

### A rare case of Intraventricular Pneumocephalus

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#### ABSTRACT

Pneumocephalus also called intracranial aerocele or pneumatocele is the presence of air in the subarachnoid pathways, ventricles or the brain substance. It occurs usually after trauma, however it can also be iatrogenic. Subdural and subarachnoid pneumocephalus are commonly seen following trauma, however intraventricular pneumocephalus is rare. We report a rare case of intraventricular pneumocephalus following skull trauma.

**Key words :** Intraventricular pneumocephalus, Mount Fuji Sign.

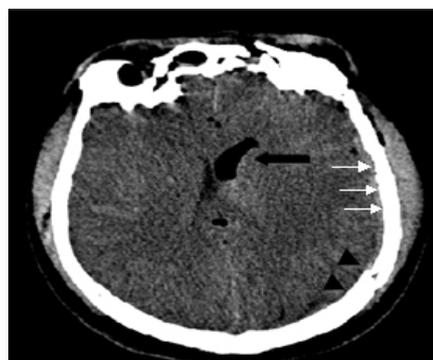
#### Introduction

Pneumocephalus also called intracranial aerocele or pneumatocele is the presence of air in the subarachnoid pathways, ventricles or the brain substance. It is usually a post-traumatic phenomenon however it can also be iatrogenic. Tension pneumocephalus is usually used to describe air trapped under pressure in the intracranial space. Air enters the intracranial space after dural tears even without direct brain laceration. The air flows “upstream” along the normal CSF pathways. It is a serious complication and a neurosurgical emergency especially when associated with clinical and neurological deterioration. Pneumocephalus in addition places the patient at an increased risk for meningitis. We report a rare case of intraventricular pneumocephalus following head trauma.

#### Case report

A 30yr old male was brought to emergency department in an unconscious state after sustaining head injury in a road traffic accident. On physical

examination, his blood pressure was 90/60mm Hg and pulse rate was 100bpm. His pupils were sluggishly reacting to light. His Glasgow coma score (GCS) was 4. He was intubated and was subjected to Computerized Tomography (CT) scan of his brain. CT scan showed multiple craniofacial fractures involving paranasal sinuses (Fig.2: white arrows). In addition, CT scan also showed diffuse cerebral edema (Fig.1: arrow heads), diffuse subarachnoid hemorrhage, left temporo-parietal region subdural hemorrhage (Fig.1: white arrow) and subarachnoid and intraventricular pneumocephalus (Fig.1&2: black arrow).

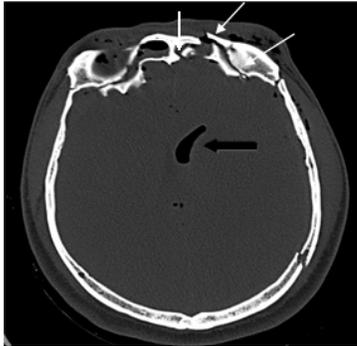


**Fig.1:** CT Axial section (brain window) at the level of frontal sinuses showing multiple craniofacial fractures involving frontal sinuses, diffuse cerebral edema (▶), subdural hemorrhage (⇒), and subarachnoid and intraventricular pneumocephalus (←)

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The patient was kept on vasoconstrictors, mannitol and volume replacement. In spite of all the possible measures, the patient died within half an hour.



**Fig. 2: CT Axial section (bone window) at the level of frontal sinuses showing multiple craniofacial fractures involving frontal sinuses (⇐) and intraventricular pneumocephalus (←)**

### Discussion

Pneumocephalus is abnormal presence of air in the cranial cavity. It could follow many conditions, commonest being head trauma, followed by surgical procedures of the head, tumors and infections.<sup>1,2</sup> Rarely, it could develop in a scuba diver or spontaneously. Headache and altered consciousness are the common symptoms.<sup>3</sup> In tension pneumocephalus there is accumulation of air under pressure resulting in mass effect on the neuroparenchyma. It is a neurosurgical emergency.<sup>4</sup> Pneumocephalus can be diagnosed on plain X-ray however CT is the modality of choice.<sup>5</sup> The air collection may be located in the extradural, subdural, subarachnoid, intraventricular, and intracerebral spaces. In cases of intraventricular pneumocephalus, fulminating, often fatal, intracranial sepsis may develop.

When pneumocephalus is suspected, CT scan play a vital role in determining the precise location of the gas collection, its relationship to the basal skull fracture site or air sinuses, whether the air bubbles are single or multiple, and the amount of mass effect on the brain. In case of tension pneumocephalus, bilateral subdural air collections cause compression and separation of the frontal lobes. The widened interhemispheric space

between the frontal lobes resembles the profile of Mount Fuji in Japan - **Mount Fuji sign**.<sup>6</sup>

Pneumocephalus rarely needs surgical intervention except when it is associated with significant neurological deficit and supported with features of tension pneumocephalus. In such cases emergent surgical open or endoscopic evacuation should be done. Small volumes of air (<2cc) are frequent in head injury and usually resolve without treatment. This case illustrates the importance of neuroimaging in making accurate diagnosis and localisation of pneumocephalus to offer adequate treatment. Early diagnosis and timely appropriate intervention will reduce morbidity and unnecessary mortality.

### Conclusion

Intraventricular pneumocephalus is a rare occurrence following trauma. Early diagnosis and appropriate treatment are important to reduce morbidity and mortality.

### References

1. Yildiz A, Duce MN, Ozer C et al Disseminated pneumocephalus secondary to an unusual facial trauma. *Eur J Radiol* 2002;42:65–8
2. Jenson MB, Adams HP. Pneumocephalus after air travel. *Neurology* 2004;63:400–1
3. Kapoor T, Shetty P (2008) *J Emerg Med* 35:453–54.
4. Satapathy GC, Dash HH. Tension pneumocephalus after neurosurgery in the supine position. *Br J Anaesth* 2000;84:115–17.
5. Sharifabad MA, Gianatiempo C, Gharibshahi S. Pneumocephalus: a case report and review article. *Int J Clin Pract* 2007;61:74–6.
6. Michel S J. Signs in imaging, The Mount Fuji Sign. *Radiology* 232, vol 2:449-50.