Spontaneous regression of herniated cervical disc: A case report and literature review

Anil Kumar Sharma1, Charandeep Singh Gandhoke1, Simran Kaur Syal2

1Department of Neurosurgery, All India Institute of Medical Sciences, Raipur, Chhattisgarh, 2Department of Pediatric Endocrinology, Bai Jerbai Wadia Hospital for Children, Mumbai, Maharashtra, India.

E-mail: Anil Kumar Sharma - dr.anilsharma02@gmail.com; *Charandeep Singh Gandhoke - charandeepsingh2008@gmail.com; Simran Kaur Syal - simransyal100@gmail.com

Background: We have reviewed 75 cases plus our own single instance of spontaneous regression of herniated cervical discs.

Methods: We searched PubMed and EMBASE databases (until September 2020) utilizing the following keywords; “spontaneous regression,” “herniated cervical disc,” and “Magnetic Resonance Imaging (MRI) studies.”

Results: In the literature, we found 75 cases of herniated cervical discs which spontaneously regressed; to this, we added our case. Patients averaged 40.95 years of age. Discs were paracentral or foraminal in 84% of the cases, with most occurring at the C5-C6 (51%) and C6-C7 (36%) levels. Symptoms included neck pain/radiculopathy (91%) or myelopathy (9%). The average interval between initial presentation and spontaneous regression of herniated discs on MRI was 9.15 months. Interestingly, on MRI, extruded/sequestrated discs were more likely to undergo spontaneous regression versus protruding discs.

Conclusion: Successive MRI studies documented the spontaneous regression of herniated cervical discs over an average of 9.15 months. Although this may prompt greater consideration for conservative treatment in younger patients without neurologic deficits, those with deficits should be considered for surgery.

Keywords: Extruded, Foraminal, Herniated cervical disc, Paracentral, Spontaneous regression

INTRODUCTION

Spontaneous regression of herniated lumbar disc has been well established in the literature, but, the phenomenon of spontaneous regression of herniated cervical discs has not been as thoroughly documented. Here, we focused on the 75 cases of spontaneous regression of herniated cervical discs from the literature and added our own experience with one patient.

CASE ILLUSTRATION

A 24-year-old male presented with 3 weeks’ duration of severe neck pain, right upper extremity radicular pain, and right C7 distribution weakness/numbness. The cervical MRI showed a right paracentral disc extrusion at the C6-C7 level resulting in the anterolateral cord and right C7 root compression [Figures 1 and 2]. The patient refused surgery and chose a trial of conservative
management (i.e., nonsteroidal anti-inflammatory drugs, analgesics, muscle relaxant, immobilization in a cervical collar, and physical therapy). After just 4 weeks, he reported marked improvement in his complaints. The follow-up cervical MRI done 3 months later revealed significant spontaneous regression of the C6-C7 disc extrusion [Figures 1 and 2].

LITERATURE REVIEW
A literature search utilizing PubMed and EMBASE (i.e., until September 2020); using the keywords; “spontaneous regression,” “herniated cervical disc,” and “MRI studies” was performed. We identified 75 cases of the spontaneous regression of cervical disc herniations (CDH) to which we added our one case based on successive MRI studies [Table 1].

Typical clinical presentation of patients with cervical disc herniations that resorbed
Here, we have summarized the typical clinical presentations of 76 patients with cervical disc herniations that regressed. Patients averaged 40.95 years of age and included equal numbers of males and females [Figure 3]. Predominant symptoms included neck pain and/or radiculopathy (91%) and myelopathy (9%) [Figure 4]. The discs were paracentral or foraminal in 61 cases (84% of the cases) and central in 12 cases (16% of the cases); there was a higher incidence of spontaneous disc regression in the paracentral foraminal lesions [Figure 5]. Discs were mostly located at the C5-C6 (31 cases) and C6-C7 (22 cases) levels and were most frequently extruded or sequestrated [Figure 6]. The average time interval between initial presentation and spontaneous regression of herniated cervical disc documented on successive MRI scans was 9.15 months.

DISCUSSION
Mechanism of cervical disc resorption
There are three proposed mechanisms for spontaneous regression of CDH. The first involves dehydration and shrinkage of the herniated nucleus pulposus. For the second, there is a retraction of the protruded disc. In the third, there are enzymatic degradation and phagocytosis of the extruded/sequestrated disc material due to an inflammatory reaction/neovascularization. Notably, in the third hypothesis, when the disc penetrates the annulus fibrosus and the posterior longitudinal ligament, they are exposed to the systemic circulation in the epidural space where they are recognized as a foreign body, leading to an inflammatory response, and subsequent disc resorption.
| Case report/case series | Name of the first author | No. of cases | Year published | M/F with age | Central/paracentral/foraminal disc | Level | Neck pain/radiculopathy/myelopathy | Time interval between initial presentation and spontaneous regression of herniated disc on MRI |
|------------------------|--------------------------|--------------|----------------|--------------|----------------------------------|-------|----------------------------------|----------------------------------|
| Case series            | Rahimizadeh et al.       | 26 cases     | 2013           | 15/11 (mean age 37.3 years) | Foraminal | 16 cases C5-C6, 10 cases C6-C7 | Radiculopathy | 3–4 months |
| Case series            | Gurkanlar et al.         | Case 1       | 2006           | F/49         | Foraminal/paracentral/central    | C5-C6 | Neck pain | MRI done 5 years later |
| Case series            | Gurkanlar et al.         | Case 2       | 2006           | F/34         | Central                          | C6-C7 | Neck pain with radiculopathy | 2 years later |
|                      |                          | Case 3       | 2006           | F/36         | Foraminal                        | C5-C6 | Radiculopathy | NA |
|                      |                          | Case 4       | 2006           | F/36         | Foraminal                        | C6-C7 | Radiculopathy | 1 year later |
|                      |                          | Case 5       | 2006           | M/49         | Paracentral/paracentral          | C4-C5 | Neck pain with radiculopathy | 6 months later |
|                      |                          | Case 6       | 2006           | F/32         | central 6/paracentral 9          | C5-C6 | Radiculopathy | NA |
|                      |                          | 15 cases     | 1998           | Average age 50.3 years | Most common affected level | C5-C6 | The interval from onset of symptoms to the initial MRI examination was shorter in the regression group than in the no change group |
| Case series            | Mochida et al.           | 15 cases     | 1998           | Average age 50.3 years | Central/lateral 9 | C5-C6 | The interval from onset of symptoms to the initial MRI examination was shorter in the regression group than in the no change group |
|                      | Vinas et al.             | Case 1       | 2001           | F/30         | Foraminal/paracentral            | C3-C4 | Neck pain | 24 months later |
|                      |                          | Case 2       | 2001           | F/71         | NA                               | C3-C4 | Neck pain | 3 years later |
|                      |                          | Case 3       | 2001           | M/40         | NA                               | C5-C6 | Neck pain with radiculopathy | 10 months later (partial regression) |
|                      |                          | Case 4       | 2001           | M/35         | Foraminal/paracentral            | C6-C7 | Neck pain with radiculopathy | 2 years |
| Case series            | Turk et al.              | 14 cases     | 2019           | 4/10 (mean age 40.79 years) | Central/diffuse (3); foraminal/paracentral (11) | C4-C5 (4 cases); C5-C6 (5 cases); C6-C7 (5 cases) | Radiculopathy | Complaints of patients reduced at mean 5.07 weeks; mean duration between 2 MRIs 9.71 months |
| 1st case report        | Krieger and Maniker      | 1            | 1992           | M/38         | Paracentral                      | C5-C6 | Neck pain with occasional radiculopathy | 11 months |
| Case report            | Song et al.              | 1            | 1999           | F/37         | Central                          | C5-C6 | Myelopathy | 28 months |
| Case report            | Westmark et al.          | 1            | 1997           | F/48         | NA                               | C6-7, and to a lesser extent C3-C4, C5-C6 | C5-C6 | Scapular pain | 18 months |
| Case report            | Kobayashi et al.         | 1            | 2003           | M/27         | Paracentral                      | C5-C6 | Radiculopathy | 12 months |
| Case report            | Pan et al.               | 1            | 2010           | M/32         | Central                          | C6-C7 | Myelopathy | 6 months |
| Case report            | Orief et al.             | 1            | 2012           | M/40         | Foraminal/paracentral            | C5-C6 | Radiculopathy | 5 months |
| Case report            | Stavrinou et al.         | 1            | 2009           | F/46         | Foraminal/paracentral            | C5-C6 | Myelopathy | 7 weeks |
| Case report            | Mahajan et al.           | 1            | 2014           | M/29         | Paracentral                      | C5-C6 | Neck pain with radiculopathy | 5 months |
| Case report            | Benzagmout et al.        | 1            | 2007           | M/48         | Foraminal/paracentral            | C5-C6 | Radiculopathy | 3 months |
| Case report            | Han et al.               | 1            | 2014           | F/39         | Paracentral                      | C4-C5 | Neck pain with radiculopathy | 2 years |
| Case report            | Our case report          | 1            | 2020           | M/24         | Paracentral                      | C6-C7 | Neck pain with radiculopathy | 3 months |

NA: Not available
MRI studies in cervical disc resorption

Extruded/sequestrated cervical discs on MRI showing rim enhancement with gadolinium are the most likely to regress.\textsuperscript{[1,17]} The enhancement reflects the increased accumulation of contrast material within the vascularized granulation tissue surrounding the avascular extruded/sequestrated disc, thus reflecting its greater potential for regression.\textsuperscript{[1,17]} In our review, the average time interval between the initial presentation and spontaneous regression of CDH on successive MRI studies was 9.15 months (range: 7 weeks–5 years).\textsuperscript{[4,13]}

CONCLUSION

We have evaluated 76 patients with cervical disc herniations that regressed on successive MRI studies over an average period of 9.15 months. Those CDHs most likely to regress were extruded or sequestrated lesions, paracentral or foraminal in location, that demonstrated peripheral rim enhancement on gadolinium-enhanced MRI studies.

Declaration of patient consent

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

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.
REFERENCES

1. Autio RA, Karppinen J, Niinimäki J, Ojala R, Kurunlahti M, Haapea M, et al. Determinants of spontaneous resorption of intervertebral disc herniations. Spine (Phila Pa 1976) 2006;31:1247-52.
2. Burke JG, Watson RW, McCormack D, Dowling FE, Walsh MG, Fitzpatrick JM. Spontaneous production of monocyte chemoattractant protein-1 and interleukin-8 by the human lumbar intervertebral disc. Spine (Phila Pa 1976) 2002;27:1402-7.
3. Doita M, Kanatani T, Ozaki T, Matsui N, Kurosaka M, Yoshiya S. Influence of macrophage infiltration of herniated disc tissue on the production of matrix metalloproteinases leading to disc resorption. Spine (Phila Pa 1976) 2001;26:1522-7.
4. Gurkanlar D, Yucel E, Er U, Keskil S. Spontaneous regression of cervical disc herniations. Minim Invasive Neurosurg 2006;49:179-83.
5. Han SR, Choi CY. Spontaneous regression of cervical disc herniation: A case report. Korean J Spine 2014;11:235-7.
6. Kobayashi N, Asamoto S, Doi H, Ikeda Y, Matusmoto K. Spontaneous regression of herniated cervical disc. Spine J 2003;3:171-3.
7. Krieger AJ, Maniker AH. MRI-documented regression of herniated cervical nucleus pulposus: A case report. Surg Neurol 1992;37:457-9.
8. Mochida K, Komori H, Okawa A, Muneta T, Haro H, Shinomiya K. Regression of cervical disc herniation observed on magnetic resonance images. Spine (Phila Pa 1976) 1998;23:990-7.
9. Orief T, Orz Y, Attia W, Almusrea K. Spontaneous resorption of sequestrated intervertebral disc herniation. World Neurosurg 2012;77:146-52.
10. Pan H, Xiao LW, Hu QF. Spontaneous regression of herniated cervical disc fragments and its clinical significance. Orthop Surg 2010;2:77-9.
11. Rahimizadeh A, Hamidifard A, Rahimizadeh S. Spontaneous regression of the sequestrated cervical discs: A prospective study of 26 cases and review of the literature. World Spinal Column J 2013;4:32-41.
12. Song JH, Park HK, Shin KM. Spontaneous regression of a herniated cervical disc in a patient with myelopathy. Case report. J Neurosurg 1999;90 Suppl 1:138-40.
13. Stavrinou LC, Stranjalis G, Maratheftis N, Bouras T, Sakas DE. Cervical disc, mimicking nerve sheath tumor, with rapid spontaneous recovery: A case report. Eur Spine J 2009;18 Suppl 2:176-8.
14. Turk O, Yaldiz C. Spontaneous regression of cervical discs: Retrospective analysis of 14 cases. Medicine (Baltimore) 2019;98:e14521.
15. Vinas FC, Wilner H, Rengachary S. The spontaneous resorption of herniated cervical discs. J Clin Neurosci 2001;8:542-6.
16. Westmark RM, Westmark KD, Sonntag VK. Disappearing cervical disc. Case report. J Neurosurg 1997;86:289-90.
17. Yamashita K, Hiroshima K, Kurata A. Gadolinium-DTPA-enhanced magnetic resonance imaging of a sequestered lumbar intervertebral disc and its correlation with pathologic findings. Spine (Phila Pa 1976) 1994;19:479-82.

How to cite this article: Sharma AK, Gandhoke CS, Syal SK. Spontaneous regression of herniated cervical disc: A case report and literature review. Surg Neurol Int 2021;12:141.