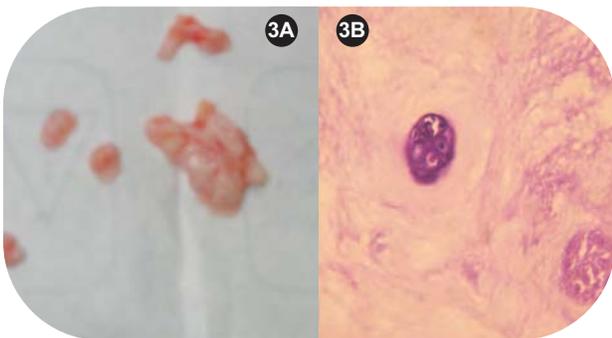


**Figure 2:** A- showing enlarged nerve root (bottom of the picture). B- The enlarged nerve root is mobilized by a probe.

incision with patient in the prone position. Ligamentum flavum on the right side was removed.

The upper edge of the S1 lamina was nibbled and the swelling exposed. Due to the long intra spinal course of S1 root, the swelling could be very well exposed.

The swelling was seen at a distance from the dura with a definite segment of normal looking nerve root in between (Fig. 2A). The swelling was opened longitudinally. Fluffy disc like materials came out from in between the nerve fibres (Fig. 2B). No CSF came out from the incision. Material was sent for histopathological examination. The nerve sheath was



**Figure 3:** A- The material excised from the nerve root. B- Histopathology of the specimen confirms it to be degenerated intervertebral disc with characteristic cell clusters

repaired with 8-0 prolene under microscopic vision. Histopathology report was consistent with degenerated disc material with collagenous tissue showing characteristic cell clusters [16] (Fig. 3).

Post operatively the patient was relieved of his symptoms except for dysesthesia at the sole of foot which remained for one year post surgery. At 5 years follow up the patient has no complains and is doing all his functional activities normally. There is no sensory motor deficient at present.

## DISCUSSION

We could locate 17 cases of intra radicular disc prolapse that are reported in the literature (Table 1). These were seen in relatively younger population with only three cases in age more than 60 years. A predominant male population was noted to be affected. Another important point was the level of such lesions which most commonly was seen at L5-S1 level. A probable reason may be that intracanal length of S1 is much longer and thus more prone to disc herniation [4].

Some confusion exists regarding the nomenclature of these lesions. Mut et al [3] divided these lesions into two types; A- herniation in dural sac, B- herniation in preganglionic nerve root. In our case the lesion was of type B. In type B lesions the disc material may either lie between the two leaflets of dura (Inter-dural [7] or pseudointradural [2,5]) or pierce both dural leaflets to be true intra-radicular [1]. In pseudo-intradural cases there is no leakage of CSF when the dura is excised to remove the disc material. In our case there was no CSF leak indicating it to be pseudo-intradural variety of intra-radicular disc herniation. The exact mechanism of dural penetration and to the root are not known. Most of the cases there were evidences of previous interventions or evidences of disc prolapse in the nearby area (Table 1). Bilkra suggested that there are localized adhesions which may limit mobility of the nerve roots and thus allow for intra-radicular penetration by disc material [17]. These adhesions probably occur as a result of several mechanisms, including traumatic irritation from a herniated disc, previous surgery [10,14] and chronic local inflammation [18,19]. However many reported cases did not have previous surgery and in our case we could not find any adhesions and nerve root was really free from all sides. Thus the adhesion hypothesis may not explain pathogenesis in all cases. Dandy suggested that acute prolapse may cause acute pressure on the anterior wall of dura and may eventually erode it to reach intra-radicular [20]. Barbera et al [1] suggested thinning of the dura as a cause. A combined hypothesis was suggested by Mut et al where adhesions between anterior nerve root dura and the posterior longitudinal ligament lead to ischemia and thinning of dura which is then easily torn by extruding disc [3].



**Table 1:** Review of Literature showing details of cases of intra-radicular disc herniation reported till 2011.

Case (Age and Sex) Reported by	Age/ gender	level	Initial operation	Radiological findings	Outcome after surgery
Barbera et al [1]	34,M	L5- S1	none	Myelography: Amputation of Left S1 and displacement of sac	Relief of radicular pain. Great motor improvement at 7th month
Suzer et al. [2]	41,M	L5-S1	No	MRI: L5-S1 disc protrusion	Immediate pain relief and normal muscle strength by 1 week
Mut et al. [3]	32,M	L5-S1	No	MRI: Posterolateral extruded fragment	Prompt recovery with complete resolution of pain
Ozdemir et al [4]	46,F 61,M	L5-S1 L4-L5	No	MRI – extruded disc	Immediate relief of pain and full recovery
Ozer E et al. [5]	41,M	L5-S1	Yes	MRI: Sequestered disc fragment with round pattern	Immediate pain relief. At 9th month symptom-free
Turgut et al [6]	41,M	L5-S1	Yes	MRI- non diagnostic of intraradicular lesion	Immediate relief of symptoms
Akhaddar et al [7]	34,M	L5-S1	No	MRI- extruded disc	Immediate symptom relief
Finkel [8]	46,M	L5-S1	Yes	MRI: Extruded disc fragment with inferior migration	Pain ceased after surgery. Residual sensory and reflex deficit at 2nd year
Akdemir et al. [9]	60,M	L5-S1	Yes	CT-myelo posterior compression	Immediate pain relief, Normal sensation but absent AR at 6th month
Nazzal et al. [10]	62,M	L4-L5	No	Myelogram: block at L5	Pain relief immediately after surgery
Ergungor and Kars [11]	44,F	L5- S1	No	Myelography: R S1 amputation, medial displacement of dural sac	Wound infection Discharged with residual motor and reflex deficit
Karabekir et al [12]	36, M 37,F	L2-L3 L4-L5	No	MRI-extruded disc	Immediate relief
Acikgoz et al. [13]	30,M	L5-S1	Yes	Myelography: L5-S1 extradural defect	Symptom-free and normal neurological exam at 2nd year.
Tsuji et al. [14]	38,M	L5- S1	Yes	Myelogram: L S1 nerve root defect	Pain relieved by 1 week Normal neurological examination at 6th year
Dao et al [15]	27 F	L5-S1	No	Mri-Posterolateral disc	Complete relief after surgery
Pillai [present study]	51,M	L5-S1	No	MRI- nerve root tumor	Complete relief after surgery

Preoperative diagnosis of intra-radicular disc herniation is difficult, however some suggest to suspect it if MRI shows rounded or fusiform shape of extruded fragment [2,8]. Mainly the diagnosis is intraoperative and in cases where no extruded disc material is found, an intra-radicular herniation should

be suspected. In present case there was no previous interventions and no evidence of disc prolapse in the nearby area. The swelling in the nerve root was at a distance from the dura, leaving a normal segment of root free. The disc material was found in between the nerve fibers rather than to one side. Again in our case MRI was suggestive of an intraneural tumor



and hence only a histopathological examination could provide a definitive final answer. As seen from Table 1, all lesions were treated surgically and had uniformly good result except in two cases (one with infection [11] and other continued to have neurodeficit although pain relief was complete [8]). In our case too there was immediate relief of pain, however sensory dysesthesia of sole was seen postoperative till one year. At final follow up the patient was pain free with no neurodeficit.

## CONCLUSION

It is a unique way of presentation of disc prolapse. This case represents the first histopathologically confirmed herniated disc sequestration in the nerve root in between the nerve fibers, at a distance from the dura mimicking a nerve root tumor. The surgeons must be aware of this condition, when they suspect nerve root tumor

## CLINICAL MESSAGE

*Intra-radicular disc herniations can present without other signs of disc herniations and can mimic nerve root tumor.*

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