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Review Article

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

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ABSTRACT

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].[4-16]

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.[9] For the second, there is a retraction of the protruded disc.[9] In the third, there are enzymatic degradation and phagocytosis of the extruded/sequestrated disc material due to an inflammatory reaction/neovascularization.[3] 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 (e.g., the intervertebral disc produces chemokines such as monocyte chemotactic protein 1 (MCP-1) and interleukin 8 (IL-8) that act as chemoattractants for macrophages and capillaries).[2,9]

Figure 1: (a) MRI cervical spine, sagittal view, suggestive of a posterior disc extrusion at the C6-C7 level indenting the cervical spinal cord. (b) Follow-up MRI cervical spine, sagittal view, 3 months later revealed significant spontaneous regression of the C6-C7 intervertebral disc extrusion.

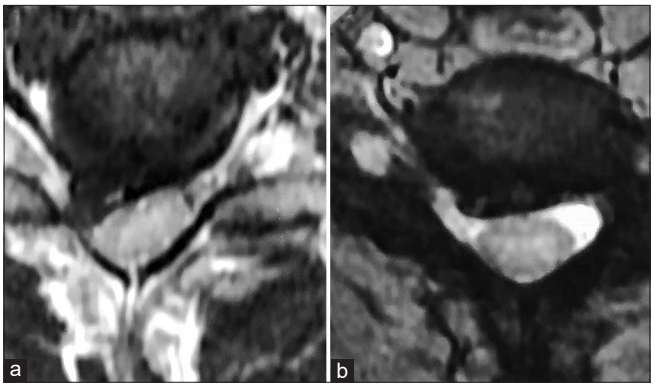

Figure 2: (a) MRI cervical spine, axial view, suggestive of a posterior disc extrusion at the C6-C7 level in the right paracentral location indenting the cervical spinal cord and the exiting right C7 root. (b) Follow-up MRI cervical spine, axial view, 3 months later revealed significant spontaneous regression of the C6-C7 intervertebral disc extrusion.

Table 1: Summary of the previously reported cases of spontaneous regression of CDH.

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	C5-C6	Neck pain	MRI done 5 years later
		Case 2	2006	F/34	Central	C6-C7	Neck pain with radiculopathy	2 years later
		Case 3	2006	M/33	Foraminal	C5-C6	Radiculopathy	NA
		Case 4	2006	F/36	Foraminal	C6-C7	Radiculopathy	1 year later
		Case 5	2006	M/49	Paracentral	C4-C5	Neck pain with radiculopathy	6 months later
		Case 6	2006	F/32	Paracentral	C6-C7	Radiculopathy	NA
Case series	Mochida *et al.*	15 cases (all partial regression)	1998	Average age 50.3 years	central 6/ lateral 9	Most common affected level C5-C6	6/21 cases with radicular pain and/or paresthesia (partial regression); UL amyotrophy 5/9 (partial regression); slight myelopathy 4/8 (partial regression) – 5/8 patients with myelopathy required surgery	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	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	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
Our case report		1	2020	M/24	Paracentral	C6-C7	Neck pain with radiculopathy	3 months

NA: Not available

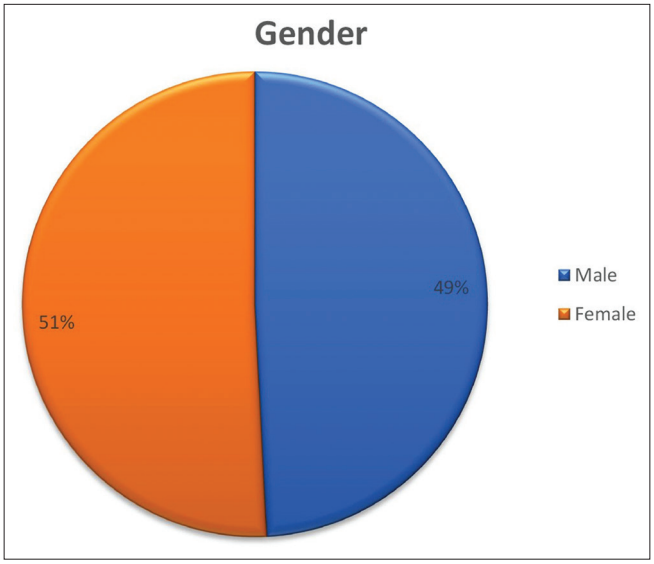

Figure 3: Pie chart showing that the male-to-female ratio was approximately 1:1.

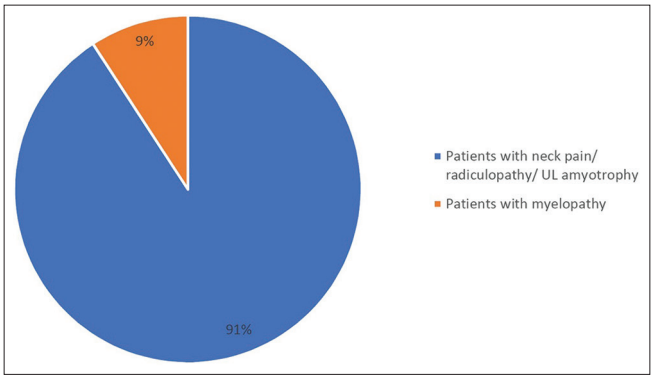

Figure 4: Pie chart depicting that 91% of the cases of spontaneous regression of herniated cervical disc had symptoms of neck pain, radiculopathy, and/or upper limb amyotrophy. Only 9% of the cases presented with early symptoms of myelopathy.

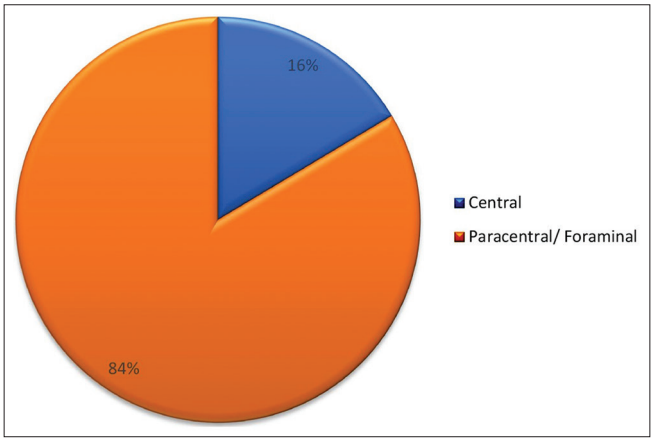

Figure 5: Pie chart depicting that the position of the herniated disc was paracentral or foraminal in 84% of the cases.

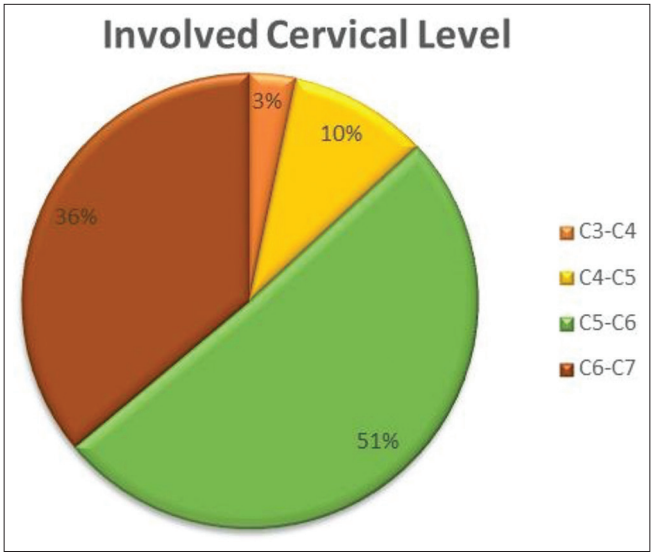

Figure 6: Pie chart showing that the most common involved levels where spontaneous regression of herniated cervical disc was observed were C5-C6 followed by C6-C7.

MRI studies in cervical disc resorption

Extruded/sequestrated cervical discs on MRI showing rim enhancement with gadolinium are the most likely to regress.[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.[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).[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.

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Conflicts of interest

There are no conflicts of interest.

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