





## Case Report

# Unilateral facet cyst at the atlantoaxial joint leading to cervical myelopathy: A case report and review of literature

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## ABSTRACT

**Background:** Spinal synovial cysts are rare in the cervical spine where they may cause myeloradiculopathy. Contrast MR studies help differentiate these from other lesions. The optimal treatment is often surgical removal.

**Case Description:** A 47-year-old male presented with axial neck pain, numbness, and left-hand paresthesia. When the MR study showed dorsolateral cord compression due to a left-sided C1-C2 facet cyst, he underwent a unilateral decompression/fusion. Adequate cyst removal/excision was documented on a postoperative MR performed 2 weeks and 3 months postoperatively.

**Conclusion:** A 47-year-old male presented with myelopathy attributed to an MR-documented dorsolateral C1/C2 facet cyst. Following excision/decompression of the cyst and posterior fusion, the patient's symptoms/signs resolved.

**Keywords:** Cervical spine cysts, Goel-Harms technique, Unilateral C1-C2 fusion, Unilateral facet cyst

## INTRODUCTION

Cervical spinal arachnoid cysts, alternatively called ganglion, retrodental, or juxtafacet cysts, are rare in the cervical spine.<sup>[2]</sup> They are benign lesions that occur adjacent to facet joints or within the yellow ligament. When MR studies document that they contribute to cord compression, surgical removal with accompanying fusion constitutes the most likely treatment of choice.

## CASE DESCRIPTION

A 47-year-old male presented with a nontraumatic 4-month history of axial neck pain, with numbness/paresthesia in involving his left upper limb (i.e., C6/C7 distribution).

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The preoperative neck 7 visual analog score (VAS), 28 Oswestry Disability Index, and 16 modified Japanese Orthopaedic Association (mJOA) scores were consistent with radiculopathy/myelopathy. The MRI showed  $0.7 \times 1.1 \times 1.3$  T1 hypo/T2 hyperintense nonenhancing extradural cystic lesion at the C2 level. It was located beneath the posterior longitudinal ligament (PLL) resulting in cervical spinal cord compression/severe canal stenosis with a high-intensity left cord signal. The preoperative CT angiogram showed that the vertebral arteries were not involved, while also confirming the maximum diameter of the C2 pedicle (i.e., isthmus 2.6 mm on the right and 3 mm on the left side).

### Surgery and postoperative outcome

The patient underwent a C1–C2 lateral mass pedicle screw/rod fusion only on the left side (i.e., Goel-Harms technique) as the C2 isthmus was too small on the right [Figure 1]. Autograft, harvested from the posterior superior iliac spine, was utilized for facet fusion. Three months postoperatively, the VAS (i.e., 7–2) and the mJOA (up to 18) both improved. One year later, the patient returned to his job with Nurick grade improved from 2 to 0.

## DISCUSSION

### Few reports of high cervical synovial cysts

Few reports of supra-axial cervical synovial cysts are found in the literature [Table 1].<sup>[1,3,4]</sup> There is much debate regarding the exact etiopathogenesis of spinal synovial cysts. Some invoke trauma, while others suggest metaplasia, developmental rests, excess stress at the facet joints/herniation of synovial tissue, and/or mucinous degeneration of the connective tissue.<sup>[5]</sup> Most are located anterior to the cervical cord [Table 1].<sup>[7,9]</sup> Enhanced MRI is the diagnostic study of choice typically demonstrating low to intermediate signal intensity on T1-weighted images, variable signal intensity on T2-weighted images depending on type of fluid, and extensive rim enhancement on gadolinium diethylenetriamine pentaacid (Gd-DTPA) MRI.<sup>[8]</sup> In our case, the cyst on MRI was hypointense on T1 and hyperintense on T2 studies. Further, the extradural cyst located ventral to the PLL along the posterior aspect of C2. C2 vertebra readily enhanced with contrast [Figures 2 and 3].

### Import of preoperative CT and CTA studies

The preoperative CT demonstrated that the maximum diameter of the contralateral pedicle on the right was just 2.6 mm, insufficient for the placement of a screw, while the left pedicle at 3.0 mm was adequate for screw fixation. In addition, the CTA documented that the left synovial cyst did not impinge on the vertebral artery.



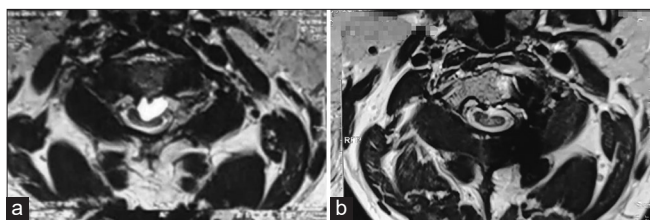
**Figure 1:** Postoperative X-ray showing Goel and Harms C1 lateral mass–C2 pedicle fixation (left).



**Figure 2:** (a and b) MRI sagittal T2 shows (a) hyperintense cystic lesion deep to PLL along dorsal aspect of C2 impinging and deforming cord. MRI axial T2 shows (b) 3-month postsurgery showing complete resolution of cyst and restoration of CSF flow.

Author reference	Age/Sex	Symptoms/Signs	MR/CT cyst location	Procedures/treatment	Outcome/conclusion
Aksoy and Gomori, Spine (Phila Pa 1976) (2000) <sup>[1]</sup>	61/M	Lower limb stiffness; hand weakness	Cyst associated with os odontoideum (C2); compressing the cord.	Posterior craniovertebral junction exploration; laminectomy of C1 and C2 and anterior fusion	Differential diagnosis of an extradural mass; MRI investigation of choice.
Costa et al., European Spine Journal (2010) <sup>[2]</sup>	84/M	Cervicobrachialgia; progressive hypostenia right arm	Extradural lesion with a right lateral extension between C7 and T1; no cord compression	Decompressive laminectomy; cystectomy	Histopathology-synovial cyst; symptomatic
Gazzeri et al., European Spine Journal (2005) <sup>[3]</sup>	66/F	Progressive gait disturbances; spastic paraparesis	Differential diagnosis of ligamentum flavum cysts and synovial cysts; anterolateral lamina of C7	C7-T1 decompressive hemilaminectomy	Histopathology-ligamentum flavum cyst associated with cervicothoracic subluxation.
Ito et al., Journal of Orthopaedic Surgery (2000) <sup>[4]</sup>	8/M	Neck pain	C1-C2 subluxation with dens hypoplasia; round lesion posterior to the odontoid process causing slight cord compression	Transarticular screw fixation; arthrodesis	>6 weeks MRI showed no retrodental cyst; solid osseous union after 6 months
Paik et al., Journal of Korean Neurosurgical Society (2015) <sup>[6]</sup>	-	Chronic nuchal pain with or without neurological deficits in rheumatoid arthritis cases	Atlantoaxial instability; C1-C2	11 cases underwent unilateral C1LM-C2P screw fixation rest bilateral fixation	Unilateral fixation is a useful alternative in patients with anatomical variations.
Patel and Sanders, American Journal of Neuroradiology. (1988) <sup>[7]</sup>	42/F	Cervicobrachialgia right sided with radiculopathy	CT demonstrated facet erosion C4-C5	Partial laminectomy of the inferior aspect of the C4 lamina; cystic mass	Histological examination Synovial cyst
Sasamori et al., Clinical Imaging (2014) <sup>[8]</sup>	48/M	Progressive gait disturbance; spastic paraparesis	Extradural cystic mass in contact with the left facet joint at the C7-T1 level; Gd-DTPA MRI	C6-T1 hemilaminectomy and cyst excision	Extensive rim enhancement on Gd-DTPA MRI; histological examination – juxtafacet cyst
Shima et al., Spine (2002) <sup>[9]</sup>	Case 1. A 66/M Case 2. 68/M Case 3. 68/F	Neck pain; gait disturbances; weakness upper and lower limb	MRI-fluid-containing extradural lesion; CT gas content in the lesion; C7-T1	Case 1 C3-C6 laminoplasty with C7-T1 laminectomy; rest C7 laminectomy; cystectomy	MRI and CT scan are useful in diagnosis of “degenerative intraspinal cyst.”

Gd-DTPA: Gadolinium diethylenetriamine pentaacid



**Figure 3:** MRI axial T2 shows (a) hyperintense likely synovial cyst arising from the left C1-C2 facet with the left-sided myelomalacia changes in cord. (b) Three-month postsurgery showing complete resolution of cyst.

## Surgery

The patient successfully underwent a left-sided C1/C2 pedicle screw fusion alone.<sup>[6]</sup> The authors determined that decompression alone was warranted as the cyst did not significantly compress the cord and the mild “short-term” myelopathy would likely resolve with spontaneous cyst regression. Following the unilateral C1-C2 fusion, the patient neurologically improved and remained stable/fused 3 months later [Figures 2 and 3].

## CONCLUSION

Synovial cysts of the cervical spine are extremely rare. They are best defined by contrast MRI studies and respond well to direct surgical excision utilizing decompression alone or decompression with fusion as indicated.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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### Conflicts of interests

There are no conflicts of interest.

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