

Radicular Compression due to Herniated Intradiscal Gas

Disk Mesafesindeki Gazın Fıtıklaşmasına Bağlı Kök Basısı

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Abstract: A case in which epidural collection of gas compressed the left S1 nerve root and thecal sac, and produced symptoms and signs identical to those of a herniated nucleus pulposus is presented. Gas collection within the epidural space is demonstrated radiologically. The pathophysiology and management of an epidural collection of gas compressing nerve root and thecal sac are considered based on a review of the literature.

Key Words: Degeneration, intervertebral disc, gas, nerve root compression

Özet: Bu çalışmada, sol S1 sinir köküne ve dural keseye bası yaparak nükleus pulposus fıtıklaşmasına benzer bulgu ve belirtiler oluşturan epidural gaz birikimli bir olgu sunuldu. Epidural gaz birikimi radyolojik olarak saptandı. Literatür taraması esas alınarak sinir köküne ve dural keseye bası yapan epidural gaz birikiminin patofizyolojisi ve tedavisi değerlendirildi.

Anahtar Sözcükler: Dejenerasyon, intervertebral disk, gaz, sinir kökü basısı

INTRODUCTION

The most common cause of sciatica is nerve-root compression secondary to disc herniation. Clinical symptoms can be related to other processes occupying the extradural space, such as arachnoid cysts, neurofibromas, cystic tumors, or synovial cysts arising from the facet joints or rarely gas within spinal canal (1,3).

It has been accepted that gas collections occur in cracks or spaces that develop within degenerated discs. This condition is commonly referred to as the "vacuum disc phenomenon". This disorder is most often identified by computerized tomography (CT), or magnetic resonance imaging (MRI) (4,6,10).

CASE REPORT

A 48-year-old man was admitted on August 21, 1993, with a 3-months history of progressive left

leg pain. There was no history of back trauma and his job rarely required him to lift heavy objects. The pain was mechanical in nature and was accompanied by altered sensation and intermittent paresthesias over the lateral aspect of the calf and foot. The pain initially began after he had walked only 500 meters and resolved after sitting for approximately 30 minutes but pain was not relieved with bed rest.

Neurological examination revealed normal muscle strength but the left ankle reflex was diminished compared to the right. His straight-leg raising was positive on the left at 40°. CT of the lumbar spine showed an extradural pocket of gas situated anterolaterally in the spinal canal on the left side and the vacuum phenomenon was seen at the L5-S1 disc (Figure1). The patient was advised an operative treatment, but he refused. He was treated conservatively. At the time of follow up, his pain had disappeared. A repeat CT scan one year later, showed a normal spinal canal. There was not any

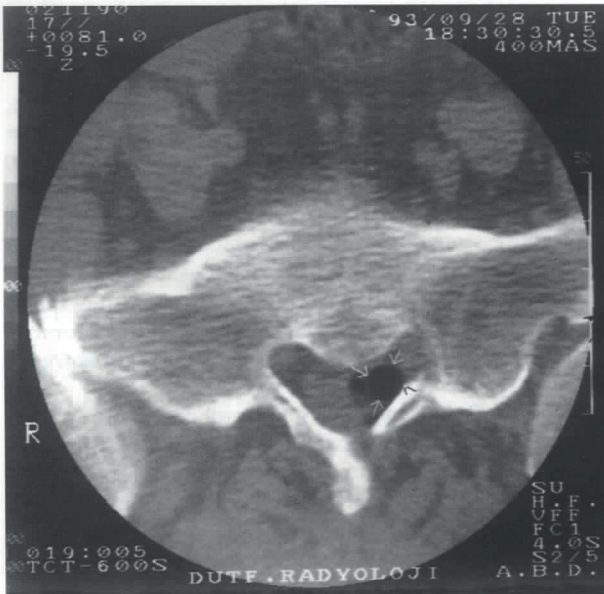


Figure 1: On CT, the gas bubble is seen anterolaterally within the spinal canal on the left side. CT reveals the relation between the gas bubble, the nerve root and the thecal sac. There is radicular compression due to herniated intradiscal gas.

gas bubble in the spinal canal although the vacuum phenomenon was still present at the L5-S1 disc (Figure 2). In this final examination he was neurologically intact, relieved of his pain, remained pain-free, and no restriction of his activity were observed.

DISCUSSION

The vacuum phenomenon can be defined as a gaseous collection demonstrated radiographically in the intervertebral disc space at single or multiple levels (8,9). Its detection usually confirms the diagnosis of degenerative disease of the intervertebral disc, trauma, chymopapain chemonucleolysis, calcium pyrophosphate dihydrate deposition disease, ochronosis, osteonecrosis with vertebral collapse, skeletal metastases, cartilaginous nodes, synovial cysts arising from the facet joints (11,15,16). It is useful to eliminate the possibility of infection. Rarely, radiolucent collections are seen in infection, especially if the organism produces gas as a result of its metabolism (2). By far the most common

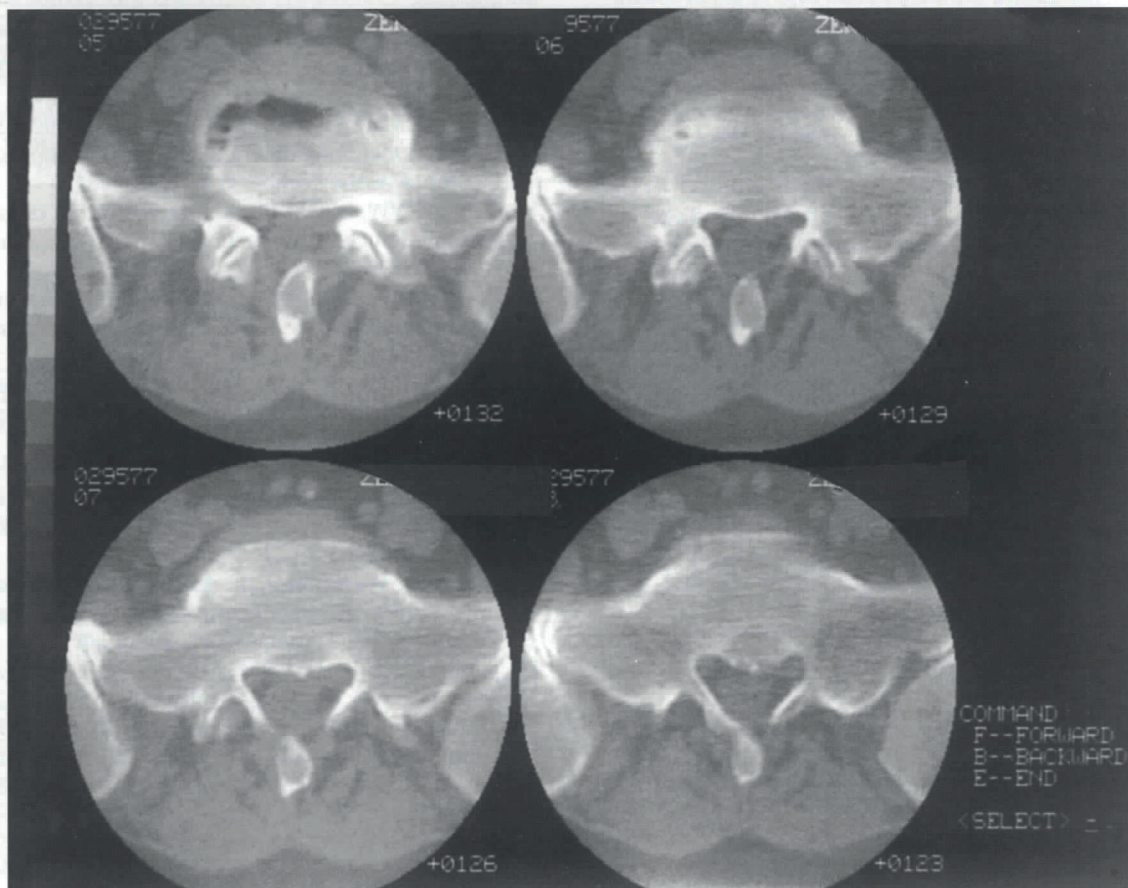


Figure 2: One year after the conservative treatment, it is seen that the vacuum phenomenon exists within the degenerated disc, although there is no gas at the same level in the spinal canal screened previously

etiology for intradiscal gas is degenerative disc disease. This gas is composed of 90 % or more nitrogen, along with oxygen, carbondioxide, and other trace gases (5).

In our patient, there was no history of back trauma and the diagnosis of ochronosis was eliminated by urine test and specific enzymatic methods.

Intradiscal gas may be forced out of the disc space through a weak spot or defect in the annulus. If this extruded gas was to collect in the epidural space, it could than conceivably compress a nerve root and produce symptoms (14). In our case, the symptoms began immediately on the patient assuming a vertical posture and was not relieved with bed rest. In the supine position, compression was not released allowing air to return into the degenerated disc space because air-filled sac that freely uncommunicated with the disc space.

There is a few previously reported cases of epidural gas collections producing symptomatic impingement of a nerve root. In these cases, gas had persisted for periods as long as 2 or 4 week and treatment had consisted of hemilaminectomy and cyst excision (7,13).

In our case, operative treatment was refused, and the patient was treated conservatively. Twelve months later, there was not any pain and ankle reflexes were bilaterally normal. In the final CT examination there was no gas in the epidural space although there was gas within the degenerated disc.

The gas formed in the nucleus pulposus may remain there for a long time because there is no vascular network for resorption of the gases in this space (12,17). But in the spinal canal, the gases may be resorbed by the vascular network in this space. In our opinion, for a patient with sciatica resulting from lumbar root compression due to an epidural gas collection, the surgery may be postponed as far as possible if there is no important neurodeficit.

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REFERENCES

1. Bielecki DK, Sartoris D, Resnick D, Lom KV, Fierer J, Haghighi P: Intraosseous and intradiscal gas in association with spinal infection:report of three cases. *AJR* 147: 83-86, 1986
2. Cheng TM, Link MJ, Onofrio BM: Pneumatic nerve root compression: epidural gas in association with lateral disc herniation. *J Neurosurg* 81:453-458, 1994
3. Demierre B, Ramadan A, Hauser H, Reverdin A, Billiet B, Berney J: Radicular compression due to lumbar intraspinal gas pseudocyst: case report. *Neurosurgery* 22: 731-733,1988
4. Elster AD, Jensen KM: Vacuum phenomenon within the cervical spinal canal: CT demonstration of a herniated disc. *J Comput Assist Tomogr* 8:533-535,1984
5. Fandino J, Garcia J, Garcia AM: Compression radicaire par gaz dans un kyste spinal extradural. Rapport sur 2 cas. *Neurochirurgie* 40:179-182, 1994
6. Ford LT, Gilula LA, Murphy WA, Gado M: Analysis of gas in vacuum lumbar disc. *AJR* 128:1056-1057,1977
7. Hjarbaek J, Kristensen PW, Hauge P: Spinal gas collection demonstrated at CT. *Acta Radiol* 33:93-96, 1992
8. Kumar R, West CGH, Gillespie JE: Gas in a spinal extradural cyst. Case report. *J Neurosurg* 70: 486-488,1989
9. Kumpan W, Salomonowitz E, Seidl G, Wittich GR: The intervertebral vacuum phenomenon. *Skeletal Radiol* 15:444-447,1986
10. Larde D, Mathieu D, Frija J, Gaston A, Vasile N: Spinal vacuum phenomenon:CT diagnosis and significance. *J Comput Assist Tomogr* 6:671-676, 1982
11. Orrison WW, Lilleas FG: CT demonstration of gas in a herniated nucleus pulposus. *J Comput Assist Tomogr* 6:807-808, 1982
12. Reginster P, Collignon J, Dondelinger RF: Synovial cysts of the lumbar spine:CT and MRI correlations. *Eur Radiol* 4:332-336,1994
13. Ricca GF, Robertson JT, Hines RS: Nerve root compression by herniated intradiscal gas. *J Neurosurg* 72: 282-284,1990
14. Simonetti G, Martino V, Santilli S, Chiappetta F: Lumbar root compression by a gas-containing cyst in the extradural space:case report. *J Neurosurg Sci* 36:101-102, 1992
15. Tash RR, Weitzner I Jr: Acute intervertebral gas following vertebral fracture. CT demonstration. *J Comput Assist Tomogr* 10:707-708, 1986
16. Tobback IG, Parizel PM, Milants W, de Moor J, de Schepper AM: Gas-filled intraspinal synovial cyst. *ROFO Fortschr Geb Rontgenstr* 156:300-301,1992
17. Yetkin Z, Chintapalli K, Daniels DL,Haughton VM: Gas in spinal articulations. *Neuroradiology* 28:150-153, 1986