Epidural Pneumatic Pseudocyst with Lumbar Radiculopathy: Two Case Reports and Review of the Literature

Bong Hyun Jin, Jong Un Lee, Tae-Hun Kim, Ki-Hong Kim, Man Kyu Choi, Dae-Hyun Kim

Department of Neurosurgery, Daegu Catholic University Medical Center, Catholic University of Daegu College of Medicine, Korea

Corresponding Author:
Dae-Hyun Kim, MD, PhD
Department of Neurosurgery, Daegu Catholic University Medical Center, Catholic University of Daegu College of Medicine, 33, Duryagongwon-ro 17-gil, Nam-gu, Daegu 42472, Korea
Tel: +82-53-650-3495
Fax: +82-53-650-4932
E-mail: daehkim@cu.ac.kr

Received: May 15, 2019
Revised: June 3, 2019
Accepted: June 7, 2019

INTRODUCTION

Intradiscal vacuum phenomenon represents collection of gas into the intervertebral disc space. It is a relatively common radiologic finding. Although the clinical significance of intradiscal gas is not significant, gas in the spinal canal is meaningful in terms of neural compression. The gas formation in intervertebral disc space may occur as a result of disc degeneration and migration of gas in the intervertebral space to the spinal canal could lead to spinal cord and/or root compression, triggering radiating pain and neurological symptoms.

However, gas-containing pseudocysts causing lumbar radiculopathy are relatively rare, and a few cases have been reported. Sometimes, epidural gas-containing cystic lesion may be misdiagnosed as epidural mass or disc herniation on magnetic resonance imaging (MRI), because patient’s symptoms are nonspecific and cannot be distinguishable from those of degenerative disease.

We report two patients with radiculopathy resulting from gas-containing pseudocysts on the L5-S1 space. In addition, we report the diagnostic tool and treatment options of symptomatic epidural gas-containing pseudocyst based on our cases with review of previous studies.

CASES REPORT

Case 1

A 74-year-old female patient with a 5-month history of right leg radiating pain on posterior aspect admitted to our clinic. She had difficulty in lying and walking due to the severe leg pain. She had presented poor response after 5 months of conservative treatment at other hospital. The pain and sensory deficit were localized to right S1 sensory dermatome. The pain and sensory deficit were localized to right S1 sensory dermatome. VAS (visual analogue scale) score for leg pain was 8 points. Physical examination revealed the weakness of plantar flexion of right great toe (Medical Research Council power Grade 4/5). Electromyography and nerve conduction study showed the radiculopathy of right S1 dermatome.

On MRI, the lesion was located on ventral side of L5-S1 spinal canal (subarticular area). It was oval shape with homogenous hypo-intensity on T1- and T2-weighted images. Computed tomography (CT) scan also revealed intradiscal vacuum phenomenon on L4-5 and L5-S1 levels. The lesion was hypodense and could be diagnosed as an epidural gas-containing lesion (Fig. 1). It had been found at the same area on CT scan that has been performed 21 months ago. There was no change
Case 2

A 69-year-old female patient with a 3-month history of right leg radiating pain was admitted to our medical center. The pain and sensory deficit were localized to right L5 sensory dermatome. Dorsiflexion strength of right great toe was slightly decreased (Grade 4+/5). Twenty months ago, she was underwent decompressive laminectomy for severe stenosis at L3-4 and L4-5 level in other hospital.

On MRI, oval shaped lesions were located on both intervertebral foramina at L5-S1 level. It was homogenous hypo-intensity on T1- and T2-weighted images. CT scan revealed vacuum phenomenon, the right one was larger than the left. The lesion was hypodense and could be diagnosed as an epidural gas-containing lesion (Fig.3). The lesion was found at the same site in previous CT scan (performed twenty month ago). We performed the right L5 nerve root block and then symptoms were improved.

DISCUSSION

Gas collections have been described in literatures regardless of spinal segment, including the disc space, vertebral structure, epidural and intradural spaces, synovial cysts and facet joints. Intradiscal vacuum phenomenon is commonly detected in radiologic studies of the degenerative spine. Previously reported cases had degenerative disc disease and vacuum phenomenon at lesioned level. The pathogenesis of gas-containing pseudocyst may be explained by the herniation of intradiscal gas together with vacuum phenomenon. Our cases may be characterized by discal cyst formation after disc herniation with mass effect, then herniated disc might disappear and cyst might remain. It is hypothesized that there may be gas remai-
Pneumatic Pseudocyst

Fig. 3. 69-year-old female patient with a 3-month history of right leg radiating pain. Axial (a) and sagittal (b) views on T1- and T2-weighted images demonstrate a hypo-intense lesion on MRI. Axial view (c) of CT showing a hypodense lesion within the spinal canal at the L5-S1 level. Axial view (d) on CT scan that had been examined 20 months ago.

In the present study, we suggest that lumbar gas-containing pseudocysts could induce radicular pain and/or symptoms of neurologic compromise. The gas-containing pseudocysts of two patients in our case were not spontaneously absorbed and caused radicular pain for a long time. Therefore, we suggest that surgical decompression may be effective in patients who were untreatable with conservative treatment.
**Conflict of Interest**

The authors report no conflict of interest concerning the materials or methods used in this study or the findings specified in this manuscript.

**Informed Consent**

Written informed consent was obtained from all patients for publication of this manuscript and any accompanying images.

**REFERENCES**

1. Akhaddar A, Eljebbouri B, Naama O, Boucetta M: Sciatica due to lumbar intraspinal gas pseudocyst. *Intern Med* 49:2647, 2010
2. Anda S, Stovring J, Ro M: CT of extraforaminal disc herniation with associated vacuum phenomenon. *Neuroradiology* 30:76-77, 1988
3. Bosser V, Dietemann JL, Warter JM, Granel de Solignac M, Beaujeux R, Buchheit F: L5 radicular pain related to lumbar extradural gas-containing pseudocyst. Role of CT-guided aspiration. *Neuroradiology* 31:552-553, 1990
4. Cheng TM, Link MJ, Onofrio BM: Pneumatic nerve root compression: epidural gas in association with lateral disc herniation. Report of two cases. *J Neurosurg* 81:453-458, 1994
5. Coulier B: The spectrum of vacuum phenomenon and gas in spine. *JBR-BTR* 87:9-16, 2004
6. Kaiser MC, Capesius P, Veiga-Pires JA, Brach JM: Recognition of gas-containing disc herniation on lateral CT-scoutview. *Neuroradiology* 29:98, 1987
7. Kakitsu-Ihata Y, Theodorou SJ, Theodorou DJ, Yoko M, Ito Y, Yuki Y, et al: Symptomatic epidural gas cyst associated with discal vacuum phenomenon. *Spine (Phila Pa 1976)* 34:E784-789, 2009
8. Kawaguchi S, Yamashita T, Ida K, Ikeda T, Ohwada O: Gas-filled extradural cyst of the lumbar spine. Case report. *J Neurosurg* 95:257-259, 2001
9. Kuh SU, Heo DH, Kim KS, Cho YJ: Lumbar epidural gas-containing pseudocysts as a cause of severe radicular pain. *Joint Bone Spine* 78:398-401, 2011
10. Lee DY, Lee SH: L2 radicular compression caused by a foraminal extradural gas pseudocyst. *J Korean Neurosurg Soc* 47:232-234, 2010
11. Pierpaolo L, Luciano M, Fabrizio P, Paolo M: Gas-containing lumbar disc herniation. A case report and review of the literature. *Spine (Phila Pa 1976)* 18:2533-2536, 1993
12. Ricca GF, Robertson JT, Hines RS: Nerve root compression by herniated intradiscal gas. Case report. *J Neurosurg* 72:282-284, 1990
13. Ryu KS, Rathi NK, Shin MH, Park CK: Gas-containing disc herniations: dual nerve root compression at a single disc level. *Neurol Med Chir (Tokyo)* 52:649-651, 2012
14. Yun SM, Suh BS, Park JS: Symptomatic epidural gas-containing cyst from intervertebral vacuum phenomenon. *Korean J Spine* 9:365-368, 2012
15. Zhu B, Jiang L, Liu XG: Transforaminal endoscopic decompression for a giant epidural gas-containing pseudocyst: A case report and literature review. *Pain Physician* 20:E445-E449, 2017