

Pneumocephalus Following Epidural Blood Patch In Postpartum Lady

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Received: 04 Mar 2023; Published: 06 Mar 2023;

Citation: Aboud AlJabari, Pneumocephalus following epidural blood patch in postpartum lady.

Abstract:

Background:

Epidural analgesia is a widely used technique for pain relief especially during labor. Headache complaint, is rare after epidural block with the loss of resistance to air/saline technique, is frequent after dural puncture and pneumocephalus and is attributed to intracranial meningeal irritation after air injection in the intrathecal or subdural space with a consequent cephalic dispersion.

Case presentation:

28-year-old female pregnant lady provided epidural analgesia for labor pain. 3 days following epidural she presented with postdural puncture headache. Her headache was treated by epidural blood patch complicated with pneumocephalus showed by brain and spine MRI.

Conclusion:

Such complication could be avoided if punctures following dural puncture used saline. Our case confirms the possibility of iatrogenic pneumocephalus during epidural block with the loss of resistance to air technique for epidural space identification. Signs and symptoms of meningeal irritation, CT/MRI is the diagnostic tool recommended for the differential diagnosis of pneumocephalus.

Keywords: Pneumocephalus, Epidural blood patch, Postdural puncture headache.

Background

Epidural analgesia is a widely used technique for pain relief especially during labor. Despite of its numerous advantages, still complications might occur; such as hypotension, local anesthetics toxicity, total spinal

anesthesia, accidental dural and blood vessels puncture, lumbar pain, subdural blockade and other rare neurological complications (1-3).

Since its description, several methods were proposed to identify the epidural space, the most popular being the loss of resistance to air technique described by Forestier & Sicard (5). Inadvertent air injection in the spinal space during such procedure although rare,

should not be neglected (6).

Case presentation

A 28 year old pregnant lady Gravidal Para 0, previously healthy at 38 weeks gestation in labor. The patient had neither drug allergies nor prior anesthesia and her admission vital signs were within normal range. The course of her pregnancy has been uneventful, with good fetal heart rate.

She desired to have lumbar epidural for labor analgesia, no contraindications to regional anesthesia were identified and the patient was consented to epidural labor analgesia. Under complete aseptic technique, in sitting upright position, at L4-5 level interspace, epidural catheter was inserted successfully from the first attempt with loss of resistance with saline technique, through tuohy needle 18 gauge, with aspiration, no blood or CSF leakage were found. Eight hours following epidural insertion; she gave birth to a male 3.1 kg baby with good health. Next day she was discharged home.

Later on, she complained of severe frontal headache associated with dizziness, no nausea or vomiting, no loss of consciousness, and no limb weakness. Therefore, a medical evaluation in the emergency room; indicated negative meningeal signs and anemia. She refused to do lumbar puncture to rule out meningitis. She was admitted for blood transfusion and brain imaging studies MRI/MRA/MRV which reported the following: no subarachnoid hemorrhage, no space occupying lesion, no midline shift, no evidence of aneurysm in circle of Willis, and no dural sinus thrombosis respectively. In addition, she was advised to do whole spine MRI with contrast to rule out CSF leakage and she was started on antibiotics and fluids rehydration with bed rest advice.

Sixth day following epidural analgesia, she was still complaining of PDPH despite management, so she was admitted for epidural blood patch treatment. She agreed and consented, under complete aseptic technique, in upright sitting position, with local skin infiltration epidural blood patch 20 milliliters autologous blood injected with air loss of resistance technique. Even though, she kept complaining of headache with increase of severity and worse than before. Subsequently, another brain, spine C.T scan was urgently scheduled and found to have pneumocephalus

(air bubbles) intraventricular with no hydrocephalus, and no midline shift with hypodensity in the sagittal sinus. Neurosurgical consultation advice: bed rest, starting dexamethasone, oxygen therapy and no surgical interventions in the meanwhile. Next day, her headache started to improve and she was discharged home after two days. Now, her headache has completely resolved and she is doing well.

Discussion

Many reports in the literature regarding complications of air injection in the epidural space, including: nervous roots and spinal cord compression, retroperitoneal gas collection, subcutaneous emphysema, airway embolism, incomplete analgesia, paresthesia and pneumocephalus (7). Pneumocephalus, may occur during epidural puncture, although is a relatively frequent complication in neurosurgery and/or neuroradiology (8, 9) and be also caused by trauma and infection (10, 11).

Epidural space usually identified by the sudden loss of resistance to air or saline injection or by the detection of a negative pressure when the epidural space is reached (12, 13). Fluids, which are not compressible, allow for the transition from the high resistance of extradural tissues to the low resistance of the epidural space to be immediately identified, but when excessively used may dilute local anesthetics solution and result in an inadequate blockade (14).

Air, as compressible, makes more difficult the epidural space identification with the possibility of false-positive results (16). The disadvantage of air as compared to saline was reported by Valentine et al. (17) and corresponds to a higher incidence of blockade extension failures represented by the increased number of non blocked segments, probably due to bubble formation and poor local anesthetics contact with nervous roots.

There are no reports on saline-related complications (7), while the loss of resistance to air technique has been charged with secondary effects, such as multiradicular syndromes, subcutaneous emphysema, gas embolism and pneumocephalus. Since the latter may evolve without symptoms it is not always diagnosed and may be more frequent than what has been reported (1, 6, 18-23).

Pneumocephalus is clinically diagnosed by headache, seizures, change in consciousness level, disorientation, dysarthria, nausea and vomiting (6, 20, 21, 24). Symptoms intensity and duration depend on intracranial air distribution and are volume-dependent. Symptoms may spontaneously be relieved by the supine position, hydration, analgesics and caffeine. Inhalation of 100% oxygen is recommended for allowing the uptake of collected air nitrogen (25, 26). Conversely, nitrous oxide inhalation increases gaseous volume thus worsening the situation and its use should be avoided when air is used to identify the epidural space (27, 28).

Headache complaint, is rare after epidural block with the loss of resistance to air technique, is frequent after dural puncture and pneumocephalus (7) and is attributed to intracranial meningeal irritation after air injection in the intrathecal or subdural space with a consequent cephalic dispersion (1). Aida et al. (29) have shown that the incidence of headache is significantly higher with air as compared to saline and that the latter should be preferred after accidental dural puncture (30).

Epidural air-space pain shows more intensity resulting from its intrathecal injection. This is due to unique epidural space characteristics, such as low pressure and decreased capacitance, allowing the air to spread rapidly in the cephalic direction even in the lateral position (31). Avellanal et al. (20) have described a pneumocephalus after spinal anesthesia without air injection, probably caused by the entrance of a small amount of air through the needle while removing the mandrel. Saberski et al. (7) have identified 13 pneumocephalus, 12 were radiologically diagnosed as a technical complication of the loss of resistance to air technique, with air volumes varying from 2 to 20 ml. We believe that, in our case, dural puncture during blockade attempt, the use of loss of resistance to air for epidural space identification and, as a consequence, a higher gas volume than what is normally used, allowed for the air entrance in the subdural and intrathecal space thus causing a pneumocephalus.

Conclusion

Such complications could be avoided if punctures following dural puncture used saline. Our case confirms the possibility of iatrogenic pneumocephalus during epidural block with the loss of resistance to air

technique for epidural space identification. Signs and symptoms of meningeal irritation, CT/MRI is the diagnostic tool recommended for the differential diagnosis of pneumocephalus.

Abbreviations

MRI-Magnetic Resonance Imaging
MRA- Magnetic Resonance Arteries
MRV – Magnetic Resonance Veins
CT- Computed Tomography
Kg- Kilogram
ml-Mililiters
L- Lumbar
CSF- Cerebrospinal fluid

Declarations:

I declare that I have no competing interests

Availability of data and materials:

not applicable.

Ethical approval:

not required.

Consent for publication:

Written informed consent was obtained from the patient for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor of this journal.

Competing interests:

None

Funding: none

Author contribution:

A.AJ has wrote the case report and he is the doctor in charge of the patient.

Acknowledgment: none

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Figure.CT scan of Pneumcephalus

