



Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Hemorrhagic synovial cyst: An unexpected cause of acute cervical spinal cord compression. Case report

Khaled Radhouane^{a,*}, Hadhemi Dridi^a, Nada Mansouri^b, Mohamed Dehmani Yedeas^a, Ahmed Harbaoui^a, Ridha Chkili^a^a Department of Neurosurgery, Military Hospital of Tunis, Université de Tunis El Manar, Tunisia^b Department of Pathology, Military Hospital of Tunis, Université de Tunis El Manar, Tunisia

ARTICLE INFO

Article history:

Received 28 August 2020

Received in revised form 6 November 2020

Accepted 7 November 2020

Available online 13 November 2020

Keywords:

Synovial cyst

Spinal cord compression

Hemorrhage

Laminectomy

Cervical cord

Case report

ABSTRACT

INTRODUCTION: Cervical synovial cysts are uncommon. They are most often responsible for a chronic clinical picture. Rarely, intracystic hemorrhage occurs, and may acutely present as radicular – or even spinal cord compression syndrome leading to irreversible neurological impairment.

CASE: We reported a case of bleeding synovial cyst located in the cervico-thoracic spine causing spastic paraparesis in a 68-year-old male patient. MRI revealed narrowing of perimedullary subarachnoid space by a well circumscribed, extra-axial, homogeneous mass located posterolaterally to the right of the spinal cord at the level C7-T1. The cyst was removed thoroughly by laminectomy. Pathological findings were consistent with the diagnosis of hemorrhagic synovial cyst. The patient had an excellent recovery.

DISCUSSION: Synovial cysts of the spine are rare and usually asymptomatic. It is extremely rare for intracystic bleeding to occur and be responsible for an abrupt presentation. Diagnosis of spinal synovial cyst relies on MRI but may not be evident as it depends on consistency and density of the cystic fluid.

Surgery remains the best therapeutic alternative, especially in the case of neurological impairment.

CONCLUSION: Surgery should be considered for any cervical synovial cyst. This is motivated by the risk, although rare, of bleeding and the resulting irreversible neurological damage that may occur.

© 2020 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

1. Introduction

Extradural synovial cysts or ganglion cysts of the spine occur rarely but have been reported by various authors as cystic benign lesions adjacent to the facet joints or in the ligamentum flavum [1].

They are preferentially located in the lumbar spine, while the cervical localization is unusual [2]. Surgical decompression via laminectomy and cyst excision is the current standard of care for patients with extradural synovial cyst. However, a conservative management can be considered when the cyst is asymptomatic.

However, hemorrhage into the cyst is an uncommon complication and an extremely rare cause of spinal cord or nerve root compression due to the sudden increase in the size of the lesion [3].

We reported a rare case of a 68-year-old man with cervico-thoracic hemorrhagic synovial cyst managed in the department of neurosurgery in the military hospital of Tunis, and discussed the pathological, etiopathogenetic, clinical aspects of this rare pathology and the difficulties in its neuroradiological diagnosis.

This work has been reported in line with the SCARE criteria [4].

2. Presentation of case

A 68-year-old retired military man, with no medical/family history, brought in by family member for dorsal pain that has progressed over the past two months with gradually progressive motor weakness of the left lower extremity. An acute worsening of this weakness occurred rapidly one week before he checked into the emergency room. The patient became unable to stand up or to walk without assistance. There was no history of trauma.

Neurological examination revealed spastic paraparesis with a palsy of quadriceps, biceps femoris, extensors and dorsiflexors of ankle and toes. An increased response to patellar and ankle jerks was noticed. Sustained clonus was elicited in the left ankle. Babinski sign was positive for both sides. There was superficial hypoesthesia below T7 and there were no loss of bladder or bowel function.

The magnetic resonance imaging (MRI) of the spine with axial and sagittal views revealed narrowing of perimedullary subarachnoid space by a well circumscribed, extra-axial, homogeneous mass located posterolaterally to the right of the spinal cord at the level C7-T1. The mass was causing marked cervical canal stenosis, deforming, and compressing the spinal cord. On T1-weighted images, the mass was of intermediate signal intensity. On T2-weighted images, the mass was of homogeneously low

* Corresponding author.

E-mail addresses: khaled.radhouane@fmt.utm.tn (K. Radhouane), dr.hdridi@gmail.com (H. Dridi), mansourinada@yahoo.fr (N. Mansouri), mohameddehmaniyedeas@gmail.com (M.D. Yedeas), ahmed.harbaoui@gmail.com (A. Harbaoui), chkiliridha@hotmail.fr (R. Chkili).

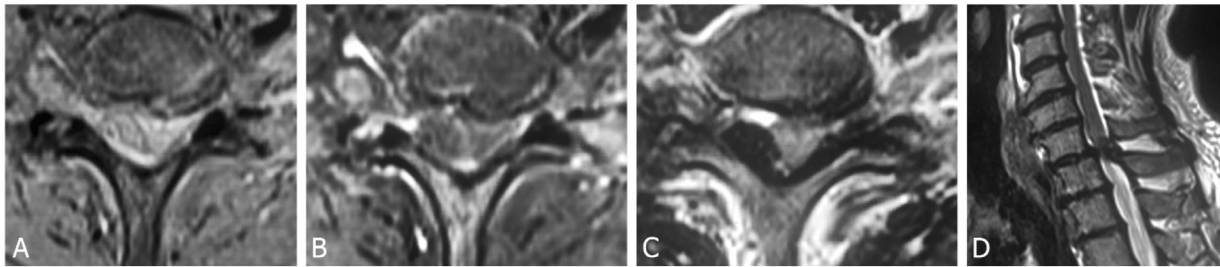


Fig. 1. MRI: (A) (B) Axial t1-weighted image without and with gadolinium showing Extradural mass with thin rim of enhancement and no internal enhancement. The spinal cord is completely compressed to the left side. (C) Axial T2-weighted image showing the high hypointense posterolateral mass which seems adherent to ligamentum flavum and fact joint. (D) Sagittal T2-weighted image showing hypointense mass causing posterolateral spinal cord compression in C7-T1.

signal intensity. Postcontrast (Gadolinium) with fat saturation, T1-weighted axial images showed a thin rim of enhancement, and no internal enhancement (Fig. 1).

The patient was operated rapidly. He was given general endotracheal anesthesia using video laryngoscope to minimize neck flexion. Cervical immobilization was used to reduce the risk of iatrogenic cervical spine cord injury during intubation. He was carefully placed in prone position with the head controlled by a horseshoe holder. A right hemilaminectomy of C7 and T1 was performed after removing spinous processes. An encapsulated cyst measuring 2 cm was attached to the right articular facet. Partial facetectomy was then performed at C7-T1. Cyst content was dark red and gelatinous like old bleeding (Fig. 2). Its wall was adherent to the hypertrophied ligamentum flavum and to dural surface. It was difficult to separate it from the dura, but the severe cord compression was removed without incidents. No fixation was needed since the contralateral laminae have been preserved. The surgery that lasted three hours was performed by a senior neurosurgeon with relevant experience of 7 years.

Postoperatively the patient reported an “evident improvement in motility of the lower limb”, which enabled the patient to take a few steps while supported. The patient had been wearing a cervical collar for 30 days and followed a rehabilitation program. He was followed up via a scheduled appointment within the hospital. One month after surgery, neurological improvement was such that the patient could walk unaided, and the superficial hypoesthesia has regressed. An MRI was done 18 months after surgery and did not show any cervical instability.

Histologically, the cyst wall consisted of fibrous tissue with subacute signs of hemorrhage and presence of lining synovial cells. There was no evidence of inflammation or granuloma or villonodular synovitis. These findings were consistent with the diagnosis of hemorrhagic synovial cyst (Fig. 3).



Fig. 2. Per operative view after C7 and D1 laminectomy showing a yellowish lesion with a dark red content situated postero-laterally and adjacent to the facet joint and which adheres to the spinal cord.

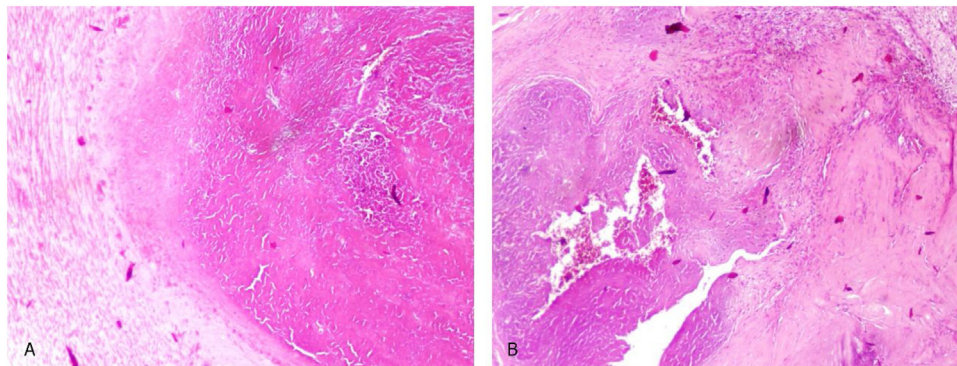


Fig. 3. Histology: (A) Hemorrhagic Synovial cyst. H&E. The cyst wall is disrupted by hemorrhage and fibrin deposits (B) Hemorrhagic Synovial cyst. H&E. Large vessels with fibrin deposits in the cyst wall.

3. Discussion

The rarity of synovial cysts of the spine is confirmed by the clinical and radiological series reported by Mercader et al. [5]. They are usually asymptomatic, unless acute hemorrhage or marked increase in size occurs. In this case, they can displace neural structures and cause nerve root or spinal cord compression signs [6]. The largest incidence was in the lumbar spine following by cervical and less frequently thoracic spine [7]. Synovial cysts usually occur during the fifth or the sixth decades [6] and most of the studied cases prevail in the male sex, like our case [8].

The spinal synovial cyst resembles an extradural cystic formation about the size of a pea or a nut, situated posterolateral to the dural sac at the level of the ventral aspect of the articular facets [9]. On occasion, it may be located on the dorsal aspect of the facets and extend into the soft paravertebral tissues [10]. In some cases, the cyst is described as developing entirely within the ligamentum flavum, dissecting the fibers inside it [2,11]. Evidence of attachment to the facet joint or the ligament may be helpful in distinguishing between these two lesions [12]. Pathologically, both synovial cysts and ligamentum flavum cysts can contain hemorrhage [2,3].

The pathogenesis of the ganglion/synovial cysts of the spine has been controversial. Many theories have been proposed to explain their etiology. The pathological substratum responsible for the development of the spinal SC, as reviewed by Miller et al., includes metaplasia and excess stress responsible of degeneration for arthrosis of the articulate facets, causing secondary lesion of the joint capsule, formation of hernia of the synovial membrane and mucinous degeneration of connective tissue [7]. Other authors seemed to imply that spondylolisthesis and trauma were the causes [13]. Another interesting observation was that, in the cases without a history of trauma, the occupations of the patients might involve considerable neck movement: e.g. factory assembly line worker, dentist, and saleswoman [14]. Our patient is a retired military with a long history of hard labor. Therefore, it can be deduced that promoting factors of synovial cysts are principally traumatic, degenerative, congenital, and inflammatory. Most patients with synovial cysts simultaneously present signs of spondylodiscarthrosis and hypermobility of a spinal segment, secondary to dehydration of the intervertebral disc. This leads to progressive weakening of the capsules of the joint facets [15].

Chronic inflammation of the synovial cyst has been reported to induce neovascularization of its wall with abundant veined structures, determining a possible intra-cystic bleeding. This may cause a sudden increase in the size of the lesion with compression on the spinal cord and nerve roots [3]. This hypothesis might justify the acute symptoms presentation and the presence of a large cystic component within the lesion.

Nowadays, diagnosis of spinal synovial cyst relies on MRI. The lesion manifests as a well-defined roundish formation, in close contact with the interapophyseal joints, iso/hypointense on T1 [1] and hyperintense on T2-weighted images with respect to cerebrospinal fluid [16].

The different signal modulations are due to the variable consistency and density of the cystic fluid, which ranges from serous through proteinous to hemorrhagic [15].

A hypointense ring, better visible on T2-weighting, is described, which presents enhancement after i.v. administration of gadolinium [14] and it is attributed to chronic perilesional inflammation or calcification of the wall. Sometimes a connection between the cyst and the articular space was identified, with enhancement of the corresponding articular extremities [17].

There are some reports of synovial cysts which are of very low signal intensity on T2-weighted images, like our case and this is usually attributed to hemorrhage and blood products within the cyst contents [9].

Differential diagnosis of extradural spinal cyst in the posterior or lateral spinal canal must include synovial cyst, ganglion cyst, hypertrophic synovitis, hypertrophic pigmented villonodular synovitis, herniated disc (detached disc fragment), infectious cyst (e.g.: cysticercosis or hydatid), arachnoid cyst, and neoplasm (cystic degeneration in a neurofibroma, schwannoma, dermoid cyst, meningioma, extradural metastasis), or possibly a cystic bone lesion [11].

As far as management is concerned, we should be aware that this is a benign lesion that only requires surgical intervention with excellent prognosis. Some authors have documented free remission [18]. Some others reported a reduction of spinal synovial cysts with conservative treatment or minor surgery. The former consists of bed rest, analgesic drugs and orthosis [5,19], while the latter consists of CT-guided aspiration of the cyst contents plus epidural or intra-articular injection of cortisone [19]. While these therapeutic methods may play a role in lumbar synovial cysts, which mainly give radicular symptoms (as long as the diagnosis is certain), they are not appropriate in patients with cervical or cervico-thoracic cysts, who usually present with severe myelopathy or spinal cord compression.

4. Conclusion

The pathogenesis of synovial cysts remains unclear and risk factors that may contribute to hemorrhagic complication are largely unknown. Surgery should be considered for any cervical synovial cyst. This is motivated by the risk, although rare, of bleeding and the resulting irreversible neurological damage that may occur.

Declaration of Competing Interest

The authors report no declarations of interest.

Funding

This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Ethical approval

This case report was exempt from ethical approval in our institution.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

All listed authors have made substantial contribution to the following aspects of the manuscript: Khaled Radhouane, Ridha Chkili and Nada Mansouri participated in diagnosing and treating the patient, acquisition of data. Hadhemi Dridi and Mohamed Dehmani Yedeas collected the findings and drafted the manuscript. Khaled Radhouane and Ahmed Harbaoui revised the manuscript. The authors read and approved the final manuscript.

Registration of research studies

N/A.

Guarantor

The integrity of this work is guaranteed by Dr Ridha Chkili.

Provenance and peer review

Not commissioned, externally peer-reviewed.

References

- [1] P. Lunardi, M. Acqui, G. Ricci, A. Agrillo, L. Ferrante, Cervical synovial cysts: case report and review of the literature, *Eur. Spine J.* 8 (1999) 232–237, <http://dx.doi.org/10.1007/s005860050164>.
- [2] R. Gazzeri, A. Canova, C. Fiore, M. Galarza, M. Neroni, M. Giordano, Acute hemorrhagic cyst of the ligamentum flavum, *J. Spinal Disord. Tech.* 20 (2007) 536–538, <http://dx.doi.org/10.1097/BSD.0b013e31804b4605>.
- [3] G. Conforti, G.M. Della Pepa, G.M.D. Pepa, F. Papacci, A. Scerrati, S. Alba, N. Montano, Hemorrhagic synovial cyst as an “evanescent” spinal cervical mass: an issue for differential diagnosis, *Acta Neurol. Belg.* 114 (2014) 325–327, <http://dx.doi.org/10.1007/s13760-013-0277-4>.
- [4] R.A. Agha, M.R. Borrelli, R. Farwana, K. Koshy, A.J. Fowler, D.P. Orgill, SCARE Group, The SCARE 2018 statement: updating consensus surgical Case REport (SCARE) guidelines, *Int. J. Surg. Lond. Engl.* 60 (2018) 132–136, <http://dx.doi.org/10.1016/j.ijsu.2018.10.028>.
- [5] J. Mercader, J.M. Gomez, C. Cardenal, Intraspinial synovial cyst: diagnosis by CT, *Neuroradiology* 27 (1985) 346–348, <http://dx.doi.org/10.1007/BF00339570>.
- [6] B.Y. Cho, H.Y. Zhang, H.S. Kim, Synovial cyst in the cervical region causing severe myelopathy, *Yonsei Med. J.* 45 (2004) 539–542, <http://dx.doi.org/10.3349/yjmj.2004.45.3.539>.
- [7] H.A. Oliveira, A.C.F. de Jesus, R.C.P. Prado, A.C.E. Santos, P.M.S. Sobral, A.M.P. Oliveira, S.M.L. Marcena, D.R.A. Silveira, Synovial cyst of the thoracic spine: case report, *Arq. Neuropsiquiatr.* 65 (2007) 838–840, <http://dx.doi.org/10.1590/S0004-282X2007000500021>.
- [8] A.A. Cohen-Gadol, J.B. White, J.J. Lynch, G.M. Miller, W.E. Krauss, Synovial cysts of the thoracic spine, *J. Neurosurg. Spine* 1 (2004) 52–57, <http://dx.doi.org/10.3171/spi.2004.1.1.0052>.
- [9] D.E. Jackson, S.W. Atlas, J.R. Mani, D. Norman, Intraspinial synovial cysts: MR imaging, *Radiology* 170 (1989) 527–530, <http://dx.doi.org/10.1148/radiology.170.2.2911681>.
- [10] B. Pendleton, B. Carl, M. Pollay, Spinal extradural benign synovial or ganglion cyst: case report and review of the literature, *Neurosurgery* 13 (1983) 322–326, <http://dx.doi.org/10.1227/00006123-198309000-00021>.
- [11] J.I. Franck, R.B. King, G.R. Petro, M.D. Kanzer, A posttraumatic lumbar spinal synovial cyst. Case report, *J. Neurosurg.* 66 (1987) 293–296, <http://dx.doi.org/10.3171/jns.1987.66.2.0293>.
- [12] H. Mahallati, C.J. Wallace, K.M. Hunter, J.M. Bilbao, A.W. Clark, MR imaging of a hemorrhagic and granulomatous cyst of the ligamentum flavum with pathologic correlation, *Am. J. Neuroradiol.* 20 (1999) 1166–1168.
- [13] G.W. Sypert, R.W. Leech, A.B. Harris, Posttraumatic lumbar epidural true synovial cyst: case report, *J. Neurosurg.* 39 (1973) 246–248, <http://dx.doi.org/10.3171/jns.1973.39.2.0246>.
- [14] W. Choe, I. Walot, C. Schlesinger, I. Chambi, F. Lin, Synovial cyst of dens causing spinal cord compression. Case report, *Paraplegia* 31 (1993) 803–807, <http://dx.doi.org/10.1038/sc.1993.124>.
- [15] T.E.S. Amour, Synovial cyst, in: T.E.S. Amour, S. Hodges, R.W. Laakman, D.E. Tamas (Eds.), *MRI of the Spine*, Raven Press, New York, 1994, pp. 120–125, in: *MRI Spine*, Raven Press, New York, 1994: pp. 120–125.
- [16] S.R. Freidberg, T. Fellows, C.B. Thomas, A.C. Mancall, Experience with symptomatic spinal epidural cysts, *Neurosurgery* 34 (1994) 989–993, <http://dx.doi.org/10.1227/00006123-199406000-00006>, discussion 993.
- [17] G.M. Khoury, P.M. Shimkin, G.M. Kleinman, P.P. Mastroianni, D.E. Nijensohn, Computed tomography and magnetic resonance imaging findings of pigmented villonodular synovitis of the spine, *Spine* 16 (1991) 1236–1237, <http://dx.doi.org/10.1097/00007632-199110000-00018>.
- [18] C.B. Colen, S. Rengachary, Spontaneous resolution of a cervical synovial cyst, *J. Neurosurg. Spine* 4 (2006), <http://dx.doi.org/10.3171/spi.2006.4.2.186>, 186–186.
- [19] K.Y. Hsu, J.F. Zucherman, W.J. Shea, R.A. Jeffrey, Lumbar intraspinal synovial and ganglion cysts (facet cysts). Ten-year experience in evaluation and treatment, *Spine* 20 (1995) 80–89, <http://dx.doi.org/10.1097/00007632-199501000-00015>.

Open Access

This article is published Open Access at [sciencedirect.com](https://www.sciencedirect.com). It is distributed under the [IJSCR Supplemental terms and conditions](#), which permits unrestricted non commercial use, distribution, and reproduction in any medium, provided the original authors and source are credited.