

Nontraumatic pneumocephalus and subarachnoid hemorrhage case: Brain abscess related to complicated otitis media

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Abstract

We wanted to present this case to emphasize that the diagnosis of complicated otitis media should be kept in mind in patients presenting to the emergency department with headaches, nausea, vomiting, and confusion. Our case was a 30-year-old male patient. Although he was on oral treatment for otitis media, his symptoms persisted, and a headache started. A brain CT scan performed in the emergency room revealed no pathology. Five days later, pneumocephalus and surrounding subarachnoid hemorrhage were detected on brain CT imaging due to nausea, vomiting, headache, and confusion. The patient was discharged 70 days after receiving medical care. As seen in our case, it should be kept in mind that pneumocephalus in an unconscious patient may occur due to non-traumatic causes and may be a consequence of complicated otitis media, and this situation should be thoroughly investigated.

Keywords: intracranial abscess, complications, lateral sinus thrombosis, suppurative otitis media, temporal abscess

1. Introduction

The middle ear is a thin temporal bone gap, with inner and outer surfaces adjacent. The majority of the outer wall of the middle ear is composed of the tympanic membrane (TM), while the medial wall of the middle ear is the outer wall of the inner ear. It is connected to the cellulae mastoideae via the antrum mastoideum in its posterior part and to the pharynx via the eustachian tube in its anterior part (1).

Acute Otitis Media (AOM) is characterized by acute, suppurative inflammation of the middle ear fluid and mucosa. Purulent otorrhea may be observed if the tympanic membrane (TM) is perforated (2, 3). Malignancies, sinusoidal illnesses, reflux, eustachian dysfunction, smoking, intensive care follow-up, sarcoidosis, and HIV infection are all known to be risk factors for acute otitis media (AOM) (4, 5). AOM that is not treated appropriately and for an adequate amount of time can lead to complications such as TM perforation, mastoiditis, labyrinthitis, petrositis, meningitis, brain abscess, hearing loss, and lateral and cavernous sinus thrombosis (3).

We wanted to present this case to bring attention to the fact that the diagnosis of complicated otitis media should be kept in mind in patients brought into the emergency department with headaches, nausea, vomiting, and confusion. The remarkable aspects of our case are the detection of a brain abscess after the worsening of clinical features while receiving antibiotic and

antifungal treatment under supervision, the occurrence of this condition in a short period of time when brain CT imaging performed a few days earlier was normal, and the diagnosis of pneumocephalus when the differential diagnosis is more suggestive of traumatic events.

2. Case Report

A 30-year-old male patient was given oral treatment and ear drops (antibiotics and NSAIDs) in a primary health care facility due to otitis media. As the patient's complaints persisted, he sought therapy from an otorhinolaryngology specialist; IM treatment was planned due to purulent discharge in the left ear, the antibiotic spectrum was expanded, and an antifungal was commenced. Six days after receiving this treatment, the patient presented to the emergency department complaining of a headache. Brain CT imaging was conducted and reported normal (Fig. 1).

After five days, the patient was brought to the emergency room with nausea, vomiting, a headache, and blurred consciousness. Blood tests revealed WBC: $7.3 \cdot 10^9/L$, LYM: $0.61 \cdot 10^9/L$, AST: 42.6 U/L, ALT: 57.8 U/L, and CRP: 94 mg/L. After an initial diagnosis of encephalitis, the patient was referred to a higher-level facility, where the brain CT scans revealed pneumocephalus and the presence of subarachnoid hemorrhage (SAH) in the area (Fig. 2).

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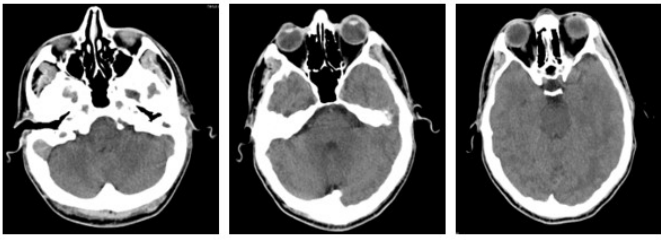


Fig. 1. Brain CT imaging 5 days prior to diagnosis of pneumocephalus and brain abscess

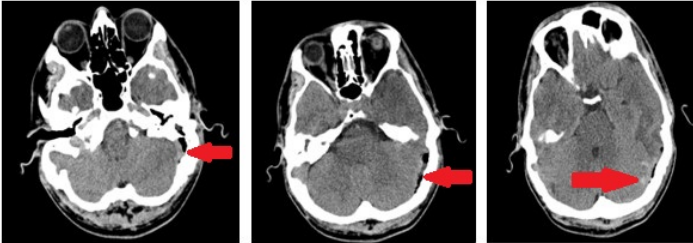


Fig. 2. Brain CT scan when pneumocephalus is detected

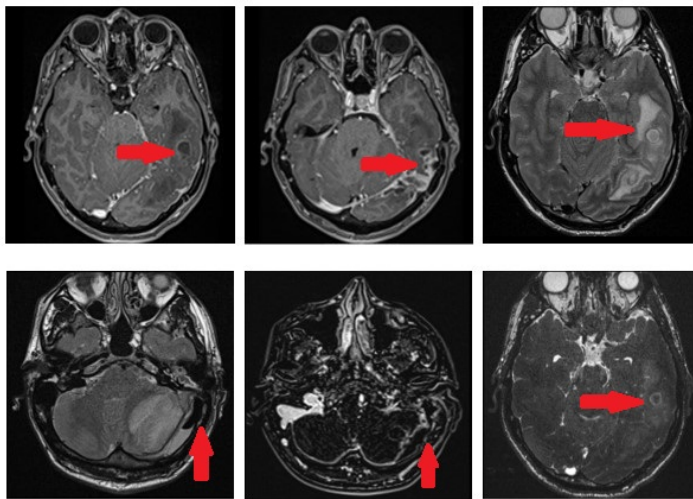


Fig. 3. Brain MRI image performed with pre-diagnosis of brain abscess

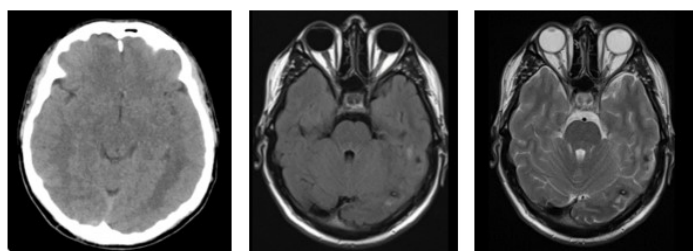


Fig. 4. Post-treatment brain CT and MRI images

After MRI scans revealed abnormalities suggestive of an abscess in a patient with no prior history of trauma, the patient was admitted to the Surgical Intensive Care Unit for further evaluation and treatment under neurosurgery care (Fig. 3). The patient, for whom a medical treatment decision had been made, was transported to the service the following day.

The patient, who had a history of antibiotic use, had a significantly reduced amount of purulent ear discharge, and no microorganism growth was detected in his repeated cultures.

The Brucella test was negative as well.

The patient's abscesses were determined to shrink after a prolonged course of intensive and broad-spectrum antibiotic treatment (piperacillin/tazobactam, meropenem, and vancomycin). During this period, the patient developed left sinus vein thrombosis and was discharged with anticoagulant therapy 70 days after hospitalization (Fig. 4). The patient, who had been symptom-free for 15 to 20 days before discharge, had a normal neurological assessment, and complete well-being was achieved with no motor deficits.

3. Discussion

It is common knowledge that the incidence of AOM decreases with age, and it is recognized as one of the most significant diseases requiring antibiotic treatment. Because of this, the majority of AOM investigations in the scientific literature are conducted on children, focusing mostly on pediatric treatment and complication processes. Consistent with our case, it has been reported in the literature that AOM in adults is more prevalent in men and those in the 3rd decade age group (2, 6, 7).

Pneumocephalus is known for the presence of air in the cranial cavity. Some publications report that it mostly occurs due to traumatic events, surgical procedures that require opening of the skull, and very infrequently as a result of intracranial vascular and infectious events. Some publications in the literature report that pneumocephalus and SAH develop following meningitis, which is extremely uncommon. Similar to our case, the chief complaint is a headache, and meningitis secondary to middle ear infection is among the differential diagnoses (8, 9).

A brain abscess following AOM is one of the most dreaded complications of otitis media. Mortality rates rise to 10%. It has been determined that abscesses occur most often in the temporal lobe, less commonly in the cerebellum, and rarely in both regions. The malodorous purulent ear discharge and subsequent symptoms of an abscess, such as fever and malaise, followed by symptoms suggestive of an intracranial space-occupying formation such as headache, nausea, and vomiting, as well as meningitis symptoms such as nuchal rigidity and confusion of consciousness due to the spread of the abscess, are also compatible with the clinical process of our case (10, 11).

When diagnosing patients, symptoms such as high fever and headache should be carefully checked after symptoms such as ear pain, purulent ear discharge, hearing difficulties, and headache, which typically accompany or follow an upper respiratory infection. On physical examination, as in our patient, otoscope findings of purulent discharge are supportive. In addition, the asinus vein thrombosis seen in our case is one of the conditions of complicated otitis media (2, 12).

Brain abscess treatment includes surgical and medicinal approaches, aiming to remove the infection's primary focus.

Age, underlying etiology, and comorbid conditions are just a few factors that have an impact on the pathogens that cause this condition. Evacuation of abscesses of 2.5 cm or greater for surgical treatment is described in the literature, but evaluating the treatment approach by observing whether there is a reduction in the abscess size with antibiotic treatment is one of the strategies that can be followed. In our case, the abscess lesions were found to shrink with IV antibiotherapy treatment, and the patient was discharged with full recovery without the need for surgical intervention (12–15).

Diagnosing individuals who present to the emergency department with confused consciousness is a highly challenging and complex process. The patient's medical history and known conditions will be the most helpful in shedding light on this process. In order to establish the source of this confused state of consciousness in managing this critical situation, it is crucial to swiftly select the appropriate investigations and analyses from among a large number of options. When considering a conscious patient who has been diagnosed with pneumocephalus, the first possible cause that comes to mind is trauma. As seen in our case, it is a condition that should be kept in mind that this may be the result of complicated otitis media and that the patient's medical history needs to be meticulously investigated.

Conflict of interest

The authors declared no conflict of interest.

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Authors' contributions

Concept: F.C.T., M.S., Design: M.S., Data Collection or Processing: F.C.T., M.S., F.S.Ö., Analysis or Interpretation: F.C.T., M.S., F.S.Ö., Literature Search: F.C.T., M.S., Writing: F.C.T.

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