Meningitis: An Unusual Cause of Pneumocephalus

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Abstract

Pneumocephalus, characterized by the presence of air in the cranial cavity is frequently caused by trauma and surgery. Meningitis is a very rare cause of pneumocephalus. Here we report a patient who had meningitis as a cause for his pneumocephalus. This patient was diagnosed to have pneumocephalus on CT scan study and was treated with antibiotics to which he responded well, and the repeat CT scan done after two weeks showed normal study.

INTRODUCTION

Pneumocephalus is “the presence of air or gas within the cranial cavity.” Pneumocephalus arises when there is a breach in the integrity of the cranial bone or dura and a pressure gradient that allows air to enter the cranial cavity. It is a relatively common occurrence after skull base surgery, and in the majority of cases the air resolves spontaneously. Common causes of pneumocephalus are head trauma, surgery, tumor, and diagnostic procedures. In the absence of head trauma, meningitis is an extremely rare cause of pneumocephalus. We report an unusual case of a spontaneous pneumocephalus caused by meningitis in the absence of head trauma, and surgery.

CASE REPORT

A 21 years male presented to us with the history of high-grade intermittent fever of five days duration and vomiting since 2 days with altered sensorium.

On general examination, he was febrile with normal blood pressure and respiratory rate. He was stuporous, but responding to painful stimuli, neck rigidity was present. Pupils were equal and reacting to light. There was no evidence of any source of infection particularly pertaining to ear. Patient had no history of trauma. There were no other clinical findings. Therefore, the diagnosis of either meningitis or cerebral malaria was thought of and we proceeded to investigate the patient on those lines.

Patient’s routine haemogram with peripheral smear was done. Patient underwent CT scan study followed by CSF study.

Patient had hemoglobin of 14.8 gm% with a total leucocyte count of 6000/cmm (N - 80%, L - 18%, E - 02%). His electrolytes were normal (S. Sodium - 136 meq/L, S. Potassium - 4 meq/L) and so were his renal parameters (S. Creatinine - 0.9 mg%, BUN - 18 mg%). The random blood sugar was 135 mg%. CT scan brain showed hypodense area of air density in supracellar cistern, perimesencephalic cistern and sylvian fissure suggestive of pneumocephalus with no bony abnormality or communication with any sinus (Fig. 1). CSF study revealed an opening pressure of 220 mm of H2O, proteins - 180 mg%, sugar - 75 mg%, total cells - 520 cells/cmm with 85% neutrophils and 15% lymphocytes. However, no organisms were detected in CSF on culture. Patients ELISA for HIV was negative.

Patient was treated with crystalline penicillin 20 lakh units every 2 hourly and injection gentamicin 60 mg I.V. eight hourly.

There was remarkable improvement in two days as evidenced by his level of consciousness and ability to being well oriented. Treatment was continued for 14 days and all along patient continued to register significant clinical improvement. CSF study and CT scan repeated on 14th day was normal (Fig. 2).

Patient was subsequently discharged and was followed up regularly on OPD basis and was asymptomatic.

DISCUSSION

In 1741, Lecat reported the first case of pneumocephalus (cranial aerocele). Pneumocephalus may occur after destruction of the skull base or disruption of the dura matter.¹ In a review by Markham⁷ of 295 patients with pneumocephalus, trauma was the etiological factor in 73.9% of cases, followed by tumor (12.9%), infection (8.8%), surgical intervention (3.7%), and unknown causes (0.6%).

Tanaka T et al³ had reported three cases of pneumocephalus suspected to have resulted from aerobic bacteremia caused by Enterobacter cloacae, Escherichia coli, and Klebsiella aerogenes. In two cases, the E. cloacae and K. aerogenes were isolated from the cerebrospinal fluid.
Infection by gas-forming organisms can also result in air in the intracranial spaces. Penrose-Stevens et al had reported a case of fatal Clostridium perfringens meningitis with localized pneumocephalus which occurred 4 months after a craniotomy.4

The presentation of pneumocephalus is often vague and nonspecific. The patient may complain of a headache, nausea and vomiting, lethargy, and an altered state of consciousness and show signs of meningism. The diagnosis is often unsuspected and made only after a computed tomographic scan. Computed tomography is a highly accurate diagnostic tool and can detect as little as 0.5 ml of air in the intracranial compartment.5

Treatment of pneumocephalus depends on the clinical state of the patient, the extent and progression of the air collection, and the etiology. Most cases resolve with conservative management and close monitoring, although the rate at which the air is absorbed is uncertain.6

Surgical intervention is generally indicated when there is continued CSF leak or progression of pneumocephalus to a “tension” condition.

Our patient was treated with intravenous antibiotics based on CSF report, which was suggestive of meningitis. However, no organisms were isolated on aerobic CSF culture. Patient responded remarkably to the treatment and was clinically stable and normal. A repeat CT scan done after two weeks showed no evidence of pneumocephalus.

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REFERENCES