Pneumocephalus diagnosis

Radiographic signs: pneumocephalus on CT or skull X-ray. Pneumocephalus occurs in ≈ 20% of patients with Cerebrospinal fluid fistulas [1)]

In clinical practice, it is of significant importance to differentiate simple from tension pneumocephalus.

A high index of suspicion is necessary to make the diagnosis and prompt treatment of these cases. Monitoring Near infra-red spectrometry (NIRS) monitoring could help to complete the diagnosis and treatment in these cases. A venous air embolism is a common complication in neurosurgical procedures that are performed in a sitting position, where this monitoring has also been shown to be useful. In the case presented, NIRS monitoring, along with clinical and analytical data, was used for the diagnosis of the two complications [2)].

Head computed tomography

An excellent correlation is observed between the ABC/2 method and the computer-assisted measurement. This study verified that the ABC/2 method is an accurate and simple “bedside” technique to estimate pneumocephalus volume [3)].

Pneumocephalus is most easily diagnosed on Head computed tomography, which can detect quantities of air as low as 0.5 ml. Air appears dark black (darker than CSF) and has a Hounsfield coefficient of –1000. One characteristic finding with bilateral pneumocephalus is the Mount Fuji sign in which the two frontal poles appear peaked and are surrounded by and separated by air, resembling the silhouette of the twin peaks of Mt. Fuji. Intracranial gas may also be evident on plain skull X-rays.

To detect fractures, skull base defects, hydrocephalus and obstructive neoplasms. Include thin coronal cuts or reconstructions through anterior fossa all the way back to the sella turcica

a) non-contrast(optional):to demonstrate bony anatomy

b) with IV contrast:leak site is usually associated with abnormal enhancement ofa djacent brain parenchyma (possibly from inflammation).

At many academic centers, it is common to get a noncontrast CT scan within 6–12 hours of surgery to assess for acute complications (primarily blood—within the brain or epidural or subdural hematoma, amount of pneumocephalus, hydrocephalus…).

If a CT scan cannot be obtained, a Skull XR may identify it

1)
Bakay L. Head Injury. Boston: Little Brown; 1980
2)
Rodríguez Díaz-Regañón I, Benatar-Haserfaty J, Perez JC. [Near infrared spectroscopy (NIRS) in a

neurocritical patient with an air embolisism and pneumocephalus]. Rev Esp Anestesiol Reanim. 2015 Feb;62(2):96-100. doi: 10.1016/j.redar.2014.04.003. Epub 2014 Aug 28. Spanish. PubMed PMID: 25173985.

3)

Chan DYC, Cheung EYH, Hui KH, Leung CMS, Ng SCP, Mak WK, Wong GKC, Chan TMD, Poon WS. ABC/2 formula for “bedside” postoperative pneumocephalus volume measurement. Chin Neurosurg J. 2022 Aug 3;8(1):18. doi: 10.1186/s41016-022-00287-z. PMID: 35922864.