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Case Report

Waste not, want not: Report of a completely calcified C1-C2 juxtafacet cyst and literature review

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ABSTRACT

Background: Calcified juxtafacet cysts in the cervical spine are extremely rate. Such symptomatic cysts commonly cause neck pain, radiculopathy, or even myelopathy. MR and CT studies typically document cord/root compression. On occasion, some of these cysts will spontaneously regress, while many others may warrant surgical removal.

Case Description: A 70-year-old male presented with a 2-year history of a progressive tetraparesis. The preoperative MR/CT studies showed a C1-C2 left extradural mass occupying more than half of the spinal canal. On MR, it was homogeneously hypointense on both T1- and T2-weighted images, while the CT showed a calcified cyst. Intraoperative and histopathological findings documented a calcified cervical juxtafacet cyst (i.e. ganglion subtype) that was fully excised without sequelae.

Conclusion: C1-C2 juxtafacet cervical cyst should be considered when a patient presents with myelopathy due to a calcified MR/CT documented paraspinal lesion contributing to significant cervical cord/root compression.

Keywords: Calcified cyst, Cervical degenerative disease, Ganglion cyst, Juxtafacet cyst, Spinal cyst

INTRODUCTION

Cervical juxtafacet cysts are unilateral/dorsolateral intraspinal extradural lesions originating from the facet capsule of a cervical synovial joint[4,7,8] These patients are typically in their 60s–70s.[4,7,8,10] When symptomatic, the clinical presentation depends on size, location, and extent or cord/root compression.[8] Here, we report a 70-year-old patient whose C1-C2 juxtafacet cyst contributed to cervical myelopathy that resolved following surgical decompression/fusion.

CASE REPORT

A 70-year-old male presented with a 2-year history of a progressive tetraparesis that markedly worsened 2 weeks before presentation. On examination, he was severely myelopathic (i.e. with

diffuse hyperreflexia, and bilateral Babinski and Hoffman's signs).

MR and CT studies

MR and CT studies documented a large left-sided C1-C2 juxtafacet cyst that resulted in unilateral/dorsolateral extradural cord compression. It was homogeneously hypointense on both T2- and T1-weighted images; additionally, there was significant T2 hyperintensity in the medulla [Figure 1a-c]. The CT further documented a 1.2 cm ossified mass occupying more than half of the spinal canal without apparent connection to adjacent bony/articular structures [Figure 1d and e].

Surgery

The patient underwent a C1 and C2 left hemilaminectomy. At surgery, the C1-C2 cyst appeared as a yellow, round, well-defined and bone-like finding, easily separated from adjacent neural/dural and/or vascular structures [Figure 2a]. With a clean cleavage plane between the cyst and the dura, it was readily removed under the operating microscope. In addition, the left C1-C2 foraminal extension was also easily removed [Figure 2b and c]. The postoperative course was uneventful, and the patient was transferred to a rehabilitation hospital.

Pathology

The histopathology was consistent with a juxtafacet cervical ganglion cyst comprised a fibrocalcific capsule containing a moderately fibrous and sclerotic liquid matrix. No atypical cells were observed, and no synovial lining was found [Figure 3].

Literature review

Here, we reviewed multiple studies involving cervical juxtafacet cysts. Criteria for literature review search strategy included "spinal cyst" or "ganglion cyst" or "facet cyst" or "juxtafacet cyst" or "cervical" or "calcified" in appropriate combination, in the main databases (PubMed, Google Scholar, MEDLINE, and Scopus). We identified 169 patients with these lesions; patients averaged 65.2 years of age and included 96 men, 66 women and unknown 5 cases. Cysts were located predominantly at the following levels: odontoid process in 17 cases (10.06%), C1-C2 facet joint in 25 (14.8%), and C7-T1 facet joint in 57 cases (33.73%). Most of the patients typically underwent laminectomy/hemilaminectomy for the excision of these cysts; 3 had laminoplasty. Posterior

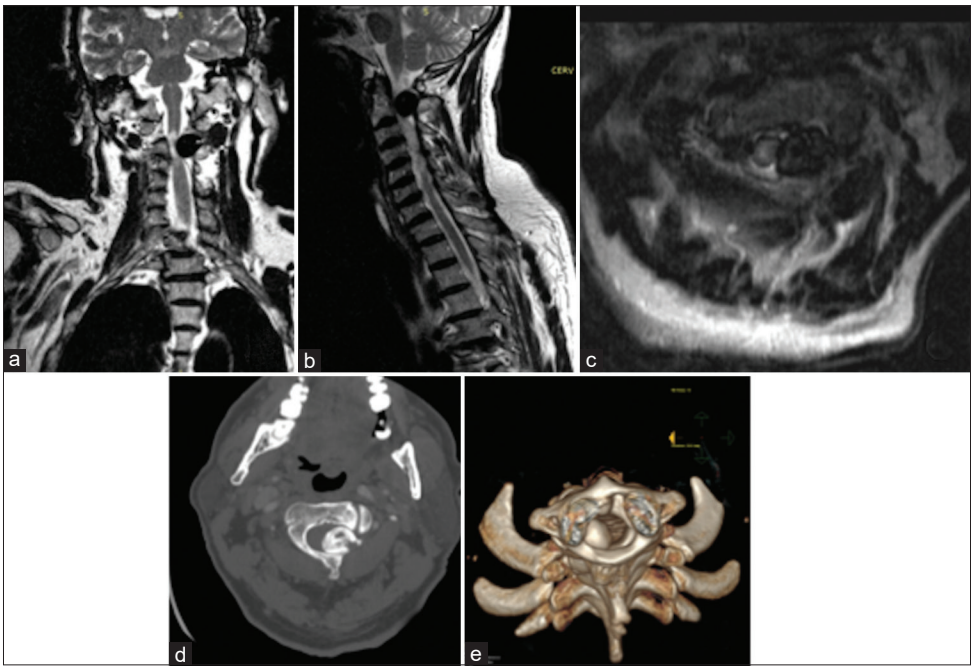

Figure 1: T2-weighted coronal (a), sagittal (b), and axial (c) MRI images show an extradural mass homogeneously hypointense at the C1-C2 level on the left with the characteristic total signal loss. The mass causes severe compression and dislocation of the dural sac with prominent area of T2 hyperintensity involving enterally the medulla at the same level. Axial bone window CT image (d) shows a completely bone density mass occupying more than half spinal canal, with no apparent connections with adjacent bony articular structures. In (e), a three-dimensional CT reconstruction.

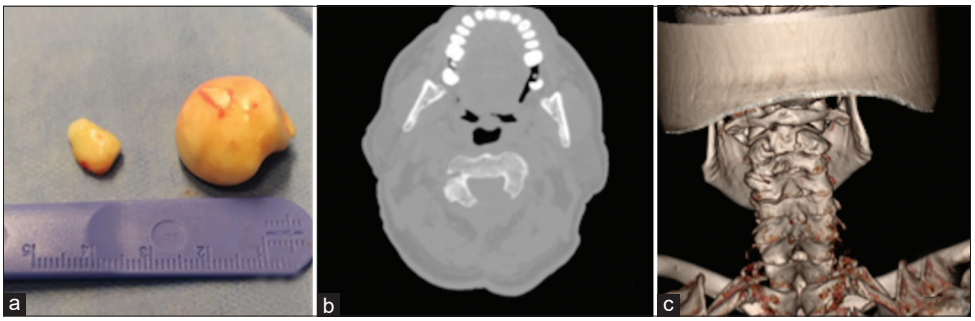

Figure 2: Intraoperative image (a) showing *en bloc* resection of the calcified cyst. Axial bone window CT image (b) and its three-dimensional CT reconstruction (c) show postoperative results and the completely excision of the bone mass, without altering C1-C2 facet joints and cervical stability.

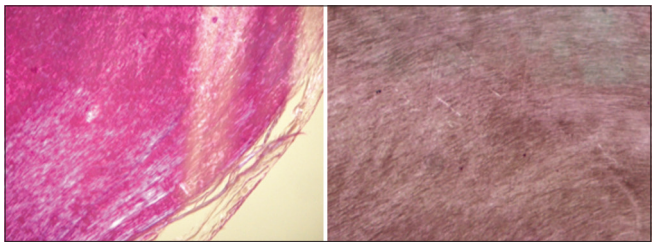

Figure 3: The microscopical examination showed a fibrocalcific capsule containing a moderately fibrous and sclerotic liquid matrix, and the absence of synovial cell lining of the cystic wall (hematoxylin-eosin stain).

cervical fusion was also performed in 22 cases (i.e. two were occipitocervical fusions). Fifteen cases were approached utilizing a transoral route (i.e. most of were C1-C2 facet joint cysts). The histopathological examination, when accessible, documented 103 synovial cyst, 27 ganglion cyst, and 37 were not specified. No completely calcified cysts were found [Table 1]

DISCUSSION

Juxtafacet cysts are likely due to "degenerative joint disease" and facet joint degeneration.[4,8] Degenerative changes lead to myxoid degeneration of collagen connective tissue, joint capsule weakness, and potential herniation of synovial tissue (i.e. synovial fluid fills the newly formed cavity and becomes a cyst).[2,4,8] Cervical localization is less common and the most cases occur at the cervicothoracic junction-C7/T1.[2,4,7,8,10]

Histopathological types

Two histopathological types of degenerative spinal cyst are describe The *synovial cyst* is considered as an extrusion of the synovial membrane through a capsular defect from a degenerated facet joint; here, there is direct communication with the synovial cavity of the facet joint. The *ganglion cyst* shows no synovial lining but has a fibrous connective tissue wall with no direct communication with the facet joint.[1,8] Therefore, synovial cysts are usually known as "*true cysts*" and ganglion cysts as "*pseudocysts*."[3,8,10]

Imaging of juxtafacet cysts

MRI is the modality of choice to differentiate juxtafacet cysts from other extradural or even intradural compressive lesions.[8] MR images typically show a well-circumscribed, extradural lesion located adjacent to the facet joint with low/intermediate T1-weighted intensity (hypointensity) and high T2-weighted intensity (hyperintensity).[4,8] Erosion of adjacent bone and progressive enlargement might mimic malignancy.[4] With gadolinium, there is usually peripheral rim enhancement of the cyst wall (i.e. reflecting the relative increased vascularity of the capsule).[1,8]

Calcification of juxtafacet cyst

Calcification in the cyst walls is commonly reported and characterized by low signal intensity (hypodensity) on T1-weighted and T2-weighted images.[3,9] Note, completely calcified cysts are extremely rare and are better appreciated on CT scans [Figure 1].[3,5]

Surgery for juxtafacet cysts

Only a subset of juxtafacet cysts is symptomatic.[6,8] Posterior decompression surgery through laminectomy typically addresses the resultant cervical spinal stenosis, in some instances, also warranting fusion.[7,10,12] Laminoplasty is another alternative surgical approach. Due to occasional

Table 1: Summary of case report and case series of the literature review on juxtafacet cyst at the cervical level.

Criterion	Detail
Timeframe	1974–2021
Number of journal articles	78
Number of patients	169
	96 M
	66 F
	5 not specified
Age of patients	Mean age 65.2 yo (range 8–86)
Location of cyst	
Odontoid process	17 (10.06%)
Atlantoaxial junction	6 (3.55%)
C1-C2 transverse ligament	2 (1.18%)
C2 quadrate ligament	1 (0.6%)
C2-C3 facet joint	3 (1.78%)
C3-C4 ligamentum flavum	4 (2.37%)
C3-C4 facet joint	9 (5.33%)
C4-C5 facet joint	10 (7.5%)
C4-C5 ligamentum flavum	3 (1.78%)
C5-C6 facet joint	12 (7.10%)
C6-C7 facet joint	19 (7.69%)
C7-T1 facet joint	57 (33.73%)
C7-T1 ligamentum flavum	5 (2.96%)
Anterior longitudinal ligament	2 (1.18%)
Bilateral cysts	5 (2.96%)
Type of cyst	
Synovial cyst	103
Ganglion cyst	27
Not specified	37
Treatment	
Laminectomy/hemilaminectomy	Most of cases
Laminoplasty	3
Posterior cervical fusion	22
Transoral approach	15
Transnasal and transoral odontoidectomy	2
Anterior approach	1
Spontaneous resolution	1
CT-guided aspiration	1
Just observation	1
No treatment	1

dense dural adhesions, some resections require leaving a small segment of the adherent capsule behind to avoid a cerebrospinal fluid leak (CSF).[11] Notably, CT-guided needle aspiration is rarely safe or effective and can result in significant CSF leaks and/or direct cord damage.[7,9]

CONCLUSION

Juxtafacet cysts should be considered among the differential diagnostic consideration for symptomatic intraspinal-extradural or paraspinal space-occupying lesions of the cervical spine, even when completely calcified radiological findings are documented.

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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