



Case Report

# Spinal cord herniation following multilevel anterior cervical discectomy and fusion: A case report and literature review

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## ABSTRACT

**Background:** Anterior cervical discectomy and fusion (ACDF) is one of the most commonly performed spinal operations. Spinal cord herniation following these procedures is rare, more typically being described as occurring posteriorly rather than following anterior corpectomy and fusion (e.g., reported in four corpectomy cases). Here, we describe a case in which spinal cord herniation was attributed to a three-level ACDF.

**Case Description:** A 31-year-old male initially presented with a 1 year's duration of increasing myelopathy attributed to MR documented three-level disc disease (C4-C7). He successfully underwent a three-level ACDF without complications/durotomy. One year later, he again presented, with myelopathy (i.e., recurrent neck pain and stiffness) newly attributed to MR documented anterolateral C4-C5 cord herniation. As he declined further surgery, he was treated medically (e.g., utilizing analgesia and physiotherapy) and was no worse 6 months later.

**Conclusion:** The occurrence of spinal cord herniation through a prior ACDF defect must be considered when patients present with recurrent myelopathy following previous ACDF surgery.

**Keywords:** Anterior cervical discectomy and fusion, Herniation, Myelopathy

## INTRODUCTION

Anterior cervical discectomy and fusion (ACDF) is one of the most common spinal operations performed in the U.S. and worldwide to treat herniated discs, cervical spondylosis, fractures, and neoplasms.<sup>[2,9]</sup> Routine complications typically include dysphagia (1.7–9.5%), postoperative hematoma (0.4–5.6%), recurrent laryngeal nerve palsy (0.9–3.1%), cerebrospinal fluid (CSF) leaks (0.5–1.7%), wound infections (0.1–0.9%–1.6%), increased radiculopathy (1.3%, particularly a C5 palsy), increased myelopathy (3.3%), and Horner's syndrome (0.06–1.1%); the mortality rate is 0.1%.<sup>[4]</sup>

There have been just four known cases of anterior spinal cord herniation following multilevel anterior corpectomy fusion cases.<sup>[5]</sup> Here, we present a 31-year-old male who, 1 year after a C4-C7, three-level ACDF developed, anterolateral C4-C5 spinal cord herniation.

## CASE DESCRIPTION

A 31-year-old male originally presented with a 1-year history of progressive myelopathy (e.g., four-limb hyperreflexia). The MR revealed three-level disc disease (e.g., C4/C5, C5-

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C6 and C6/C7) resulting in spinal canal stenosis and cord compression; the preoperative MR showed a high cord signal on the T2-weighted study at the C4/5 level [Figure 1]. He underwent an uneventful three-level ACDF without complications (e.g., specifically no durotomy) [Figure 2].

One year later, he developed a recurrent and progressive myelopathy; it was attributed to MR documented anterolateral spinal cord herniation on the right at the C4/5 level [Figure 3]. He, however, elected to be managed nonoperatively (e.g., with physiotherapy and pain management) and was no worse within the ensuing 6 months.

## DISCUSSION

More than a hundred cases of spinal cord herniation have been described in literature. The vast majority, however, occur in the thoracic spine; they are considered idiopathic and/or

attributed to congenital causes and/or trauma. Interestingly, 2/3 of cases occur at the level of a disc herniation.<sup>[1]</sup>

### Incidence of CSF leaks after anterior cervical surgery and frequency of associated myelomeningoceles

The vast majority of small CSF leaks following cervical surgery (1%) are clinically insignificant and had no sequelae up to 5-year postoperatively.<sup>[7]</sup> In Guerin *et al.*, series of 240 patients, the incidence of durotomy after anterior cervical surgery was 0.42%.<sup>[6]</sup> Even in Xu *et al.*, CSF leaks occurring in 5 of 642 ACDF did not result in any long-term sequelae.<sup>[10]</sup> However, there are multiple other reports of large durotomies resulting in symptomatic pseudomeningoceles contributing to symptomatic dysphagia.<sup>[8]</sup> In our patient, as the spinal cord herniation occurred just 1 year following a C4-C5 ACDF, it most likely was attributable to an occult intraoperative durotomy.

### Prior reports of anterior spinal cord herniation

The etiology of spinal cord herniation following anterior cervical surgery is not well delineated. Cases of anterior spinal cord herniation following anterior cervical corpectomy and fusion have been described. Finneran *et al.* described anterior cord herniation occurring 17 years after a single-level C5 corpectomy in the absence of an obvious original intraoperative dural defect. The authors attributed the cord herniation to a thinning/resorption of the corpectomy graft and to dural thinning/attenuation to adhesions of the spinal cord, with CSF pulsation/hydrostatic factors contributing to spinal cord herniation.<sup>[5]</sup> In our case, where the cord herniation occurred within the 1<sup>st</sup> postoperative year, there was likely an occult CSF fistula created at the time of the original surgery, plus the chronic C4-C5 disc herniation may have



Figure 1: Preoperative MRI scan; sagittal T2 view.



Figure 2: Postoperative MRI; sagittal T2 view.

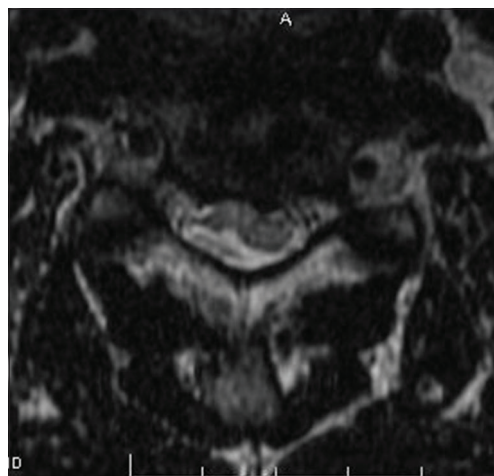


Figure 3: Postoperative MRI; axial T2 view.

contributed to preoperative mechanical dural thinning/atrophy.

### Two cases of posterior cervical cord herniation following laminectomies

Two cases of posterior cervical cord herniation following laminectomies were identified. One case involved posterior spinal cord herniation into a pseudomeningocele occurring 14 years after a laminectomy performed for excision of an intradural extramedullary neurinoma.<sup>[7]</sup> In the second case, Cobb and Ehni reported posterior cervical cord herniation into a pseudomeningocele that occurred 3 years following a laminectomy for myelopathy.<sup>[3]</sup> Notably, both cases required revision surgery including duroplasties.

### CONCLUSION

Anterior spinal cord herniation may occur following an ACDF and be attributed either to an atretic dura at the level of preoperative maximal compression or to an unobserved intraoperative durotomy.

### Declaration of patient consent

Patient's consent not required as patients identity is not disclosed or compromised.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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