

Recurrent atlantoaxial synovial cyst resection via a navigation-guided, endoscope-assisted posterior approach

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Received: 18 June 14 Accepted: 13 August 14 Published: 30 December 14

This article may be cited as:

Colasanti R, Lamki T, Taylor AA, Ammirati M. Recurrent atlantoaxial synovial cyst resection via a navigation-guided, endoscope-assisted posterior approach. *Surg Neurol Int* 2014;5:S567-9.

Available FREE in open access from: <http://www.surgicalneurologyint.com/text.asp?2014/5/16/567/148048>

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Abstract

Background: Atlantoaxial cysts are rare, and only 46 histologically confirmed cases have been reported.

Case Description: A 75-year-old male presented 2 years ago with headache, neck pain, loss of balance, and episodic dysphagia, for which he had undergone posterior cervical drainage of a left-sided atlantoaxial cyst. Although his original symptoms resolved, they recurred 2 years later and were correlated with an enhanced MR that showed a recurrent left C1-C2 synovial cyst causing marked cervical cord compression. It was successfully resected through a navigation-guided, endoscope-assisted posterior approach. The patient's symptoms/signs resolved completely, and he has remained symptom-free for over 30 months postoperatively, with no evidence of recurrence on MR or craniocervical instability.

Conclusions: A patient who successfully underwent resection of a recurrent synovial cervical cyst using a navigation-guided, endoscope-assisted posterior approach has been reported here.

Key Words: Atlantoaxial joint, endoscopic assistance, intraoperative navigation, posterior approach, semi-sitting position, synovial cyst

Access this article online

Website:

www.surgicalneurologyint.com

DOI:

10.4103/2152-7806.148048

Quick Response Code:



INTRODUCTION

Juxtafacet cysts (JFCs) arise at the joint capsule of the spinal facet synovial joint and include cysts with a synovial membrane (synovial cysts) as well as cysts without any specific lining (ganglion cysts).^[4] Cervical JFCs are rare, and only 165 histologically confirmed cases have been reported. They are mainly located at the atlantoaxial (46 cases) and cervicothoracic (61 cases) junctions and cause symptoms due to neural compression.^[1-9,11,12,14-16] JFCs' recurrence is rare even after partial excision.^[16]

Various treatment modalities have been proposed for the management of C1-C2 cysts. All are aimed at neural decompression while preserving the functional integrity of the upper cervical spine (UCS).^[6,7,13] Here, we present a case in which a 75-year-old patient with a recurrent atlantoaxial JFC underwent resection of the lesion successfully, using a navigation-guided, endoscope-assisted posterior approach.

CASE REPORT

A 75-year-old man presented with a history of headache, neck pain, and balance issues. Two years

prior to our evaluation, he had undergone a posterior cervical operation for drainage and cauterization of a left-sided atlantoaxial cyst at another institution. His original symptoms/signs were partially relieved by the prior operation for a period of 18 months after which they reappeared and progressed. His new presenting complaints included numbness, tingling, and weakness in both arms (predominantly left-sided). The neurological findings included a Lhermitte's sign, unsteady gait, and episodic swallowing difficulties.

Cervical MR scan

The preoperative enhanced cervical MR scan revealed a 1.7 × 1.4 × 1.6 cm cyst (larger than in the original studies) arising from the left C1-C2 facet joint, markedly compressing the cord [Figure 1].

Endoscope-assisted surgery

In the semi-sitting position, a midline posterior incision was made using intraoperative navigation. The incision straddled the craniovertebral junction and involved removal of the left C1 hemilamina. Under the operating microscope in navigation mode, the cyst was defined, and was confirmed with real-time ultrasound guidance. The lesion was anterior to the dura mater at the craniocervical junction on the left side, abutting the horizontal segment of the left vertebral artery (VA). Following a vertical durotomy performed just medial to the C1-C2 joint and using the endoscope to define the cyst versus VA, extensive fibrosis was removed along with the lesion [Figures 2 and 3].

The dura was closed in a watertight fashion and supplemented with an onlay fat graft and fibrin glue. The patient's symptoms resolved and he has remained symptom-free for over 30 postoperative months without MR evidence of recurrence or craniocervical instability [Figure 4].

DISCUSSION

Frequency and location

Cervical JFCs are rare causes of neurological deficits (only 165 cases have been reported). They are mainly located at the atlantoaxial (27.88%) and cervicothoracic (36.97%) junctions.^[1-9,11,12,14-16] JFCs' etiology remains controversial, and their development is generally connected to facet joint degeneration, while other reports suggest congenital, inflammatory, or traumatic causes. Most are located at the L4-L5 level.^[6,7]

Surgical alternatives

Different surgical approaches have been proposed, such as transoral, anterolateral, and posterolateral. The transoral approach is usually recommended for ventral cysts, while the posterolateral approach is typically better tolerated by the patient.^[6,7,15] Posterior fusion is

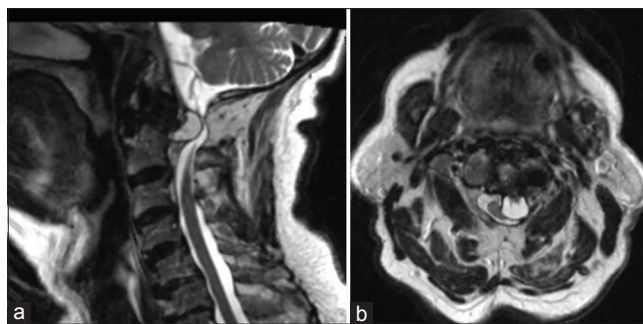


Figure 1: Preoperative sagittal (a) and axial (b) T2-weighted MR showing a 1.7 × 1.4 × 1.6 cm left anterolateral atlantoaxial cyst arising from the left C1-C2 joint and extending towards the left side causing a remarkable cervical cord deformity

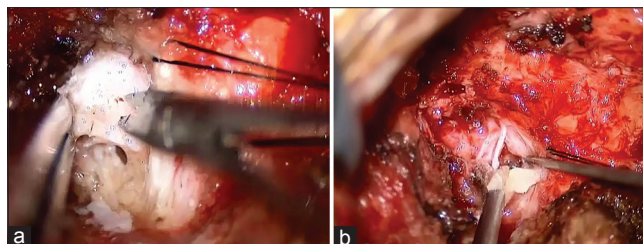


Figure 2: Intraoperative microscopic pictures (a,b) showing the progressive removal of the cyst. Extensive fibrosis is evident around the surgical cavity (b)

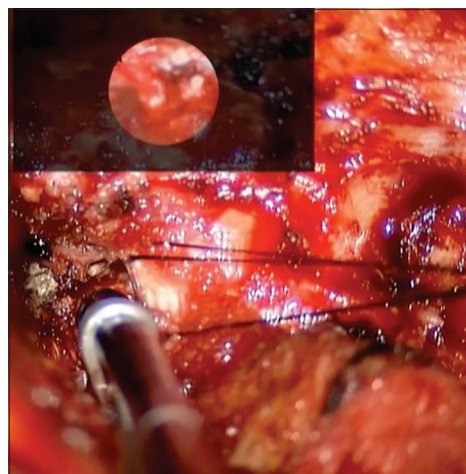


Figure 3: A 0° 2.7 mm endoscope was inserted after retraction of the cyst wall to assess the relationship of the cyst with the VA. Endoscopic view was displayed using an image injection system into the microscope oculars

recommended prior to performing transoral cyst removal with odontoidectomy and C1 anterior arch resection (due to the surgical approach linked instability),^[6,7,15] and in some cases, it can be the only necessary procedure since the stabilization of the C1-C2 joint may determine the spontaneous regression of the cyst.^[6,7,15]

Our case is unique because of the recurrence of the cyst and the combined intraoperative use of microscope-linked neuronavigation and endoscope.^[10] This well-known surgical route allowed complete lesion

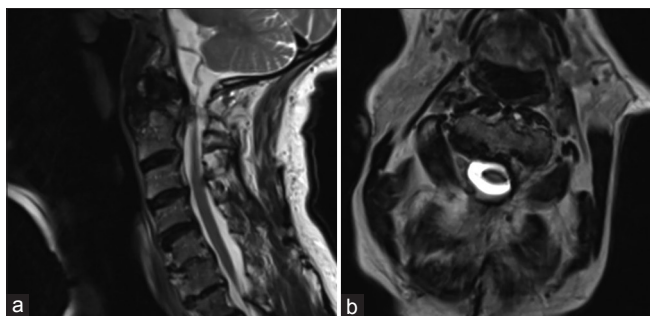


Figure 4: (a) Two-years follow-up sagittal (a) and axial (b) T2-weighted MR demonstrating neural decompression without lesion recurrence

resection without causing craniocervical instability. The endoscope was employed as an adjunctive tool permitting intraoperative assessment of the VA position as well as providing assurance of complete resection. In conclusion, a posterior approach in the semi-sitting position allowed safe removal of a recurrent, symptomatic JFC by accomplishing effective neural decompression while preserving the UCS's stability and functional integrity.

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