

An Unusual Case of Pneumocephalus in Ecoli Meningitis

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Abstract

Pneumocephalus is a condition characterized by the presence of air in the cranium and it is mainly caused by trauma or a neurosurgical procedure. Meningitis is an extremely rare cause of pneumocephalus. Only isolated case reports of meningitis leading to pneumocephalus is reported in literature. E coli meningitis leading to pneumocephalus is still rare. A rare case of spontaneous pneumocephalus in an infant, caused by E coli meningitis, with computed tomography finding and review of literature is presented here.

Keywords: Pneumocephalus; E coli; Meningitis

Introduction

Pneumocephalus is the presence of air in the cranial cavity. Common causes are head trauma, surgery, tumor and diagnostic procedures [1,2]. Meningitis is an extremely rare cause of pneumocephalus and is usually associated with *Clostridium perfringens* meningitis and rarely with mixed aerobic-anaerobic meningitis. Intracranial infections can produce gas by putrefaction due to the autolysis of intracellular proteins and decomposition of glucose. Ischemia may also feature as the gas produced might not be absorbed [3].

These factors may act singly or in combination and resulting in pneumocephalus. We report an unusual case of pneumocephalus associated with *E coli* meningitis.

Case Report

Six (6) months old girl child presented with complaints of fever, seizures, incessant cry and poor feeding of 3 days duration. Child had uneventful perinatal period, developmentally

normal and immunized for age. At admission, the child had GCS of E4V4M5, febrile with stable vitals. Anterior fontanelle was tense. Pupils were equal and reacting to light. There was no ear discharge or sinus or swelling in lumbosacral region. Neurological examination showed normal cranial nerves, normal tone, exaggerated deep tendon reflexes and extensor plantar. Other systems were normal.

As child's sensorium deteriorated further on the day of admission, CT scan was taken followed by lumbar puncture. Blood investigations showed Hb-10.1gm%, TC-15100cells/mm³, DC-P68% L28% E4%, PLT-4.2 lakh/mm³, Blood urea-15mg/dL, S. creatinine-0.5mg/dL, Na/K-133/4.5mEq/L. SGOT/SGPT/ALP-63/62/94IU/L. CT scan showed pneumocephalus with no bony abnormality (Figure 1).

CSF was purulent; Gram stain showed Gram negative bacilli. CSF cytology showed 300 cells/mm³ with 90% polymorphs. CSF biochemistry also suggestive of bacterial infection (sugar 20mg/dL and protein 90mg/dL). CSF and blood culture showed growth of *E coli* sensitive to imipenem, meropenem, piptaz and tigecycline, resistant to ampicillin, ceftriaxone and cefepime.

The child was treated with meropenem and other supportive measures. Later the child developed ventriculitis and hydrocephalus. The girl expired on day 10 of admission due to intractable seizures and septic shock.

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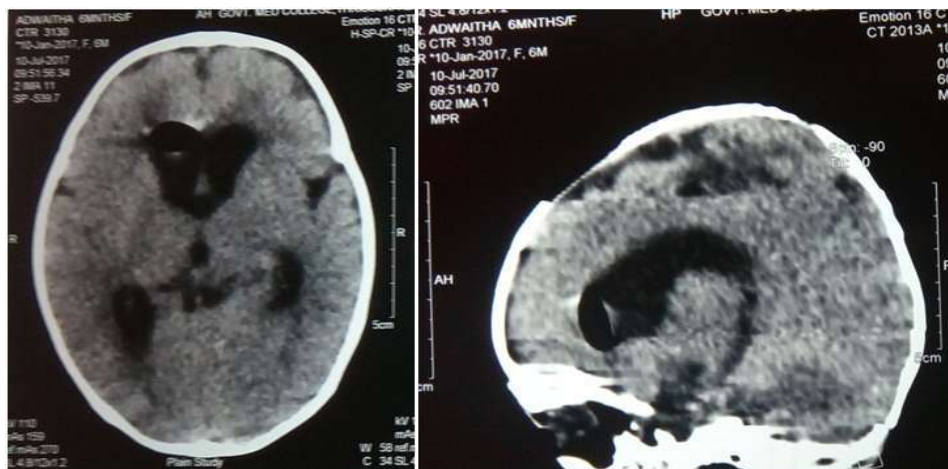


Fig. 1: CT scan showing air in the cranial cavity

Discussion

Pneumocephalus has been reported after central nervous system trauma, surgery, air embolus, brain abscess, or post radiation necrosis of skull appendages. Pneumocephalus following trauma may be due to destruction of the skull base or disruption of the dura matter [4]. In a review 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 [5].

Spontaneous pneumocephalus caused by meningitis is extremely rare in infants and is usually associated with *Clostridium perfringens* meningitis. Rarely may be due to mixed aerobic-anaerobic meningitis. Three cases of pneumocephalus reported due to aerobic bacteremia caused by *Enterobacter cloacae*, *E.coli*, and *Klebsiella aerogenes* [6]. Intracranial infections can produce gas by putrefaction due to the autolysis of intracellular proteins and glucose decomposition [3].

The presentation of pneumocephalus is often vague and may be of primary disease only (eg: meningitis). The patient may complain of 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 [7]. Most cases resolve under conservative management and close monitoring, although the rate at which the air is absorbed is uncertain [8].

Surgical intervention is generally indicated when there is continued CSF leak or progression of pneumocephalus to a tension condition [5]. Pneumocephalus associated with meningitis usually has a fatal outcome in infants and neonates [9,10].

Our patient was treated with intravenous antibiotics and supportive measures. But it was a case of severe pyogenic meningitis with septicemia. Hence the patient succumbed to death.

Conclusion

Meningitis is a rare cause of spontaneous pneumocephalus in children. Very rarely it can be seen associated with *E coli* meningitis and can have a fatal outcome in infants and young children.

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