Turkish Neurosurgery 2008, Vol: 18, No: 3, 241-244

Cervical Intradural Ventral Arachnoid Cyst Resected Via Anterior Corpectomy With Reconstruction: A Case Report

Anterior Korpektomi ve Rekonstrüksyon ile Rezeke Edilen Servikal İntradural Ventral Araknoid Kist : Bir Olgu Sunumu

Siyavuş MUHAMMEDREZAİ[1]
Mustafa Onur ULU[2]
Necmettin TANRIÖVER[3]
Amir M.G. MOGHADDAM[4]
Ziya AKAR[5]

[1,4] Acıbadem Bakırkoy Hospital, Neurosurgery Clinic, Istanbul, Turkey
[2,3,5] Istanbul University, Cerrahpasa Medical Faculty, Department of Neurosurgery, Istanbul, Turkey

Received : 02.02.008
Accepted : 24.06.008

ABSTRACT

Intradural arachnoid cysts are rare lesions that frequently arise posterior to the spinal cord in the thoracic spine region. Those located at the cervical spine level, anterior to the spinal cord are even rarer. The usual treatment of symptomatic intradural spinal cysts involves surgical removal through a posterior approach using a laminectomy or laminotomy. However, ventrally located intradural cysts are frequently not amenable to complete resection without undue manipulation of the cord and aggressive removal through a posterior approach may result in spinal cord injury. The authors present a 29-year-old male harbouring an intradural ventral cervical arachnoid cyst which was successfully resected via an anterior approach with corpectomy and reconstruction.

CONCLUSION: For purely ventral cervical intradural arachnoid cysts, which compress the spinal cord dorsally, an anterior approach can allow access to the lesion without any need for intraoperative manipulation of the spinal cord. For such cases, the anterior approach prevents the consequent risk of neurological injury due to posterior approaches.

KEY WORDS: Anterior approach, Arachnoid cyst, Corpectomy, Intradural spinal cyst, Ventral

ÖZ

İntradural araknoid kistler sıklıkla torasik bölgede omuriliğin posterioruna lokalize nadir görülen lezyonlardır. Servikal omurga düzeyinde, özellikle omuriliğin önünde bulunmaları daha da nadirdir. Semptomatik intradural spinal kistlerin olağan tedavisi posterior yaklaşımla laminektomi veya laminotomi sonrası cerrahi eksizyondur. Fakat ön yerleşimli intradural kistlerin tam rezeksiyonu omuriliğin aşırı manipülasyonu olmaksızın sıklıkla mümkün olmamakta ve posterior yaklaşımla agresif rezeksiyon girişimleri omurilik hasarına yol açabilmektedir. Bu sunumda yazarlar intradural ön yerleşimli servikal araknoid kisti olan 29 yaşında bir erkek hastanın anterior korpektomi ve rekonstrüksyon ile başarılı tedavisini sunmaktadır.

SONUÇ: Dorsalinden omuriliğe baskı yapan, tamamiyle ön yerleşimli intradural servikal araknoid kistlerde anterior yaklaşım, omuriliğe herhangi bir manipülasyon gerektirmeksizin lezyona ulaşım sağlamaktadır. Bu olgularda anterior yaklaşım ile, posterior yaklaşımların neden olduğu nörolojik hasar riskleri önlenebilir.

ANAHTAR SÖZCÜKLER: Anterior yaklaşım, Araknoid kist, Korpektomi, İntradural spinal kist, Ventral

Correspondence address:
Necmettin TANRIÖVER
Cerrahpasa Tıp Fakültesi Nöroşirürji Kliniği
Cerrahpasa, İstanbul, Turkiye, 34728
Phone : 0090 216 337 09 72
Fax : 0090 216 578 0249
E-mail : nctan27@yahoo.com

INTRODUCTION

Spinal arachnoid cysts (AC) are relatively uncommon lesions that may be intradural or extradural with the intradural variety being rare (7,8). Intradural AC may occur as congenital lesions (primary) or secondary to trauma, infection, or subarachnoid hemorrhage (2,4). They frequently arise posterior to the spinal cord in the thoracic spine region (6), and only 15% are located in the cervical region (7,8). Those located anterior to the spinal cord in the cervical spine region are distinctly rare (3,4,6, 9,10). The usual treatment of intradural symptomatic spinal cysts involves removal through a posterior approach using a laminectomy or laminotomy (1). However treatment of ventrally located symptomatic ACs may be challenging via a posterior approach. Moreover, ventrally located intradural cysts are frequently not amenable to complete resection without undue manipulation of the cord and aggressive removal through a posterior approach may result in spinal cord injury (12). In this report we present a rare case of a symptomatic intradural AC located anterior to the cervical spinal cord, successfully resected via an anterior approach with corpectomy and reconstruction.

CASE DESCRIPTION

A 29-year-old man was admitted to our clinic with two-month history of progressive weakness in both legs. He was diagnosed as having an intradural ventral cervical cystic mass with signal intensity similar to cerebrospinal fluid (CSF) and subsequently operated via a posterior approach at another institution one month ago (Figure 1A-D). When the preoperative and postoperative cervical magnetic resonance imaging (MRI) sections were compared, no change was found regarding the cyst size. Moreover the patient admitted that his symptoms got worse after the operation. He had no history of trauma. Neurological examination revealed moderate motor weakness of both lower extremities (3/5 motor power) with hyperreflexia. Responses to light touch, pin prick, and temperature sense were decreased below the C6 dermatome. Both joint position and vibration senses were intact. The patient underwent a standard anterior cervical approach for C7 corpectomy. After bony removal and hemostasis were achieved, a midline durotomy was performed, and the intradural cystic mass was identified (Figure 2). Intraoperative inspection confirmed the exclusively ventral midline position

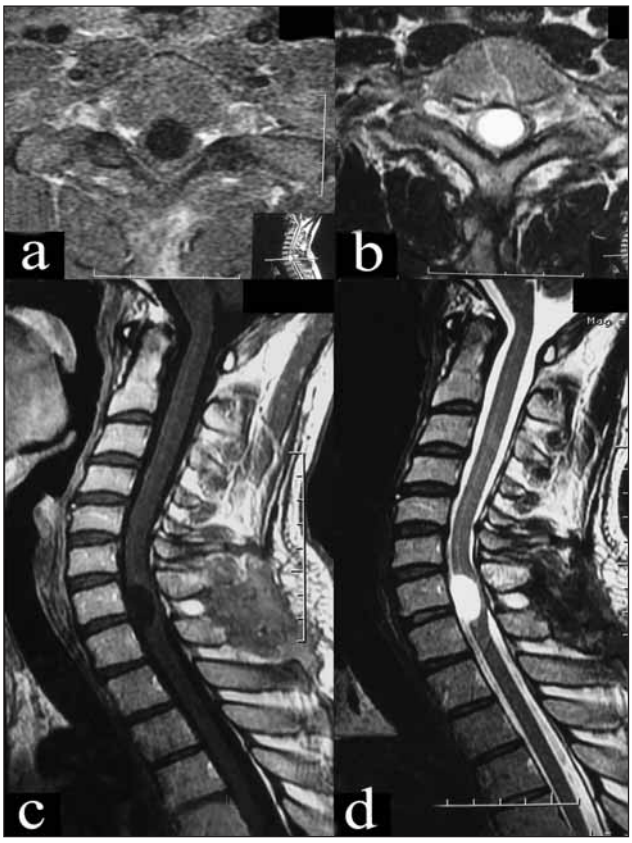

Figure 1: *Axial T1- and T2-weighted (**A** and **B**) and sagittal T1- and T2-weighted (**C** and **D**) MRI sections reveal a ventrally located intradural cyst at C7 level, compressing the spinal cord dorsally. Note that the intensity of the cyst is similar to that of CSF.*

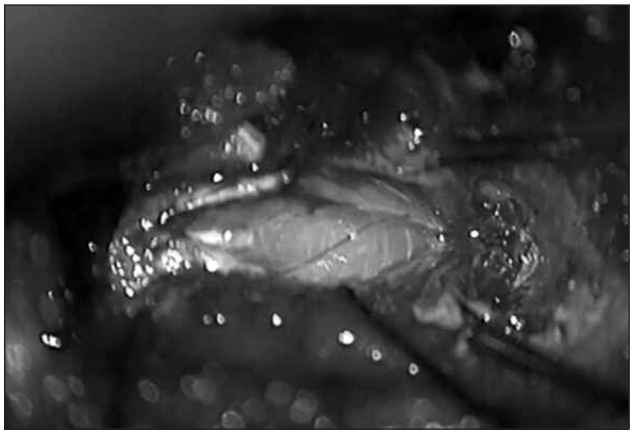

Figure 2: *İntraoperative photograph of the lesion after the dura is opened and tacked with sutures.*

of the mass and the absence of attachment to any discrete neural structure. As the cyst was incised, CSF was forcefully released out of the cavity. Following the evacuation of the cyst and total resection of the cyst wall, a watertight dural closure

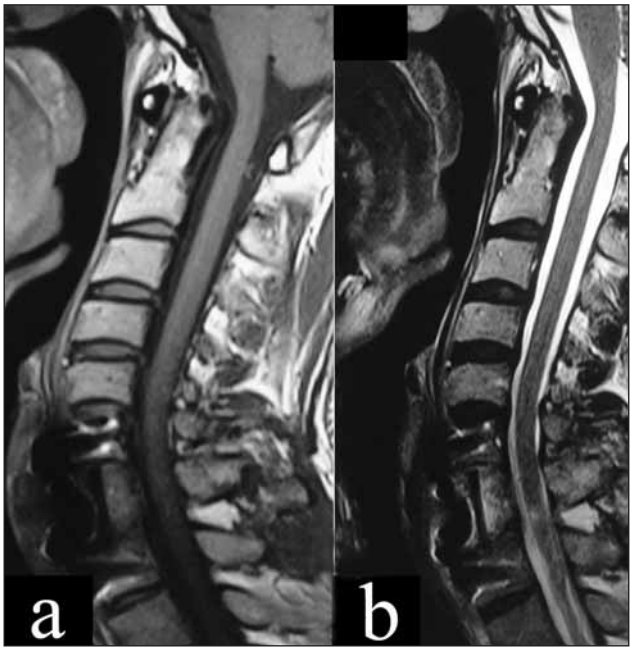

Figure 3: *Postoperative sagittal T1- and T2-weighted (a and b) MRI sections reveal total excision of the cyst and the reconstructed anterior cervical column.*

was achieved through separated sutures under the surgical microscope. Fibrin glue (Tisseal®) was applied to prevent postoperative CSF leakage. The anterior cervical spine was reconstructed by applying a fibular allograft into the corpectomy defect and with an anterior cervical titanium plate system. The patient showed marked neurological improvement in the early postoperative period and was discharged on the postoperative 5th day. The patient's motor weakness was totally resolved at his 1-month follow-up. The postoperative cervical MRI

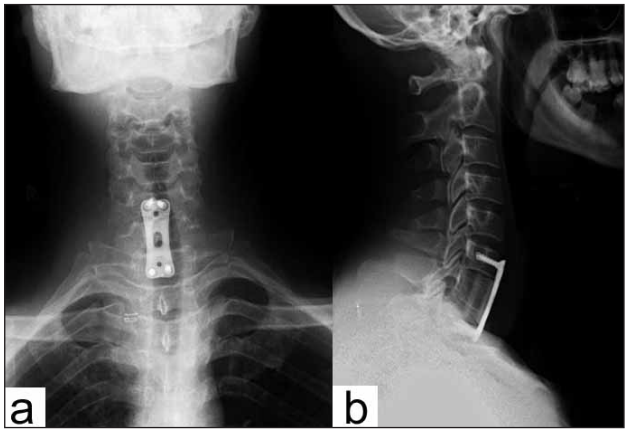

Figure 4: *Postoperative anteroposterior (**A**) and lateral (**B**) cervical spine x-ray films showing the anterior instrumentation with fibular allograft and titanium plate.*

demonstrated total removal of the cyst with sufficient decompression of the spinal cord (Figure 3A-B) and postoperative cervical X-rays confirmed anterior instrumentation (Figure 4A-B). The histopathological examination was consistent with an AC.

DISCUSSION

Spinal intradural ACs are rare causes of compressive myelopathy or myeloradiculopathy and can be congenital or acquired (2,4,13). Acquired ACs are more commonly encountered and they are mostly related to spinal cord trauma, postsurgical arachnoiditis, meningeal infection, and other insults that cause inflammation and subarachnoid adhesions (4,13). The congenital or idiopathic spinal ACs, on the other hand, are rarer and there is no antecedent history of trauma or other etiological factors causing inflammation (9,13). The patient presented had no history of trauma or infection prior to surgery. Moreover the intraoperative appearance of the cyst wall with normal arachnoid tissue suggested that this lesion was more likely to be congenital or idiopathic.

MRI is useful to assess the size, nature and extent of the cystic lesion as well as the mass effect on the cord and considered as the imaging modality of choice for spinal ACs (8).They may appear as isointense or slightly hyperintense relative to CSF on T1-weighted imaging. They usually show increased signal on T2-weighted images with no cyst wall after contrast enhancement. In the present case, the slightly higher signal intensity than CSF seen on T1-weighted images can be attributed to the slightly higher protein content in these cysts by loculation of CSF as reported before (8). Nonneoplastic cystic lesions, such as neuroenteric cysts, syringes, and teratomas, may show a very similar MRI appearance to ACs (11), however the definite diagnosis can be achieved by histopathological examination of the cyst wall. In our case, the radiological and intraoperative findings suggested AC, which was confirmed by histopathological examination of the cyst wall.

The surgical treatment of intradural ACs includes complete resection, fenestration of the wall, or shunting the cyst to the subarachnoid space, peritoneum, or atrium (2, 5). The optimum surgical approach must be safe and less invasive while providing sufficient surgical window for complete

excision of the cyst wall to prevent recurrences. Traditionally, the surgical approach to intradural ACs has been by posterior laminectomy and resection or fenestration of the cyst (2, 6). Indeed, most intradural lesions located posteriorly or posterolaterally can be easily accessed by a posterior or posterolateral approach. However, when the cyst is situated anterior to the spinal cord, attempts for complete excision of the cyst wall via the posterior approach is associated with a high risk of spinal cord injury, especially when the anteriorly located cyst is adherent to the ventral part of the dura or the cord (1, 6). The posterior approach also often cannot provide visualization of the entire ventral portion of the canal or cord without prohibitive cord retraction or rotation (12). For instance, in the present case, attempts to remove the lesion via the posterior approach in the previous surgery had resulted in failure probably due to possible problems in accessing the lesion.

Several authors have reported on the posterior approach for removal of anteriorly located cervical ACs which mostly includes laminectomy with partial resection of the cyst wall and fenestration (6,9). A meticulous review by Kazan et al. described 8 cases of anteriorly located ACs in the cervical spine, all of which were treated with fenestration via hemilaminectomy and/or cytoperitoneal shunting (6). They also reported two similar ventrally located AC cases treated with fenestration and/or partial resection of the cyst wall via a posterior approach (6). Safriel et al reported a cervicothoracic anteriorly located giant AC which was treated with fenestration subsequent to two levels of laminectomies. The authors admitted that the cyst could not be completely removed due to the its anterior location and multiple adhesions and was fenestrated instead (10). As can be seen from the available literature, complete resection of the cyst wall is often impossible via a posterior approach. The anterior approach, on the other hand, provides good visualization and safe removal of the lesion. It has been reported to offer favorable outcomes in the treatment of other ventrally located cysts such as neuroenteric cysts (11). In the present case, an anterior approach with corpectomy and fusion provided complete excision of the cyst with favorable outcome which was not possible with the previous posterior approach.

In conclusion, congenital spinal ACs located in the cervical region are relatively uncommon lesions. For purely ventral cervical intradural ACs, which compress the spinal cord dorsally, an anterior approach can allow access to the lesion without any need for intraoperative manipulation of the spinal cord. The anterior approach to ventrally located cervical ACs prevents the consequent risk of neurological injury due to posterior approaches, as exemplified by the case presented here.

REFERENCES

1. Asazuma T, Sato M, Ichimura S, Kogawa M, Masuoka K, Fujikawa K, Aida S, Ogawa J: Endodermal cyst of the cervical spine treated by an anterior approach for resection and shunting. J Spinal Disord Tech 15(3): 258-260, 2002
2. Bassiouni H, Hunold A, Asgari S, Hübschen U, König HJ, Stolke D: Spinal intradural juxtamedullary cysts in the adult: surgical management and outcome. Neurosurgery 55(6): 1352-1359, 2004
3. Chan RC, Thompson GB, Bratty PJA: Symptomatic anterior spinal arachnoid diverticulum. Neurosurgery 16: 663–665, 1985
4. Chen HJ, Chen L: Traumatic interdural arachnoid cyst in the upper cervical spine. Case report. J Neurosurg 85: 351–353, 1996
5. Jensen F, Knudsen V, Troelsen S: Recurrent intraspinal arachnoid cyst treated with a shunt procedure. Acta Neurochir (Wien) 39: 127-129, 1977
6. Kazan S, Ozdemir O, Akyüz M, Tuncer R: Spinal intradural arachnoid cysts located anterior to the cervical spinal cord. Report of two cases and review of the literature. J Neurosurg 91(2 Suppl): 211-215, 1999
7. Lee H-J, Cho D-Y: Symptomatic spinal intradural arachnoid cysts in the pediatric age group: description of three new cases and review of the literature. Pediat Neurosurg 35: 181–187, 2001
8. Lolge S, Chawla A, Shah J, Patkar D, Seth M: MRI of spinal intradural arachnoid cyst formation following tuberculous meningitis. Br J Radiol 77(920): 681-684, 2004
9. Palmer JJ: Spinal arachnoid cysts. Report of six cases. J Neurosurg 41: 728-735, 1974
10. Safriel YI, Sanchez G, Jhaveri HS: Giant anterior cervicothoracic arachnoid cyst. Spine 2002; 27(15): E366-8
11. Sasani M, Ozer AF, Oktenoglu BT, Peker K, Bozkus MH, Sarioglu AC: Excision of an asymptomatic cervical intradural neurenteric cyst through the anterior approach: a study of two cases and a review of the literature. Spine J 7(6): 720-727, 2007
12. Takase T, Ishikawa M, Nishi S, Aoki T, Wada E, Owaki H, Katsuki T, Fukuda H: A recurrent intradural cervical neurenteric cyst operated on using an anterior approach: a case report. Surg Neurol. 59(1): 34-39, 2003
13. Wang MY, Levi AD, Green BA. Intradural spinal arachnoid cysts in adults. Surg Neurol 60(1): 49-55, 2003