Pneumocephalus

- Sequential Brain Shift Patterns During Staged Bilateral Deep Brain Stimulation Surgery for Parkinson's Disease
- Management of Rare Temporomandibular Joint Cysts with Intracranial Extension: A Case Series and Literature Review
- EEG changes and seizure outcomes following anterior corpus callosotomy in adults with Lennox-Gastaut syndrome: A single-center experience
- Pro-Con Debate: Air or Saline for Loss-of-Resistance Technique of Interlaminar Epidural Access with Fluoroscopy-Guided Pain Medicine Procedures
- Management of Traumatic Anterior Skull Base Fractures and Cerebrospinal Fluid Fistulas
- Lead-Shift Error and Pneumocephalus in Awake, Robotic Deep Brain Stimulation Patients
- Diagnosis and treatment of cerebrospinal fluid rhinorrhea with intracranial hypertension
- The increased mortality of older patients with moderate traumatic brain injury

Pneumocephalus is defined as the presence of air within any of the intracranial compartments.

Pneumocephalus without a known underlying cause is defined as spontaneous pneumocephalus.

When this circumstance causes increased intracranial pressure that leads to neurological deterioration, it is known as tension pneumocephalus.

At many academic centers, it is common to get a non-contrast 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…).

Epidemiology

It is a rare but potentially serious complication of spine surgery related in most cases with inadvertent dural tear during the operation. Most collections are small, behave benign, and respond to conservative therapy.

A review of 295 patients indicates that trauma is the most common cause, accounting for 75% of cases. Infection, most common chronic otitis media, accounted for 9% of the cases reviewed [1)].

Etiology

Pneumocephalus Etiology.

Classification

Pneumocephalus Classification.

Clinical

Pneumocephalus clinical features.

Diagnosis

Pneumocephalus diagnosis

Differential diagnosis

Pneumocephalus differential diagnosis.

Complications

Intracranial abscess formation, traumatic skull base defects, and massive pneumocephalus are uncommon entities, which may be associated. It may be prudent to have heightened suspicion for the presence of intracranial abscess formation in patients with massive pneumocephalus secondary to anterior skull base trauma [2)].

see Tension pneumocephalus.

Treatment

Pneumocephalus treatment.

Case reports

A rare case of subdural pneumocephalus, unassociated with CSF leak, developed in the sellar and suprasellar regions. This complication was diagnosed in an adult male 1 week after the removal of a large tumor in the same site via ETSS. The patient presented with a severe headache and visual deterioration. He was diagnosed by a CT scan and managed emergently via ETSS. The headache was relieved immediately after surgery, and the recent visual deterioration was reversed the next day. As far as we have reviewed in the context of complications of ETSS, no previous study has reported such a complication of pneumocephalus unassociated with CSF leak following ETSS. As a conclusion, pneumocephalus can occur with or without CSF leakage as a complication of ETSS, and it may be avoided by a good (water-tight) sealing of the surgical site [3].

A 75-year-old man presented with bilateral lower limb weakness. Radiological examinations implied the possibilities of idiopathic normal pressure hydrocephalus (iNPH) and a suprasellar cyst, but both were observed conservatively at that time. Due to the progressive gait disturbance, a lumboperitoneal shunt was implanted 1 year later. The clinical symptoms improved, but the cyst had grown after another year, causing visual impairment. Transsphenoidal drainage of the cyst was performed, but delayed pneumocephalus occurred. Repair surgery was performed with temporary suspension of shunt function, but pneumocephalus relapsed two and a half months after the resumption of shunt flow. In the second repair surgery, the shunt was removed because it was assumed that it would prevent the closure of the fistula by lowering intracranial pressure. Two and a half months later, after confirming the involution of the cyst and no pneumocephalus, a ventriculoperitoneal shunt was implanted, and cerebrospinal fluid (CSF) leakage has not relapsed since then. The coexistence of idiopathic normal pressure hydrocephalus (iNPH) and Rathke's cleft cyst (RCC) is rare, but it can occur. RCC can be cured by simple drainage but delayed pneumocephalus can occur in cases whose intracranial pressure decreases due to CSF shunting. When simple drainage without sellar reconstruction for RCC is attempted after CSF shunting for coexistent iNPH, attention should be paid to changes in intracranial pressure, and it is desirable to stop the flow of the shunt for a certain period [4].

An 84-year-old man presented with dysarthria and incontinence. Computed tomography revealed an intraventricular pneumocephalus, thinning in the petrous bone, fluid in the air cells, and cleft in temporal lobe. A right subtemporal extradural approach was taken to detect bone-/-dural defects, and a reconstruction was performed using a musculo-pericranial flap.

This is the first patient of an isolated intraventricular spontaneous pneumocephalus without any other site air involved. Surgical approaches to repair such bone and dura defects should be considered an appropriate option [5].

References

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