

Letter to the Editor

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Pneumocephalus was commonly evident and pneumorrhachis was very commonly evident among our peri-anesthesia patients whose peri-partum neurological symptoms had warranted radiological investigations

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It has been anecdotally observed that while accessing epidural space, loss-of-resistance technique with air often becomes injection-of-air technique when epidural space is being accessed for continuous labor epidural analgesia, combined spinal–epidural analgesia–anesthesia and epidural blood patches [1]. It has also been anecdotally observed that sometimes air as microbubbles also gets injected intrathecally when spinal anesthesia is being administered. Therefore, after institutional review board approval for exempt research, a retrospective study followed by a follow-up retrospective study was conducted to investigate the incidence of pneumocephalus or pneumorrhachis, respectively, among our peri-anesthesia patients whose peri-partum neurological symptoms might have had warranted radiological investigations like computed tomography/magnetic resonance imaging (CT/MRI) of head/brain or spine, respectively, during a 7-year period (July 1, 2015–June 30, 2022).

Our institute's information technology team ran two separate queries in institutional electronic medical records' database to extract local Women's Hospital's peri-partum patients' lists for the 7-year period who had undergone CT/MRI of head/brain or spine during their hospital stay in

our peri-partum floors. The medical records of those patients were reviewed to rule out the presence of recent neuraxial access attempts before their radiological investigations. Concurrently, those radiological investigations were reviewed to rule out the presence of radiologically visible intracranial or intraspinal air.

Over the 7-year period, only 69 peri-partum patients had CT/MRI of head/brain among whom 30 peri-partum patients had epidural space access attempts before radiological investigations and 10 peri-partum patients had direct intrathecal space access attempts before radiological investigations. Only one peri-partum patient (3.3%) with epidural space access attempts had radiologically visible intracranial air.

Over the 7-year period, only 27 peri-partum patients had CT/MRI of spine among whom 19 peri-partum patients had epidural space access attempts before radiological investigations and 5 peri-partum patients had direct intrathecal space access attempts before radiological investigations. As many as six peri-partum patients (32%) with epidural space access attempts had radiologically visible intraspinal air. Among these six peripartum patients with radiologically visible intraspinal air, this intraspinal air was radiologically visible in lumbar regions of two patients, in thoracolumbar region of one patient, in cervical region of one patient, and in cervico-thoracic-lumbar regions of two patients.

Over the 7-year period, 88 epidural blood patches, 14,947 labor epidurals and 5,730 cesarean sections under neuraxial and/or general anesthesia were billed by our anesthesia department meaning that it was uncommon (<1% but $\geq 0.1\%$) among our peri-anesthesia patients to be neurologically symptomatic enough in their peri-partum periods to warrant CT/MRI of head/brain or spine during their hospital stay in our peri-partum floors. Therefore, it cannot be ascertained if common (<10% but $\geq 1\%$)

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pneumocephalus and very common ($\geq 10\%$) pneumorrhachis among peri-anesthesia patients neurologically symptomatic enough to warrant radiological investigations in peri-partum periods would or could have been, respectively, common and very common among neurologically asymptomatic peri-partum patients with uneventful peri-anesthesia periods. Herein, there may be a futuristic role of cranial and spinal ultrasound to routinely assess and rule out the development of pneumocephalus and pneumorrhachis, respectively, among peri-anesthesia adult patients [2–4]. Moreover, it cannot be ruled out if our peri-anesthesia patients might have had similar radiological investigations during their peri-partum periods while staying in our hospital's non-peri-partum floors or even at other hospitals after getting discharged from our hospital's peri-partum floors.

Essentially, radiologically visible air is commonly ascending cranially in our peri-anesthesia patients at least when their peri-partum neurological symptoms might have had warranted radiological investigations. This finding warrants an awareness among our obstetric anesthesia providers to either completely avoid using air for loss-of-resistance technique if planning to inject the contents of loss-of-resistance syringes during epidural space access attempts or relearn the loss-of-resistance technique without ever turning it into injection-of-air technique so as to avoid inadvertent symptomatic or even asymptomatic pneumocephalus or pneumorrhachis.

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