CT Guided Aspiration of a Cervical Synovial Cyst

Case Report and Technical note

V.J. KOSTANIAN, M.S. MATHEWS *

Department of Radiology, University of California, Irvine, USA

* Department of Neurosurgery, University of California, Irvine, USA

Key words: synovial cyst, CT guided treatment, steroid injection

Summary

Synovial cysts are cystic dilations of synovial sheaths with or without anatomical continuity within a joint space that occasionally involve the lumbar spine. Image-guided aspiration has been used successfully in the management of lumbar synovial cysts. Synovial cysts of the cervical spine are rare, tend to present with myelopathic symptoms, and are classically treated using operative intervention. We report a novel approach for cervical synovial cyst aspiration under CT guidance.

A 66-year-old woman presented to the clinic complaining of severe pain, tingling, and dysesthesia in her right upper extremity in the C5, C6 and C7 nerve root distribution. MR imaging of her cervical spine showed a synovial cyst within the right C6-C7 neural foramen with significant compression and obliteration of the C7 nerve root. The patient underwent CT-guided aspiration of the cyst using a double needle technique, where one needle was used to open up the epidural space while another aspirated the cyst. This was followed by epidural injection of local anesthetic and steroids.

Immediately after injection, the patient experienced complete relief of her right forearm pain, tingling, and dysesthesias. The patient tolerated the procedure well and there were no postprocedure complications. At four year follow-up the patient is free of any symptoms.

Image-guided aspiration of cervical synovial cysts is feasible using CT fluoroscopy. Aspiration of these cysts combined with epidural steroid injection can provide long-lasting symptomatic relief in some patients.

Introduction

Synovial cysts are cystic dilations of synovial sheaths that may or may not have anatomical continuity with a joint space¹. Synovial cysts are frequently seen in the joints and tendon sheaths of the wrist and hand¹. Infrequently they are seen in the lumbar spine, and cranio-cervical junction²⁻⁵. Synovial cysts of the cervical spine are rare¹. They tend to present with myelopathic symptoms and have classically been treated using operative interventions^{1,6,7}. We report a case of a C6-C7 synovial cyst presenting with radicular symptoms. The patient was successfully managed by image-guided needle aspiration of the cyst and epidural steroid injection. While a similar management strategy has been reported in the management of lumbar synovial cysts⁸, from our review of the literature this appears to be the first case of image-guided needle aspiration of a cervical synovial cyst.

Case Report

A 66-year-old woman presented to the clinic

Figure 1 Axial T2W MRI of the cervical spine shows a synovial cyst within the right C6-C7 neural foramen with significant compression and obliteration of the C7 nerve root.

complaining of severe pain, tingling and dysesthesia in her right upper extremity in the C5, C6 and C7 nerve root distribution. Neurological examination showed motor grade 2/5 power of right wrist extensors and 3/5 on elbow flexors. Supinator reflex was decreased (1+) on the right side. The remainder of her neurologic examination was unremarkable. MRI of her cervical spine showed a synovial cyst within the right C6-C7 neural foramen with significant compression and obliteration of the C7 nerve root (figure 1). A decision was made to perform a CT-guided aspiration of the synovial cyst and to administer local anesthetic and methyl prednisone into the epidural space neighboring the lesion.

Technical Note

On the day of the procedure the patient was placed prone on the CT table and her cervical spine from C5 to T1 was scanned with sequential 2 x 1 mm axial images. After obtaining and reviewing the films, a 20-gauge needle was inserted under CT fluoroscopic guidance into the C7-T1 interspace through a midline posterior approach. The needle was then advanced into the posterior epidural space and temporarily left in place. Accurate position of the needle was confirmed by an epidural injection of 5 cc of Omnipaque 180. Following this, a CT epidurogram of the cervical spine from the C5 body to the T1 body was obtained.

The CT gantry was then angulated caudally, and an 18-gauge spinal needle was inserted using a right paramedian approach through the C5-C6 interlaminar space, and placed into the posterior epidural space. After confirming the correct position of the needle, a second 25-gauge spinal needle, the tip of which was shaped to a gentle curve, was advanced via the 18 gauge needle, and the under CT fluoroscopy navigated into the right C6-7 lateral recess, and inserted into the synovial cyst. 0.2 cc of hemorrhagic fluid was aspirated from the cyst. During manipulation of the needle in the synovial cyst, severe radicular pain was reproduced in the right C6-7 root distribution radiating to the radial aspect of the right forearm. The 18-gauge epidural needle was then removed. The midline C7-T1 needle that remained in the epidural space was used to inject a therapeutic injection of 6 cc of 0.25% bupivacaine with 80 mg of methyl prednisone into the posterior epidural space. After injection of the therapeutic agent the needle was withdrawn. The entire procedure was carried out under conscious sedation with electrophysiologic monitoring of her vital signs throughout the procedure.

Results

Immediately after injection, the patient experienced complete relief of her right forearm pain, tingling and dysesthesias. The patient tolerated the procedure well and there were no postprocedure complications. At four year follow-up the patient is free of any symptoms.

Discussion

Synovial cysts have been pathologically classified into two types^{1,8}. The first type is lined by synovium and contains serosanguinous fluid, while the other is filled with gelatinous contents and does not have a synovium. Both types have the same appearance on CT and MRI^{8,9}. The definitive diagnosis is made by aspiration of contents or examination of the cyst wall under a microscope. Synovial cysts are most frequently seen presenting with low back pain and radicular symptoms in the lumbar spine⁸. Several groups have reported successful image-guided aspiration of lumbar synovial cysts^{8,10}. The response of synovial cysts to aspiration and risk of recurrence is thought to depend on the pathologic type of cyst, the serosanguinous

Figure 2 Axial CT scan showing an epidurogram of the posterior epidural space from C7-T1 interlaminar access using a 20-gauge needle. (Note that the CT fluoroscopy images are laterally inverted).

Figure 3 Axial CT scan showing the tip of a 25-gauge needle within the synovial cyst. The 25 gauge needle was passed coaxially through an 18-gauge needle both of which were introduced using a C6-C7 interlaminar access.

type being less likely to recur⁸. Synovial cysts may rarely occur in the cervical spine where they tend to present with myelopathic features^{1,6,7}. A review of the literature shows that surgical excision is currently the only approach being offered to patients failing conservative management of C spine synovial cysts.

Our patient presented with unilateral cervical radicular symptoms from a cervical synovial cyst. Generally, the epidural space is very small in the cervical spine and was even smaller in this case due to impingement of the synovial cyst upon the space in the lateral recess. The epidural contrast injection serves several purposes. By engorging and opening the epidural space adjacent to the cyst, it creates space to advance the needle into the cyst via the epidural approach, without perforating the dura, thereby enabling safe performance of a therapeutic epidural injection.

The cyst was approached from multiple levels. C7-T1 was the support level, for performing an epidurogram, visualizing and enlarging the adjacent epidural space. C5-6 level was the main interventional procedure access level. A single level access did not give enough space and angle to access the synovial cyst safely, therefore a "one level off" approach was chosen. This was made possible with CT guidance and gentry angulations. The cervical spine has small lamina and with extreme cranial angulations of the needle this target was reasonably

easy to achieve. Since the synovial cyst was located within the lateral recess in immediate proximity to the nerve root, alcohol or other type of cyst ablation was not an option due to the high risk of cord or nerve damage. Several needle passes through the cyst capsule were made to ensure rupture of the cyst, followed by local epidural injection with steroid which was considered a safer option.

Ultimately the cyst was decompressed using CT fluoroscopic image-guided needle aspiration of the cyst. This resulted in complete symptomatic relief. The successful outcome of this novel approach along with a review of the literature on aspiration of lumbar synovial cysts shows that image-guided aspiration may be a safe and effective alternative in the management of patients with cervical synovial cysts especially in patients who are either poor candidates for surgery, or refuse surgery. It is important that patients be counseled regarding the possibility of long-term recurrence and the need for multiple procedures.

Conclusions

Image-guided aspiration of cervical synovial cysts can be carried out in a safe and effective manner using CT fluoroscopy. Aspiration of these cysts combined with epidural steroid injection can provide long-lasting symptomatic relief in patients.

References

- 1 Lunardi P, Acqui M et Al: Cervical synovial cysts: case report and review of the literature. *Eur Spine J* 8(3): 232-237, 1999.
- 2 Deinsberger R, Kinn E, Ungersbock K: Microsurgical treatment of juxta facet cysts of the lumbar spine. *J Spinal Disord Tech.* 19(3): 155-160, 2006.
- 3 Metellus P, Fuentes S et Al: Retrospective study of 77 patients harbouring lumbar synovial cysts: functional and neurological outcome. *Acta Neurochir (Wien)* 148 (1): 47-54, 2006; discussion 54. Epub 2005 Oct 31.
- 4 Akiyama H, Tamaki N et Al: Craniocervical junction synovial cyst associated with atlanto-axial dislocation - case report. *Neurol Med Chir (Tokyo)* 39(7): 539-543, 1999. Review.
- 5 Mercader J, Munoz Gomez J, Cardenal C: Intraspinal synovial cyst: diagnosis by CT. Follow-up and spontaneous remission. *Neuroradiology* 27(4): 346-348, 1985.
- 6 Zorzon M, Skrap M et Al: Cysts of the atlantoaxial joint: excellent long-term outcome after posterolateral surgical decompression. Report of two cases. *J Neurosurg* 95(1 Suppl): 111-114, 2001.
- 7 McGuigan C, Stevens J, Gabriel CM: A synovial cyst in the cervical spine causing acute spinal cord compression. *Neurology* 65(8): 1293, 2005.
- 8 Imai K, Nakamura K et Al: Aspiration of intraspinal synovial cyst: recurrence after temporal improvement. *Arch Orthop Trauma Surg* 118(1-2): 103-105, 1998.
- 9 Jackson DE Jr, Atlas SW et Al: Intraspinal synovial cysts: MR imaging. *Radiology* 170(2): 527-530, 1989.
- 10 Shah RV, Lutz GE: Lumbar intraspinal synovial cysts: conservative management and review of the world's literature. *Spine J* 3(6): 479-488, 2003.

Marlon S. Mathews, MD,
101 The City Drive South,
Bldg 56, Suite 400,
Orange, CA 92868, USA
E-mail: mmathews@uci.edu