Research Square

Preprints are preliminary reports that have not undergone peer review.
They should not be considered conclusive, used to inform clinical practice,
or referenced by the media as validated information.

Spontaneous Resorption of Traumatic Cervical Disc Herniation with Transient Syringomyelia in a 6-Year-Old Child

Mustafa Kavcar
mustafakavcarr@gmail.com
Etlik City Hospital
Burak Şener
Etlik City Hospital
Muhammed Erkan Emrahoğlu
Etlik City Hospital
Mehmet Erhan Türkoğlu
Hacettepe University
Erdal Reşit Yılmaz
Etlik City Hospital

Case Report

Keywords: Cervical disc herniation, Pediatric, Spontaneous resorption, Syringomyelia, Trauma, Conservative management

Posted Date: June 24th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-9849667/v1

License: This work is licensed under a Creative Commons Attribution 4.0 International License. Read Full License

Additional Declarations: No competing interests reported.

Abstract

Cervical disc herniation in children is exceedingly rare, and spontaneous resorption of a traumatic non-calcified cervical disc herniation has not been previously documented in the pediatric population. We report a 6-year-old boy who presented with neck pain and restricted cervical motion following a fall from approximately 1.5 meters at a playground. Cervical computed tomography revealed no fracture or calcification, while magnetic resonance imaging demonstrated a broad-based C4–5 disc herniation compressing the anterior spinal cord. The patient was managed conservatively with cervical collar immobilization and non-steroidal anti-inflammatory drugs. Follow-up MRI at 8 weeks showed near-complete resorption of the herniated disc material with a newly identified linear syrinx cavity within the spinal cord. At 3-month clinical follow-up, the patient was asymptomatic with full neurological recovery. This case is unique in demonstrating spontaneous resorption of a purely traumatic, non-calcified cervical disc herniation in early childhood, accompanied by a transient post-compressive syrinx—a phenomenon not previously reported in the pediatric cervical spine literature. Conservative management should be considered as a primary approach in neurologically intact pediatric patients with traumatic cervical disc herniation.

Introduction

Cervical disc herniation in the pediatric population is an exceptionally rare entity, with the majority of reported cases involving calcified discs that follow a self-limiting course [1, 2]. Non-calcified, purely traumatic cervical disc herniations in children are even rarer, and their natural history remains poorly understood [3, 4]. In the adult population, spontaneous regression of cervical disc herniation has been increasingly recognized, with a comprehensive review identifying 75 documented cases [5]. However, the mean age in these series was 41 years, and pediatric cases were virtually absent [5, 6].

The mechanisms underlying spontaneous disc resorption include inflammatory-mediated phagocytosis through macrophage infiltration and neovascularization, dehydration and retraction of the herniated nucleus pulposus, and enzymatic degradation via matrix metalloproteinases [7–9]. These processes are theoretically enhanced in children due to their superior vascular supply to the intervertebral disc and a more robust inflammatory response [1, 10].

We present the first reported case of spontaneous resorption of a traumatic, non-calcified cervical disc herniation in a 6-year-old child, uniquely complicated by the development of a transient post-compressive syrinx cavity.

Case Report

A 6-year-old boy was brought to our emergency department after falling approximately 1.5 meters from playground equipment, landing on his head and neck. There was no loss of consciousness. On examination, the patient had mild neck pain with restricted cervical range of motion. Neurological examination revealed no motor or sensory deficits, and pathological reflexes were absent. Vital signs were stable with no signs of cranial trauma.

Cervical radiographs were unremarkable. Computed tomography (CT) of the cervical spine demonstrated intact vertebral body cortices with no evidence of fracture, subluxation, or disc calcification, confirming isolated soft-tissue pathology without structural instability (Fig. 3). Magnetic resonance imaging (MRI) revealed a broad-based posterior disc herniation at C4–5, hyperintense on T2-weighted sequences, extending beyond the vertebral body contour and compressing the anterior surface of the spinal cord. Axial images confirmed bilateral neural foraminal narrowing with narrowing of the subarachnoid space. Notably, no intramedullary signal change was identified at initial presentation (Fig. 1).

Given the absence of neurological deficits and myelopathic signs, conservative management was initiated with rigid cervical collar immobilization, non-steroidal anti-inflammatory drugs, and close clinical surveillance. The patient's symptoms progressively improved over the following weeks.

Follow-up MRI at 8 weeks demonstrated near-complete spontaneous resorption of the herniated disc material with resolution of spinal cord compression. However, a new finding was identified: a linear syrinx cavity within the cervical spinal cord at the level of prior compression (Fig. 2). The C4–5 disc showed loss of signal intensity and height on T2-weighted images, consistent with post-herniation degenerative changes.

At 3-month clinical follow-up, the patient was completely asymptomatic with full cervical range of motion and normal neurological examination. No surgical intervention was required.

Discussion

This case presents two novel observations in pediatric spine pathology. First, it documents the spontaneous resorption of a purely traumatic, non-calcified cervical disc herniation in a 6-year-old child—a phenomenon not previously reported in this age group. Second, it demonstrates the development of a transient post-compressive syrinx cavity following disc herniation in the pediatric cervical spine.

The rarity of pediatric cervical disc herniation is well established. Emery and Bohlman [1] reported that cervical disc disease in children accounts for less than 1% of all disc herniations. The majority of pediatric cervical disc cases involve calcified discs, which typically follow a benign, self-limiting course [2, 11]. In contrast, our patient had no evidence of calcification on CT, representing a purely traumatic soft disc herniation—an entity with very limited documentation in children [3].

Regarding the mechanism of resorption, the enhanced vascularity of the pediatric intervertebral disc likely facilitated the rapid inflammatory response observed in our case [10, 12]. When herniated disc material penetrates the posterior longitudinal ligament and contacts the epidural vascular supply, it triggers an immune cascade involving macrophage recruitment through monocyte chemotactic protein-1 (MCP-1) and interleukin-8, leading to phagocytosis and enzymatic degradation [7–9, 13]. In children, the nucleus pulposus retains greater vascularity compared to adults, potentially accelerating this process [10]. The 8-week interval to near-complete resorption in our case is notably shorter than the reported adult average of 9.15 months [5].

The development of a syrinx cavity following disc herniation represents a particularly intriguing finding. Syringomyelia associated with cervical disc disease is rare even in adults [14, 15]. The proposed mechanism involves altered cerebrospinal fluid dynamics secondary to spinal cord compression, creating a pressure differential that drives fluid into the central canal [14, 16]. In our case, the transient nature of the syrinx—appearing after disc resorption had begun—suggests that it may represent a post-compressive phenomenon related to altered CSF flow dynamics during the resorption process rather than ongoing compression. Spontaneous resolution of syringomyelia has been documented in children, attributed to the growing skull and restoration of CSF flow [17].

Table 1
summarizes the reported pediatric and young adult cases of cervical disc herniation with spontaneous regression, highlighting the unique features of our case including the youngest age, non-calcified disc, traumatic etiology, and concurrent syrinx development.

Study	Age/Sex	Level	Etiology	Calcification	Cord compression	Syrinx	Resorption time	Treatment
Dai et al. [2]	5–15 y (series)	Various	Idiopathic	Yes	No	No	Weeks–months	Conservative
Schaser et al. [3]	10/M	C5–C6	Trauma	Yes	Yes (myelopathy)	No	N/A (surgery)	Surgical
Piccirilli et al. [11]	12/F	Thoracic	Spontaneous	Yes	Yes	No	6 months	Conservative
Kobayashi et al. [12]	27/M	C5–C6	Spontaneous	No	No	No	12 months	Conservative
Sharma et al. [5]	24/M	C6–C7	Spontaneous	No	Yes	No	3 months	Conservative
Present case	**6/M**	**C4–C5**	**Trauma**	**No**	**Yes**	**Yes**	**8 weeks**	**Conservative**

Table 1 Summary of reported cases of cervical disc herniation with spontaneous regression in pediatric and young adult patients

The absence of neurological deficits despite significant cord compression in our patient likely reflects the greater plasticity and resilience of the pediatric spinal cord [18, 19]. This observation, combined with the demonstrated capacity for spontaneous resorption, strongly supports conservative management as the primary approach in neurologically intact pediatric patients with traumatic cervical disc herniation.

Conclusion

This case demonstrates that spontaneous resorption of traumatic, non-calcified cervical disc herniation can occur rapidly in young children, likely facilitated by the enhanced vascular and inflammatory capacity of the pediatric disc. The transient post-compressive syrinx represents a novel finding that warrants awareness during follow-up imaging. Conservative management with immobilization and close surveillance should be considered the first-line approach in neurologically intact pediatric patients, reserving surgery for those with progressive neurological deterioration.

Declarations

Funding: No funding was received for this study.

Competing interests: The authors declare that they have no competing interests.

Ethics approval: This study was conducted in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments.

Consent to participate: Written informed consent was obtained from the patient's legal guardian.

Consent for publication: Written informed consent for publication of clinical details and images was obtained from the patient's legal guardian.

Data availability: All data generated or analyzed during this study are included in this published article.

Author contributions: MK: conceptualization, data collection, writing—original draft. BŞ: data collection, imaging analysis. MEE: literature review, writing—review and editing. MET: supervision, critical revision. ERY: supervision, final approval.

References

1. Emery SE, Bohlman HH, Bolesta MJ, Jones PK (1990) Anterior cervical decompression and arthrodesis for the treatment of cervical spondylotic myelopathy. Two to seventeen-year follow-up. J Bone Joint Surg Am 72:1171–1180
2. Dai LY, Ye H, Qian QR (2004) The natural history of cervical disc calcification in children. J Bone Joint Surg Am 86:1467–1472
3. Schaser KD, Stover JF, Kaeaeb MJ, Haas NP (2003) Mild cervical spine trauma showing symptomatic calcified cervical disc herniation in a child. Spine 28:E17–E21
4. Loubeyre E, Terrier LM, Cognacq G et al (2024) Surgical management of herniated intervertebral disc in children: a systematic review. Neurochirurgie 70:101596
5. Sharma AK, Gandhoke CS, Syal SK (2021) Spontaneous regression of herniated cervical disc: a case report and literature review. Surg Neurol Int 12:141
6. Turk O, Yaldiz C (2019) Spontaneous regression of cervical discs: retrospective analysis of 14 cases. Med (Baltim) 98:e14521
7. Haro H, Shinomiya K, Komori H et al (1996) Upregulated expression of chemokines in herniated nucleus pulposus resorption. Spine 21:1647–1652
8. Doita M, Kanatani T, Ozaki T et al (2001) Influence of macrophage infiltration of herniated disc tissue on the production of matrix metalloproteinases leading to disc resorption. Spine 26:1522–1527

9. Kato T, Haro H, Komori H, Shinomiya K (2004) Sequential dynamics of inflammatory cytokine, angiogenesis inducing factor and matrix degrading enzymes during spontaneous resorption of the herniated disc. J Orthop Res 22:895–900
10. Cunha C, Silva AJ, Pereira P et al (2018) The inflammatory response in the regression of lumbar disc herniation. Arthritis Res Ther 20:251
11. Piccirilli M, Lapadula G, Caporlingua F et al (2012) Spontaneous regression of a thoracic calcified extruded disc herniation in a child. Childs Nerv Syst 28:321–323
12. Kobayashi N, Asamoto S, Doi H et al (2003) Spontaneous regression of herniated cervical disc. Spine J 3:171–173
13. Autio RA, Karppinen J, Niinimäki J et al (2006) Determinants of spontaneous resorption of intervertebral disc herniations. Spine 31:1247–1252
14. Athanasiou A, Magras I (2019) Syringomyelia resolution after anterior cervical discectomy: a case report and literature review. Surg Neurol Int 10:42
15. Yaman ME, Eylen A, Ayberk G (2012) Resolution of isolated syringomyelia after treatment of cervical disc herniation: association or coincidence? Bratisl Lek Listy 113:500–502
16. Brodbelt AR, Stoodley MA (2003) Post-traumatic syringomyelia: a review. J Clin Neurosci 10:401–408
17. Pang D (2004) Spinal cord injury without radiographic abnormality in children, 2 decades later. Neurosurgery 55:1325–1343
18. Eleraky MA, Theodore N, Adams M, Rekate HL, Sonntag VK (2000) Pediatric cervical spine injuries: report of 102 cases and review of the literature. J Neurosurg 92(1 Suppl):12–17
19. Vitale MG, Goss JM, Matsumoto H, Roye DP Jr (2006) Epidemiology of pediatric spinal cord injury in the United States: years 1997 and 2000. J Pediatr Orthop 26:745–749

Figures

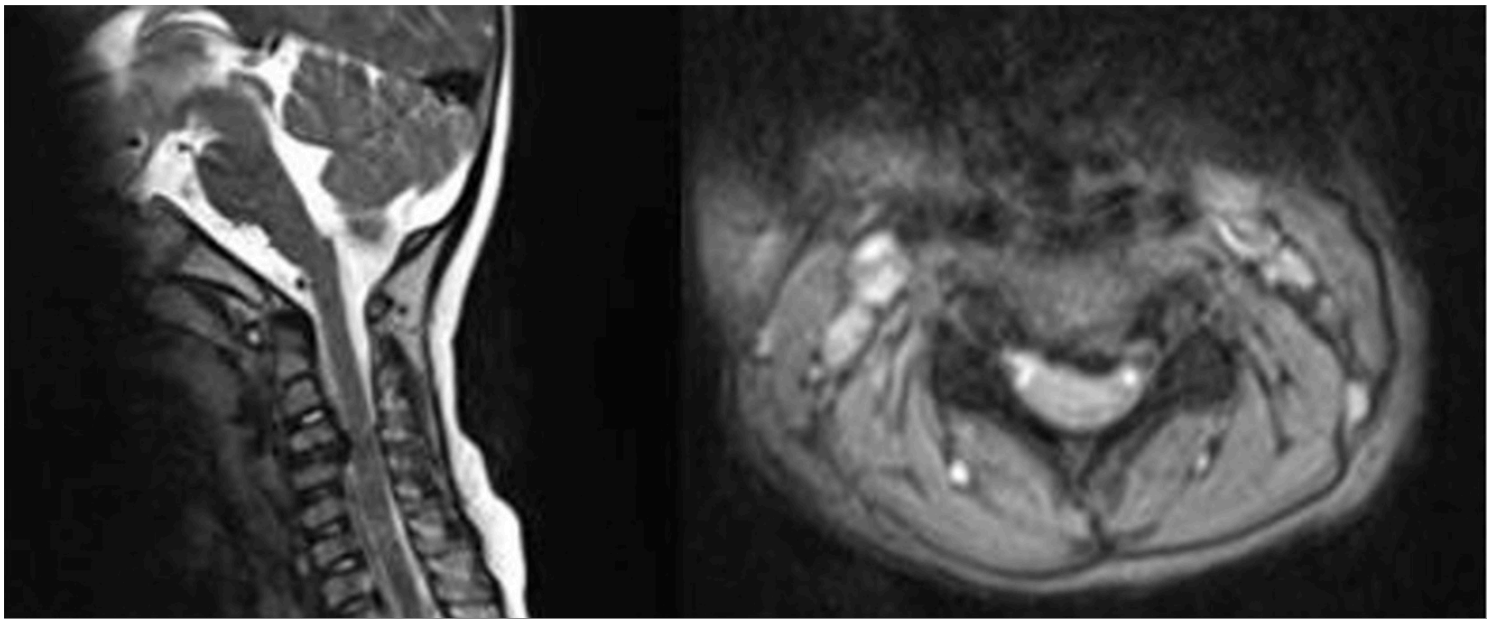


Figure 1

Sagittal non-contrast T2 MRI shows a broad-based posterior protrusion extending beyond the vertebral contour at the C4-5 level. Disc signal intensity and height are decreased at this level. Axial non-contrast T2 MRI at the same level shows bilateral narrowing of the neural foramina. Minimal compression on the subarachnoid space and cord compression are present. A narrow canal appearance is observed.

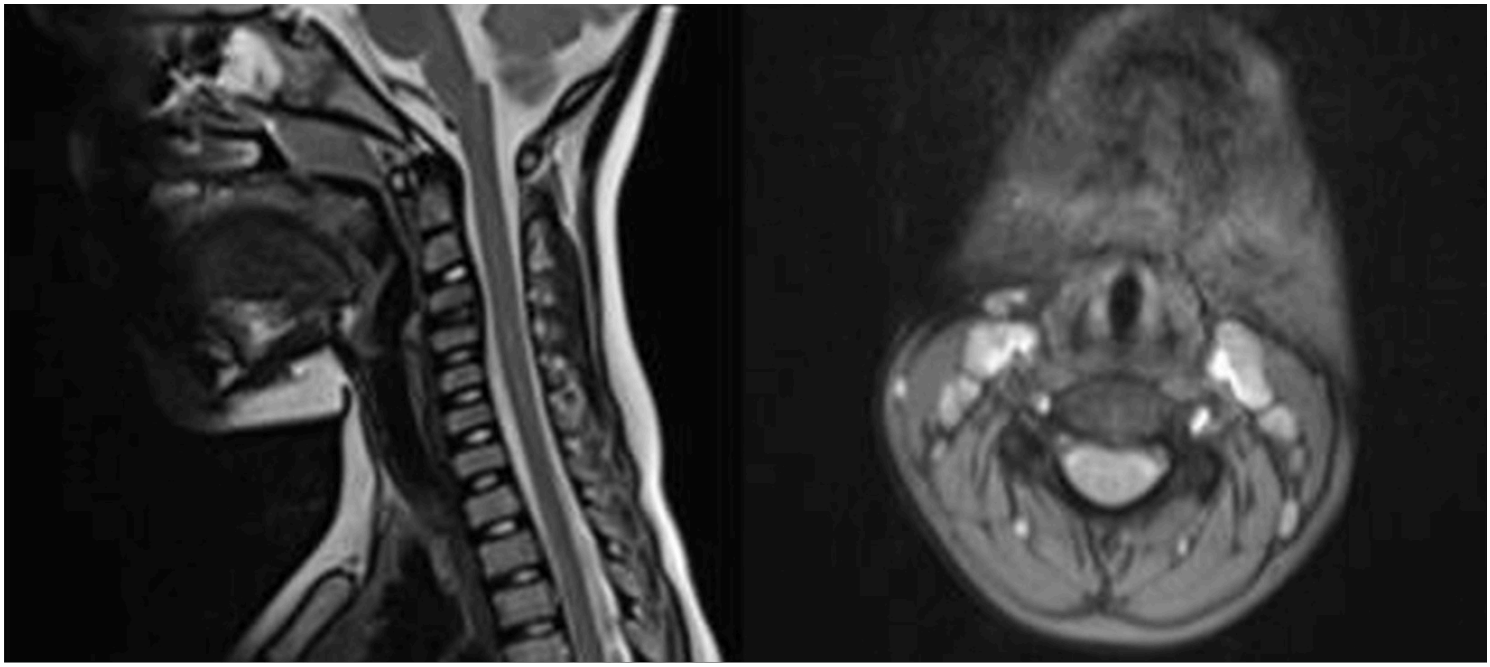


Figure 2

Sagittal non-contrast T2 MRI shows loss of disc signal intensity and height at C4-5. Comparison with previous MRI images reveals that the cervical pathology has resolved in axial and sagittal non-contrast T2 MRI images, but a linear syrinx cavity is present.

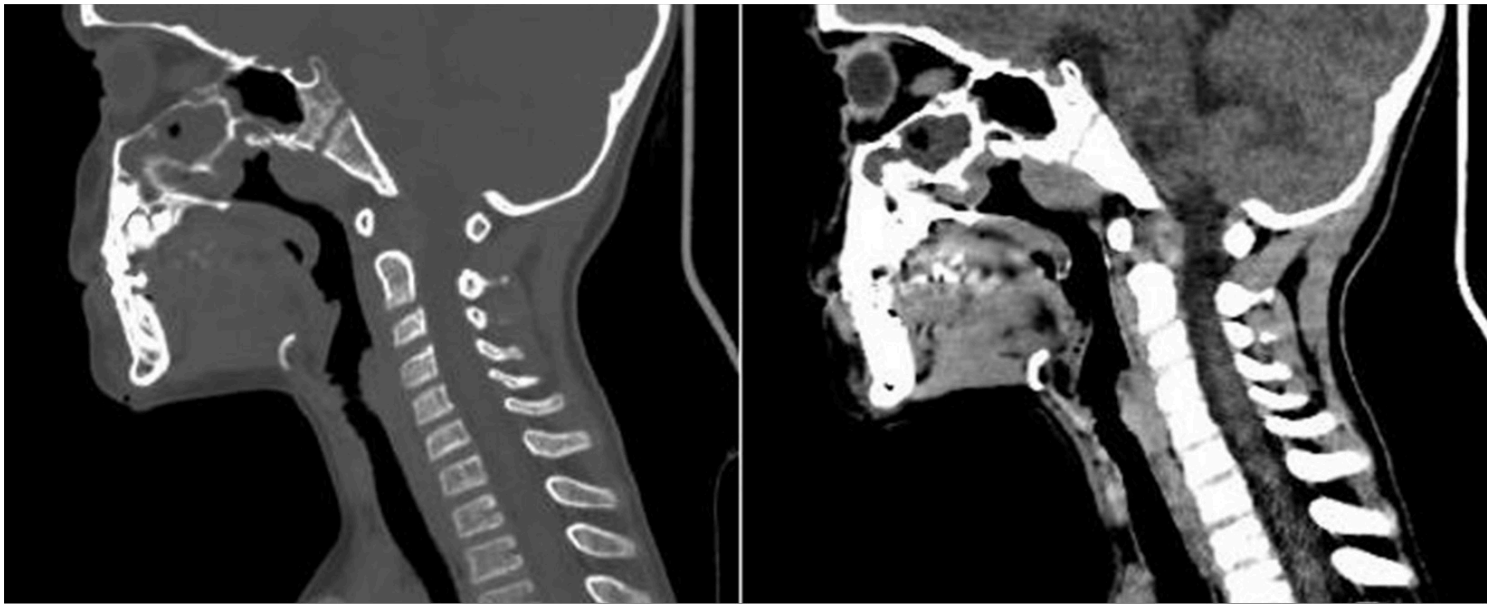


Figure 3

Sagittal cervical CT scan obtained immediately after trauma. The image shows intact vertebral body cortices with no evidence of fracture or subluxation. Intervertebral spaces are preserved. There is no bony injury, calcification or facet dislocation identified, supporting the diagnosis of isolated disc pathology without structural instability.