



Pneumocephalus Following Combined Spinoepidural Anesthesia: A Case Report

Emine Karaman, Duygu Kara, Ozgur Ozmen, Zakir Arslan

Regional Training and Research Hospital, Anesthesiology and Reanimation Department, Erzurum, Turkey

Abstract

Various complications may develop as a result of epidural anesthesia. Pneumocephalus is a rare complication during epidural catheter insertion. In this case report, 61 years old patient was admitted for hip fracture and planned to have hip replacement surgery. Combined spinoepidural anesthesia was planned during surgery as anesthetic technique. Epidural catheter was inserted for postoperative pain control. Forty-five minutes after the operation, he had a sudden blunt headache, and generalized tonic, clonic status for two minutes. We aimed to present a case of pneumocephalus after combined spinoepidural anesthesia.

Keywords: Combined spinoepidural anesthesia, epidural catheter insertion, pneumocephalus

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Corresponding Author: Duygu Kara, Regional Training and Research Hospital, Anesthesiology and Reanimation Department, Erzurum, Turkey
E-mail: drduygukara@yahoo.com **Phone:** +90 442 232 5555 +90 506 928 8141

Introduction

Regional anesthesia is a commonly employed technique in patients scheduled for orthopedic lower extremity surgery. Regional anesthesia is preferred to general anesthesia in geriatric patients since consciousness is maintained, pulmonary functions are preserved, intubation is not required, it involves less surgical bleeding and fewer thromboembolic complications and costs are low. Another advantage of regional anesthesia is that it can also provide analgesia in the postoperative period [1]. Combined spinoepidural anesthesia may be employed for the purpose of providing postoperative analgesia. Various complications of epidural anesthesia have been reported in the literature. These include cardiac arrest, hypotension, dural puncture, neurological complications and incorrect catheter placement [2]. Pneumocephalus is one of the less common complications of epidural anesthesia. The purpose of this case report is to describe a case of pneumocephalus, a rare complication, in a 61-year-old male patient scheduled for hip surgery and receiving combined spinoepidural anesthesia.

Case

A 61-year-old man was admitted by the orthopedic department due to hip fracture. Total hip prosthesis surgery was planned. No additional characteristic other than hypertension was observed at preoperative evaluation. Incomplete right branch block was determined at electrocardiography; while no pathology other than increased bilateral bronchovascular branching was identified at pulmonary x-ray. The patient's laboratory parameters were normal. An ejection fraction of 60% and left ventricular hypertrophy were determined at preoperative echocardiography (ECO) assessment by the cardiology department.

The patient was taken to the operating room for surgery and placed under monitoring. Arterial blood pressure was 160/60 mmHg, heart rate 68 beats/min and respiration rate 15 breaths/min. Oxygen saturation at room temperature was 85%. Oxygen administration was initiated by mask at 2 L/min. Following sedoanalgesia with 2 mg dormicum, the patient was placed in a seated position for administration of combined spinoepidural anesthesia. The recipient area was sterilized and covered, and 1% lidocaine was administered by local injection at the L2-3 level. An epidural needle was advanced using air for loss of resistance. Following loss of pressure, the spinal needle was placed and 15 mg Marcaine heavy was administered once cerebrospinal fluid (CSF) discharge from the needle was observed. An epidural catheter was

subsequently threaded into the epidural space. No escape of blood or CSF from the needle was observed. No hypotension, headache or any neurological early complication were observed during the procedure. The surgical procedure commenced once sensory block reached the T6 level. An additional 5 mg local anesthetic was administered from the epidural catheter in the 2nd hour of surgery. Hypotension and bradycardia developed during cement placement in the 3rd hour, and 10 mg ephedrine and 1 mg atropine were administered. The patient was taken to the recovery unit once the operation was completed. Hypotension developed at the 30th minute in the unit, and dopamine infusion was started at 5 mcg/kg/min. Local anesthetic infusion initiated from the epidural catheter for postoperative analgesia was stopped, and the epidural catheter was withdrawn. Headache subsequently developed. At neurological examination the patient was confused, the pupils were isochoric and no lateralization findings were present. The patient was evaluated by the cardiology department. Computed tomography (CT) of the thorax was planned due to expansion in the descending aorta at ECO. Generalized tonic clonic seizure lasting approximately 2 minutes occurred at the 45th minute of postoperative monitoring. Elective intubation was performed together with CT of the thorax and brain. No pathology was encountered at CT of the thorax. Cerebral CT, however, revealed an area of air density approximately 7 mm in size in the periventricular area neighboring on the frontal horn of the left lateral ventricle (Figure 1).



Figure 1. Postoperative CT of the brain

The patient was admitted to the intensive care unit for monitoring and treatment. He was returned to the ward when dopamine support was stopped at the 24th hour. No seizure was observed during monitoring. Control CT of the brain on the 8th day revealed that the intracranial air had been absorbed. The patient was discharged in a healthy condition 1 week after surgery.

Discussion

Complications associated with combined spinoepidural anesthesia may be seen during both spinal and epidural anesthesia. A decrease in CSF pressure caused by CSF leakage from a dural defect after spinal surgery and headache associated with subsequent cerebral venous dilation may be observed. Sympathetic block is known to affect the systemic circulation by reducing venous return and also by lowering systemic vascular resistance. When the block reaches the T4 level, heart rhythm and cardiac output also fall [3]. In addition, drug-related allergy and systemic toxicity may occur [4]. Complications associated with catheter use (such as fracture, displacement and infection), epidural abscess, urinary retention, meningitis, anterior spinal artery syndrome, injury to the spinal cord or nerve tissue and other

neurological complications may also be seen during administration of epidural anesthesia [5].

In this case we elected to use combined spinoepidural anesthesia, both due to the length of surgery and in order to provide effective postoperative analgesia. Presence of air in the epidural space can result in various complications. Rare complications such as air embolism [6, 7] and pneumocephalus may also occur. Pneumocephalus refers to a collection of air in the cranial cavity. While the severity and duration of symptoms may depend on the amount of air in the cavity [8], even a small amount of air in the subdural area may cause headache, edema and increased intracranial pressure by raising pressure in the bridging veins [9].

Sudden headache, worsening with movement, may be experienced with dural puncture and administration of air during epidural anesthesia [10]. No sudden onset headache occurred in our case, but headache began approximately 4 hours after the procedure. The risk of headache was avoided by reacting to the hypotension and bradycardia. Pneumocephalus-related headache differs in character from headache associated with dural puncture. Pneumocephalus-related headache is generally frontally located and worsens instead of improving in the supine position. One study reported that the best method of differentiating these two types of headache is through pain evaluation with the patient in the supine position [11].

One study that compared loss of resistance techniques with saline or air used following epidural catheter placement reported that air was visualized at CT in 30 out of 32 cases in which headache was observed in the group receiving air, while no pneumocephalus was seen in the saline group [12]. Various neurological symptoms may occur depending on the distribution of intracranial air. Confusion, disorientation, anisocoria and hemiparesis may develop depending on the location and volume of pneumocephalus [13]. The neurological symptom observed in our patient was a tonic clonic generalized seizure lasting approximately 2 minutes. Absence of sudden onset headache during the procedure and seizure occurring approximately 4 hours subsequently suggest ingress of air during infusion from the epidural catheter used for analgesic purposes. Bed rest in the supine position, administration of fluids, caffeine, oxygen therapy and analgesics are recommended as treatment [14]. Improvement of symptoms is generally associated with complete absorption of intracranial air.

Pneumocephalus is reported in the literature to resolve in 5-7 days [15]. Another study reported that pneumocephalus is absorbed within 1 week in 85% of cases and that infection associated with dural puncture may be seen in the remaining 15% of patients [12]. Pneumocephalus in our case resolved by control CT of the brain performed on the 7th day. The patient was also started on prophylactic antibiotic therapy during that time.

In conclusion, although headache and neurological symptoms in patients receiving combined spinoepidural anesthesia are rare, it should be remembered that they may be associated with pneumocephalus and appropriate monitoring and treatment should be quickly applied.

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