

Severe Low Back Pain Following Unintentional Lumbar Epidural Air Injection

Woo Yong Lee*

Department of Anesthesiology, Sanggye Paik Hospital, Inje University College of Medicine, Seoul, South Korea

*Corresponding author: Woo Yong Lee
DOI: 10.36347/sjmcr.2019.v07i02.001

| Received: 01.02.2019 | Accepted: 10.02.2019 | Published: 12.02.2019

Abstract

Case Report

The loss of resistance (LOR) technique for epidural space identification has been used for a long time. Air or normal saline can be used in this technique, and the author of this study usually used air. Until recently, use of air has not caused any problems. Recently a 62-year-old man visited the author's clinic for low back and radiating left leg pain. He underwent spinal operation but following this, pain recurred intermittently. The author then performed interlaminar lumbar epidural block with LOR using air, and the patient's pain was alleviated. However his symptoms recurred once again and he came back to the clinic. After one failed attempt, epidural steroid injection was successfully performed. However the patient's back pain became so severe that he experienced discomfort in all body positions. Only when lying on his bed in a curled up position, he was able to achieve moderate relief from pain. A CT scan was immediately taken, which showed lumbar pneumorrhachis. After two days, while the patient's pain was completely alleviated, he had hypoesthesia on his left lateral thigh. The author reports on this case along with review of the literatures.

Keywords: epidural injection, air, low back pain, lumbar.

Copyright © 2019: This is an open-access article distributed under the terms of the Creative Commons Attribution license which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use (NonCommercial, or CC-BY-NC) provided the original author and source are credited.

INTRODUCTION

Epidural injection is a common technique for analgesia and anesthesia. The complications often associated with this technique include accidental puncture of the dura or of a blood vessel, post-dural-puncture headache (PDPH), subdural blockade, and so on [1].

The loss of resistance to air (LORA) technique is widely used for identification of the epidural space; however, several complications associated with this technique has been reported including pneumocephalus[2], subcutaneous emphysema[3], venous air embolism[4], pneumoretroperitoneum[5] and spinal cord and nerve root compression[6-7].

Pneumorachis is the phenomenon of air in the epidural space. It can be caused not only by spinal trauma, and medical procedures such as epidural injections, but also by mediastinal spread such as in cocaine sniffing [8]. Pneumorachis normally does not cause complications, but in some cases [6-7] it can cause nerve damage. Sometime even surgical treatment is required [6]. In the present case, the patient's pain fortunately subsided in the end and there were no severe complications. The author reports on this case.

CASE REPORT

A 62-year-old man visited the clinic for low back pain and radiating pain in his left leg. He had undergone microdisectomy at L3/4 due to a ruptured disk more than two years ago when he had similar symptoms. After this, his pain was significantly alleviated but once a year his pain would recur. When this happened, he visited the author's clinic and had an interlaminar epidural block, causing his pain to subside. His recent numeric rating scale (NRS) score was 5/10 while sitting down. He had no specific diseases except diabetes mellitus. His laboratory results were normal with the exception of slightly higher than normal blood glucose level (135 mg/dl). The author tried a lumbar epidural block with the LORA technique without the help of fluoroscopy at L3/4 using a 22-gauge epidural needle (Dr. Japan Co., Ltd, Japan). At the first attempt, the drug was not injected due to equivocal loss of resistance; 3 mL of air was instead consumed. The author then tried a second time at L4/5 and successfully injected 0.5% bupivacaine 1.5 cc+ normal saline 8.5 cc+ dexamethasone 2mg with 3 cc air for accurate confirmation. Immediately following this, extreme pain in the same area developed and lasted persistently without tenderness or paralysis. The patient's NRS score was 10/10 despite intravenous injection of Demerol 25 mg and ketorolac tromethamine 30mg. The patient was unable to experience pain relief in any position except for a 90-degree flexion position when

lying on the bed. A lumbar CT scan was taken, which showed air bubbles in the posterior epidural space (Fig.1.).

After 12 hours passed, the patient's pain lessened gradually and it completely subsided after 2

days but hypoesthesia remained. After 25 days, upon visiting the clinic, he had neither pain nor paralysis but still had hypoesthesia to pinprick on the left lateral thigh



Fig-1: Lumbar spine CT scan, which shows air bubbles in the posterior epidural space extending to the thoracic area on the sagittal view and air bubbles in the posterior epidural and neighboring transforaminal space at the L4/5 level on the axial view

DISCUSSION

The patient in the present study experienced temporary but severe lumbar and radiating leg pain after the lumbar epidural block with the LORA technique. The distribution of the patient's pain coincided with the spreading of air. In the author's opinion, the air bubbles might function as a space-occupying lesion and irritate the left fourth nerve root through the L4/5 intervertebral foramen because as the air was absorbed, the pain was lessened.

According to the report by Henthorn *et al.* [7], severe scapular pain developed 20 minutes after cervical epidural block at the C7/T1 level, performed for the management of neck and shoulder pain from spondylosis. The authors of this report also tried blocks twice and consumed more than 5 cc of air to find the epidural space. A CT scan showed air bubbles in the epidural space in the regions C4-5 and C6-7. The patient recovered gradually though and showed no neurologic complications, and her initial pain was improved at the time of one-month follow-up. The patient in the author's case also experienced significant improvement of initial pain, but the hypoesthesia remained 25 days after the block. The author expects that the hypoesthesia will recover with time. Bloodworth analyzed 33 cases of neurologic deficits after epidural steroid injection [9]. He divided the deficits into 2 categories: permanent and reversible. Nerve root trauma, as in the author's case, belongs to the reversible category.

However, neurologic deficits caused by spinal cord infarction exist permanently. As mentioned below, spinal cord infarction could be caused by the LORA technique. Chae *et al.* [6] reported paraplegia following cervical epidural catheterization using the LORA

technique. Cervical epidural catheterization at the C7/T1 level was performed in a patient who had transient spinal cord stimulator lead at the lower thoracic level, consuming about 7 ml of air for the management of upper extremity pain. Six hours after catheterization, the patient complained of hypoesthesia and motor weakness of both lower extremities without pain, and neurologic examination revealed markedly reduced sensation to pinprick, cold, and touch below the T10 level. A whole spine CT scan showed multiple air bubbles in the epidural space, intervertebral space, and paraspinous muscles between C1 and T9 without hematoma or abscess. As paralysis progressed, the doctors decided to perform spinal operation. Upon opening of the spine at the T10 level, they found no abnormalities, and decompressive operation was performed at the cervical area where the escaping air bubbles were observed. While in the post anesthesia care unit, the patient's paraplegia and hypoesthesia recovered to normal. The doctors speculated that increased epidural compartment pressure caused by the air bubbles interrupted blood supply to the spinal cord via compression of the segmental radiculomedullary arteries, which travel through the upper portion of the intervertebral foramen between T8 and T11. They concluded that the operation was the best choice, knowing that the "critical ischemia time" is 3 hours for recovery of the spinal cord following ischemia.

Pneumorrhachis can be caused by multiple factors and is usually self-limiting with no symptoms [10]. However there is a report [11] highlighting that unmanaged pneumothorax can cause symptomatic pneumorrhachis. Considering reported complications caused by pneumorrhachis associated not only with iatrogenic procedures such as epidural block using LORA technique but also with increased mediastinal

pressure, there are doubts regarding the safety of the LORA technique.

Even though there are studies attempting to prove the superiority of saline to air, adequate evidence has not yet been established [12]. However, there is a progressive shift in practice in favor of saline due to many reports such as the above mentioned ones, which highlight complications associated with the LORA technique [13-14].

CONCLUSION

There has been no evidence to prove the superiority of saline to air for the loss of resistance technique in finding the epidural space until now. However, considering the large quantity of reports showing complications associated with pneumorrhachis associated with the LORA technique, the author would rather use normal saline instead of air. If air is used, it is recommended that a small amount be used, such as less than 2 ml, especially for the patients whose spinal spaces are narrowed due to degeneration or operation.

REFERENCES

1. Parnass SM, Schmidt KJ. Adverse effects of spinal and epidural anesthesia. *Drug Safety*. 1990; 5(3): 179-194.
2. Chew YW, Suppan VK, Ashutosh SR, Tew MM, Jimmy-Tan JH. Pneumocephalus following combined spinal epidural anaesthesia for total knee arthroplasty: A Case Report. *Malaysian Orthopaedic Journal*. 2017; 11(3):42-44.
3. Paiva WS, de Andrade AF, Figueiredo EG, Amorim RL, Prudente M, Teixeira MJ. Effects of hyperbaric oxygenation therapy on symptomatic pneumocephalus. *Therapeutics and clinical risk management*. 2014;10:769.
4. Sinha S, Ray B. Cerebral venous air embolism during epidural injection in adult. *Indian Journal of Critical Care Medicine*. 2015; 19(2):116-118.
5. Isakov A, Shtein A, Kyzer S. Pneumoretroperitoneum after attempted epidural anesthesia. *The Journal of Critical Care Medicine*. 2016; 2(4):198-200.
6. Chae YJ, Han KR, Park HB, Kim C, Nam SG. Paraplegia following cervical epidural catheterization using loss of resistance technique with air-a case report-. *Korean Journal of Anesthesiology*. 2016; 69(1):66-70.
7. Henthorn RW, Murray K. Severe Scapular Pain Following Unintentional Cervical Epidural Air Injection. *Pain physician*. 2016 Mar 1;19(3):E511-4.
8. Challita S, Daher M, Roche N, Alifano M, Revel MP, Rabbat A. Pneumorrhachis after cocaine sniffing. *Respiratory medicine case reports*. 2014 Jan 1;12:10-2.
9. Bloodworth DM, Perez-Toro MR, Nouri KH. Neurological deficits after epidural steroid injection: Time course, differential diagnoses, management, and prognosis suggested by review of case reports. *American Academy of Pain Medicine*. 2008; 9(S1):S41-S57.
10. Oertel MF, Korinth MC, Reinges MHT, Krings T, Terbeck S, Gilsbach JM. Pathogenesis, diagnosis and management of pneumorrhachis. *European Spine Journal*. 2006; 15(S5): 636-643.
11. Park JS, Kim H, Lee SW, Min JH, Kim SW, Lee KW. Symptomatic pneumorrhachis after chest tube insertion for spontaneous pneumothorax. *The American journal of emergency medicine*. 2010 Sep 1;28(7):846-e1.
12. Brogly N, Guasch E, Alsina E, Garcia C, Puertas L, Dominguez A, Diez J, Gomez J, Gilsanz F. Epidural space identification with loss of resistance technique for epidural analgesia during labor: A randomized controlled study using air or saline—new arguments for an old controversy. *Anesthesia & Analgesia*. 2018; 126(2):532-536.
13. Cowan CM, Moore EW. A survey of epidural technique and accidental dural puncture rates among obstetric anaesthetists. *International journal of obstetric anaesthesia*. 2001 Jan 1;10(1):11-6.
14. Wantman A, Hancox N, Howell PR. Techniques for identifying the epidural space: a survey of practice amongst anaesthetists in the UK. *Anaesthesia*. 2006 Apr;61(4):370-5.