

Case Report

Volume 5 Issue 3 - August 2017
DOI: 10.19080/OAJNN.2017.05.555661

Open Access J Neurol Neurosurg
Copyright © All rights are reserved by AK Kanodia

Cervical Intradural Disc Herniation: Understanding Pathophysiology and Imaging



Badran K¹, Kanodia AK^{2*}, Kouli O¹, Abdelsadg M¹, Main G² and Mowle DH¹

¹Neurosurgery Department, Ninewells Care, UK

²Radiology Department, Ninewells Care, UK

Submission: July 07, 2017; **Published:** August 15, 2017

***Corresponding author:** AK Kanodia, Department of Radiology, Ninewells Care, Dundee, UK, Email: avinash.kanodia@nhs.net

Abstract

Cervical intradural disc herniation is very rare event and often manifests in severe clinical presentation. We present a 43 year old lady with severe neck pain and left arm pain associated with left side hemiparesis. MRI cervical spine showed C5/6 disc herniation with significant cord compression with disproportionate oedema. She underwent C5/6 anterior cervical discectomy and fusion. Post-operatively the patient is making significant progress and neurological improvement. This case highlights the importance of urgent imaging and intervention along with potential causes and explanation for disproportionate clinical and imaging findings.

Keywords: Intradural disc herniation; Extradural disc herniation; Brown-Sequard syndrome

Background

Intradural disc herniation (IDH) is a rare type of intervertebral disc herniation. It is more common in lumbar region (>90%), however, it has also been known to occur in cervical spine, accounting for less than five percent of cases [1]. The first published case of cervical IDH dates back to 1959 by Morega [2]. To our best knowledge, 35 total cases of cervical are reported following database searches although is likely that these are under-reported [2-7]. There is a slight male predominance in the published case reports (19/35) and the average presenting age is approximately 45 years old [5-7]. The commonest site of IDH in cervical spine is described as C5/6 and C6/7 [3].

Case Report

A 43 year old lady presented with a few weeks history of neck pain and gradual weakness left upper and lower limb. Pain started as moderate but progressively became severe over a period of few days. She also gave a history of intermittent neck pain for the last few years without other neurological symptoms. She had past history of hypertension, hypothyroidism and morbid obesity. On examination, she had left side hemiparesis with power as follows: shoulder 3/5, left elbow and wrist 2/5, left lower limb 2/5, along with left sided C5 level paraesthesia, brisk reflexes and hypertonia.

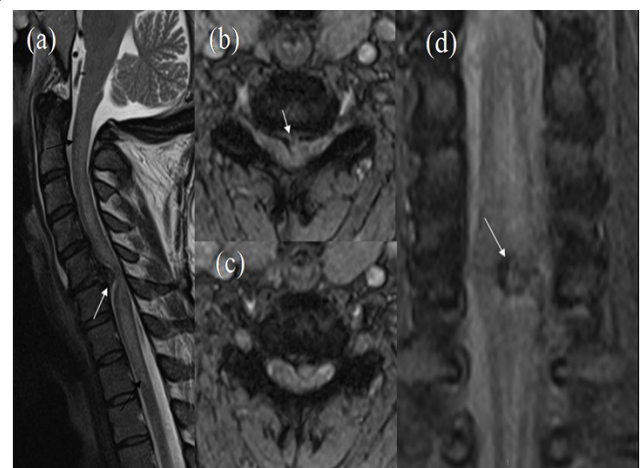


Figure 1: Preoperative MRI: (a) T2 sagittal images showing disc extrusion at C5/6 (white arrow). Extensive cord oedema seen, from C2-T1 (black arrows). (b,c) T2 gradient echo axials showing disc extrusion with a probable dural tear (white arrow in b). (d) T2 gradient echo coronal again showing a probable dural tear (white arrow representing dark margins having a central bright tear).

An urgent MRI cervical spine was performed which showed C5/6 disc extrusion slightly on left side of midline with significant cord compression (Figure 1). Notably, there was cord oedema extending from C2-T1 level, quite disproportionate for

single level compression. A focal dural tear was also suspected. She underwent C5/6 anterior cervical discectomy and fusion. It was a difficult surgical approach because of obesity. The surgical approach involved right side anterior triangle incision and exposure of anterior cervical spine, Caspar screws insertion and removal of all disc material. Intraoperatively we identified left paramedian rupture in the posterior longitudinal ligament, and very large disc fragment penetrating dura but not the arachnoid that was seen ballooned out with minimal CSF leak (Figure 2). Thin layer of Duraseal was used and 6mm Cervios cage sad inserted in disc space.

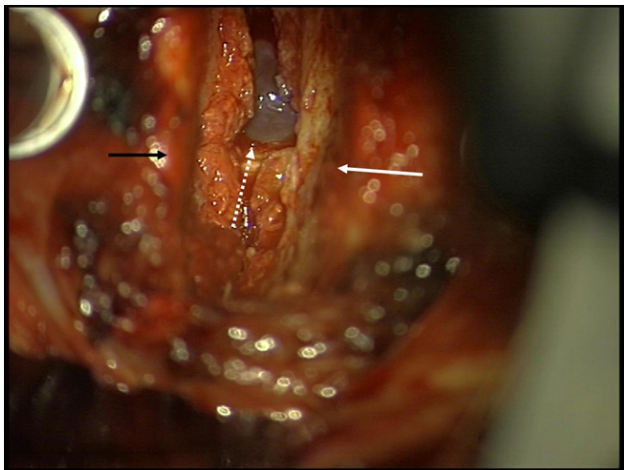


Figure 2: Intraoperative photograph. Black arrow represents the inferior end plate of C5. White arrow represents superior end plate of C6, the gap representing the disc space after excising the disc material. The broken white arrow represents the margin of the dural tear through which a bulging whitish glistening arachnoid can be seen.



Figure 3: The entire disc material including the extruded component.

Post operatively, over subsequent weeks, the patient made significant and progressive motor and sensory improvement in left upper and lower limb and continues to have physiotherapy and exercise.

Discussion

The exact risk factors for IDH remain unclear. A suggested probable risk factor considered by many authors is trauma,

however, not considered essential [1,3,4,6,8]. Several different mechanisms have also been suggested, an important one being chronic adhesions between the posterior longitudinal ligament (PLL) and dura mater predisposing to rupture [5,6]. Other mechanisms include congenital anomalies [9] and hypertrophic PLL with ossification [4,10]. In this case, patient was complaining of neck pain for few years which was progressive and it can be hypothesised that prolonged pain and inflammation may have resulted in adhesions and loss of flexibility, followed by rupture and disc herniation resulting in relatively acute presentation.

The most commonly reported clinical presentation of cervical IDH cases was Brown-Séquard syndrome (BSS), a hemisection injury to the spinal cord characterized by ipsilateral paralysis and loss of proprioception with contralateral loss of pain and temperature sensation, others being transverse myelopathy, and more rarely, radiculopathy and Horner syndrome [4,11]. Compared to extradural cervical herniation, cervical IDH is less common and therefore a less frequent cause of BSS although is associated with worse outcomes [12,13]. It has been suggested that there is more likelihood of cord damage in IDH due to direct contact of disc material with the cord.

In our patient, there were significant ipsilateral symptoms with hemiparesis and myelopathic signs (hyperreflexia and hypertonia) but no contralateral symptoms or signs. She also had C5 radiculopathy and paraesthesia (probably due to focal root compression).

The above clinical features alone were not definitive of cervical IDH and there were no specific preoperative criteria to diagnose it. There was disproportionate cord oedema present extending from C2 to T1 level. While the exact reason is uncertain, we hypothesise that it may be a result of direct damage (although arachnoid was intact) and a potential inflammatory component around extruded disc material affecting cord, particularly as “protective” role of dura is no longer present. An associated vascular/ischaemic component cannot be excluded. Inflammatory reaction around disc material and role of vascular factors in pathogenesis are well documented in the literature based on MRI studies that suggest peridiscal enhancement as an indirect evidence of inflammation [14]. We did not have contrast scan to confirm it. Several different radiographic signs have also been described in literature. Hidalgo-Ovejero et al. [15] first described epidural gas on CT as a suggestive indicator for IDH, supported by other authors [6]. Choi et al. [16] explained the “hawk-beak sign” found on MRI, due to PLL discontinuity. Brom & Bohnstedt [17] described a “halo” of isointense cerebrospinal fluid, visualized on T2-weighted MRI images, surrounding the prolapsed mass. Recently in 2012, Sasaji et al. [18] described a “Y-sign”, a potential suggestive indicator of IDH due to the division of the dura and arachnoid in two separate lines, which was also supported by other reports. In this case, there was some suspicion of dural tear on MRI imaging, although it is often difficult on imaging and may not be definite enough. However, an

overall combination of information including disproportionate imaging and prominent clinical findings can raise suspicion of IDH, which should be treated more urgently, to have best possible outcomes.

Surgical intervention is the only definitive measure for treatment and diagnosis of cervical IDH. Anterior decompressive surgery (discectomy or corpectomy) is considered superior to the posterior surgical approaches [1,3-5]. In our case, since the arachnoid was intact, minimum repair was needed with dura seal and Cervios cage. The patient continues to improve and no further imaging has been performed due to absence of any further clinical reason to do so.

Conclusion

We present this case of IDH to highlight that such patients may have quite significant clinical findings and disproportionate oedema in the cord. While it is possible to suspect it on imaging, the combination of all available information is more likely to raise reasonable suspicion and plan urgent management, in order to give best possible chance for good outcome. We also discussed the possible factors for disproportionate clinical and imaging findings. The current case report is intended to serve as a reminder of this condition.

References

- Epstein NE, Syrquin MS, Epstein JA, Decker RE (1990) Intradural disc herniations in the cervical, thoracic, and lumbar spine: report of three cases and review of the literature. *Journal of spinal disorders.* 3(4): 396-403.
- Marega T (1959) Ernia del disco cervicale espulsa nel sacco durale. *Arch Putti Chir Organi Mov* 12: 425-430.
- Pan J, Li L, Qian L, Teng H, Shen B, et al. (2011) Intradural cervical disc herniation: report of two cases and review of the literature. *Spine* 36(15):E1033-E1037.
- Wang D, Wang H, Shen WJ (2014) Spontaneous cervical intradural disc herniation associated with ossification of posterior longitudinal ligament. *Case reports in orthopedics* 2014(2014): 1-5.
- Yang HS, OH YM, Eun JP (2016) Cervical Intradural Disc Herniation Causing Progressive Quadriplegia After Spinal Manipulation Therapy: A Case Report and Literature Review. *Medicine* 95(6): e2797.
- Lian FJ, Huang JS, Chang CJ (2016) Cervical Intradural Disc Herniation and Intradural Gas on CT Scan. *Fu-Jen Journal of Medicine* 14(1): 39-44.
- Baudracco I, Grahovac G, Russo VM (2017) Spontaneous cervical intradural disc herniation presenting with Brown-Séquard and Horner's syndrome: lesson learned from a very unique case. *European Spine Journal* 26(suppl 1): 218-221.
- Eisenberg RA, Bremer AM, Northup HM (1986) Intradural herniated cervical disk: a case report and review of the literature. *American journal of neuroradiology* 7(3): 492-494.
- Yildizhan A, Paşaoğlu A, Okten T, Ekinci N, Aycan K, et al. (1991) Intradural disc herniations pathogenesis, clinical picture, diagnosis and treatment. *Acta neurochirurgica* 110(3):160-165.
- Iwamura Y, Onari K, Kondo S, Inasaka R, Horii H (2001) Cervical intradural disc herniation. *Spine* 26(6): 698-702.
- Kansal R, Mahore A, Kukreja S (2011) Cervical intradural disc herniation and cerebrospinal fluid leak. *Neurology India* 59(3): 447.
- Choi KB, Lee CD, Chung DJ, Lee SH (2009) Cervical disc herniation as a cause of Brown-Séquard syndrome. *Journal of Korean Neurosurgical Society* 46(5): 505-510.
- Sathirapanya P, Taweelarp A, Saeheng S, Riabroi K (2007) Brown-Séquard Syndrome from cervical disc herniation: a case report and review of literature. *Neurology Asia* 12: 65-67.
- Ilozue T, Abdelsadg M, Kanodia AK, Hossain-Ibrahim K (2017) Symptomatic Disc Herniations: A Review to Understand Pathophysiology and Prediction of Outcome. *Clinical Neurology and Neuroscience* 1(2): 24-33.
- Hidalgo-Ovejero AM, Garcia-Mata S, Izco-Cabezon T, Garralda-Galarza G, Martinez-Grande M (1998) Intradural disc herniation associated with epidural gas. *Spine* 23(2): 281-283.
- Choi JY, Lee WS, Sung KH (2007) Intradural lumbar disc herniation-is it predictable preoperatively? A report of two cases. *The Spine Journal* 7(1): 111-117.
- Börm W, Bohnstedt T (2000) Intradural cervical disc herniation: case report and review of the literature. *Journal of Neurosurgery: Spine* 92(2): 221-224.
- Sasaji T, Horaguchi K, Yamada N, Iwai K (2012) The specific sagittal magnetic resonance imaging of intradural extra-arachnoid lumbar disc herniation. *Case reports in medicine* (2012)2012: 1-3.



This work is licensed under Creative Commons Attribution 4.0 License
DOI: 10.19080/OAJNN.2017.5.555661

Your next submission with Juniper Publishers will reach you the below assets

- Quality Editorial service
- Swift Peer Review
- Reprints availability
- E-prints Service
- Manuscript Podcast for convenient understanding
- Global attainment for your research
- Manuscript accessibility in different formats
(Pdf, E-pub, Full Text, Audio)
- Unceasing customer service

Track the below URL for one-step submission

<https://juniperpublishers.com/online-submission.php>