

## CASE REPORT

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# Tension Pneumocephalus Unexpected Complication Following Lumbar Disc Surgery

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**ABSTRACT** Pneumocephalus (PNC) is termed as an abnormal air presence in the cranium. PNC is a well-known complication of epidural and spinal anesthesia but it develops rarely after spinal surgery for lumbar disc herniation. A 67-year-old female patient was presented to the emergency department (ED) with diffuse non-localized headache and change in mental status. Non-contrast brain-computed tomography scans revealed massive PNC in the frontotemporal fossa and intraorbital region. The patient was transferred to the neurosurgery intensive care unit for clinical observation. Among patients admitted to the ED in the early period after spinal surgery; PNC should be considered in the differential diagnosis if there is persistent headache and confusion.

**Keywords:** Pneumocephalus; lumbar disc surgery; headache

Pneumocephalus (PNC) is an unusual but critical complication of epidural procedures and spine surgery only a few cases have been reported in the literature.<sup>1,2</sup> It is an abnormal presence of air in the cranium and usually caused by traumatic head injuries, infectious gas-forming bacteria, brain tumors, cranial surgeries, spontaneous autogenic factors, otorhinolaryngology procedures and diagnostic interventions such as lumbar puncture.<sup>3</sup> Magnetic resonance imaging can be definitive in the diagnosis but is less sensitive than computed tomography (CT) scans. CT imaging is the gold standard imaging technique for the diagnosis of PNC.<sup>2</sup> In this text; we present and discuss a case of PNC who presented to the emergency department (ED) with headache and change in mental status following lumbar disc surgery.

## CASE REPORT

A 67-year-old female patient with worsening headache and change in mental status was presented

to the ED. In her medical history, it has been learned that she had undergone lumbar disc surgery for L1-5 herniation four days. Her history was positive for epilepsy, hypertension, and deep vein thrombosis, and she was using phenytoin. At the time of admission, vital signs of the patient were normal except for 130 beats heart rate tachycardia. She was drowsy, non-oriented and non-cooperative. The Glaskow Coma Score was 12 (E3M5V4). Muscle strength and deep tendon reflexes were normal and bilaterally symmetrical. The rest of the physical examination was normal. Electrolytes, complete blood count, arterial blood gases, liver and kidney function tests, and cardiac markers were normal. Non-contrast brain-CT revealed PNC in the fronto-temporal fossa (Figure 1). There was no midline shift or mass effect. Also, pneumatization in the supraorbital region was also attracted attention. The patient was given antiemetics and analgesics and admitted. The patient was transferred to the neurosurgery intensive care unit for clinical observation.

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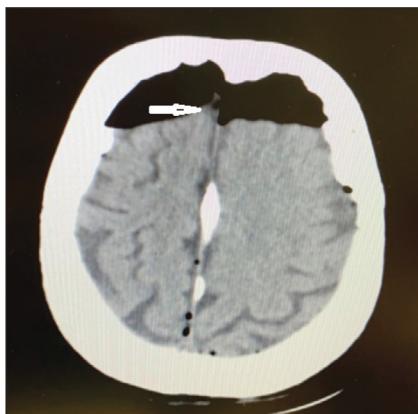
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**FIGURE 1:** Brain window of the non-contrast brain computed tomography demonstrating the pneumocephalus. Arrow point at the typical widening the inter hemispheric fissure appearance of the fronto-temporal fossa simulating the silhouette of Mount Fuji.

## DISCUSSION

PNC is a well-known complication of epidural and spinal anesthesia but it develops rarely after spinal surgery for lumbar disc herniation. Epidural injections are commonly practiced in the labor process and pain treatment.<sup>2,4</sup> Interventions frequently performed by physicians in the ED or many medical conditions they encountered may be complicated by PNC; air sinus fractures, chronic otitis media and sinusitis lumbar puncture and barotrauma.<sup>2,5,6</sup> In patients admitted to the ED in the early period after cranial or spinal surgery; PNC should be considered in the differential diagnosis if there is persistent headache, postoperative meningitis, post-surgical seizures abducens and oculomotor nerve palsy present.<sup>1,2,7,8</sup> Nowadays; lumbar disc surgery can be performed under both spinal anesthesia and general anesthesia. Each has possible disadvantages and advantages. Spinal anesthesia has started to come forward and used more frequently because it does not require airway intervention in surgery and the drug side-effect profile is less.<sup>9</sup> Severe headache is a common complication after epidural anesthesia and lumbar puncture. Attributing headache to this common side effect of the post-procedure makes it easy to overlook the underlying complication PNC.<sup>5</sup> For this reason, PNC should be included in alternative diagnoses in cases unresponsive to analgesic agents and long-lasting symptoms.

Tension PNC is the accumulation of air inside the skull that causes a mass effect and neurological symptoms. It is distinguished from simple benign PNC by the presence of Mount Fuji sign in brain CT.<sup>10</sup> Neurological consequences due to increased intracranial pressure caused by air accumulation is a life-threatening condition. Often, a wide spectrum of different clinical manifestations such acute loss of consciousness, seizures, neurological deficits and permanent brain damage may occur after neurosurgical procedures.<sup>2</sup> CT imaging revealed tension PNC in this case. Mount Fuji sign was seen in the patient's brain CT. In the subdural area of the skull, it is seen that the free air exerts significant pressure on the frontal lobes with the mass effect and creates a twin peak image. In addition, an enlargement of the interhemispheric fissure between the two lobes is observed. Simple benign PNC cases that do not cause serious clinical symptoms do not require emergency neurosurgical intervention and can be managed with close follow-up since air is self-absorbed. Medical treatments to reduce intracranial pressure in the ED in the early period may prevent clinically deterioration. When not treated; with impaired consciousness, it can progress to herniation, cerebral ischemia, coma and death. Neurosurgical interventions such as drilling burr holes, needle aspiration, and decompressive craniotomy may often be required to remove the mass effect that may lead to herniation.<sup>10</sup>

Here, a rare presentation after a frequently performed surgical intervention such as lumbar disc surgery was discussed. PNC should be considered in the differential diagnosis of patients presented in the early postoperative period with headache and cognitive impairment.

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**Conflict of Interest**

No conflicts of interest between the authors and / or family members of the scientific and medical committee members or members of the potential conflicts of interest, counseling, expertise, working

conditions, share holding and similar situations in any firm.

**Authorship Contributions**

All authors contributed equally while this study preparing.

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