

# Chronic suppurative otitis media with intracranial complication

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## ABSTRACT

A complication of otitis media is defined as a spread of infection beyond the pneumatized area of the temporal bone and the associated mucosa. Complications can be classified as intra temporal or intra cranial, which includes extradural abscess, brain abscess, subdural abscess, sigmoid sinus thrombophlebitis, otic hydrocephalus, and meningitis. Since the introduction of antibiotics, intra cranial complications in otitis media are less common, however, the occurrence should not be underestimated due to their associated morbidity and mortality. Herein, we report a case of chronic suppurative otitis media (CSOM) with intra cranial complication (brain abscess) in a 25-year-old male patient with ear discharge, severe headache, and vomiting. Computerized tomography scan confirmed the diagnosis. The patient was managed by a combined neurosurgical and otologic approach. Surgery of the abscess includes aspiration through a bur hole or craniotomy and by radical mastoidectomy for CSOM.

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Chronic otitis media refers to an inflammatory process within the middle ear cleft associated with irreversible tissue pathology. It may be active with ongoing suppuration, or inactive demonstrating sequelae of a previous infection. Complications of chronic otitis media can be classified as intra temporal or intra cranial. In the pre antibiotic era the rate of intra cranial complications of otitis media was 2.3%.<sup>1,2</sup> In 1935, Kafka<sup>3</sup> studied 2100 patients with acute mastoiditis and 1125 patients with chronic mastoiditis. Of the 3225 patients, 209 (6.4%) developed an intra cranial complication, 48% developed meningitis, 22.5% developed lateral sinus thrombosis or subdural abscess, 16.5% developed brain abscess, and 13% developed other complications. The mortality was 76.4% in patients with intra cranial complications, or one in every 20 patients with mastoiditis. In the antibiotic era, intra cranial complications of otitis media still occur. In a more recent series of

over 1400 patients with chronic ear disease and cholesteatoma followed over 15 years, nearly 7.5% developed intra cranial complications.<sup>4</sup> Meningitis is still the most common complication followed by intra cranial abscess and lateral sinus thrombosis.<sup>2,5</sup> Lateral sinus thrombosis was the result of chronic otitis media in 50% of cases. Early and aggressive surgical intervention of this otogenic complication can potentially minimize mortality, hospital stay, and length of medical treatment.<sup>6</sup> In 1995, Kangsanarak et al<sup>2</sup> conducted a review of 24,321 patients with otitis media. This review revealed an intracranial complication rate of 0.36% with a mortality rate of 18.9%. Any patient with an extra cranial complication from otitis media should have a neurological exam to rule out additional complications intra cranially. Lateral sinus thrombosis is now a rare complication of ear disease in the developed world, since the advent of the widespread use of antibiotics.<sup>6</sup> The main objective

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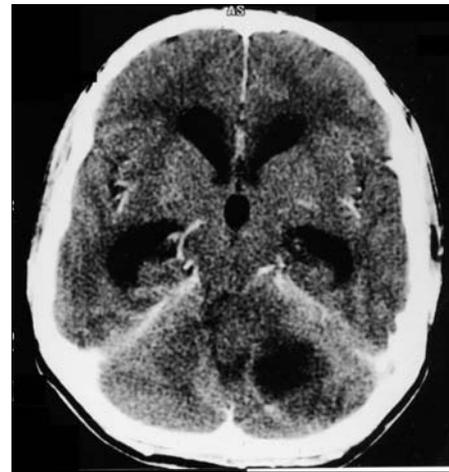
of this case is to report on a patient with brain abscess discovered through a general hospital in the Riyadh area, and to highlight the diagnostic procedures, and therapy plan adopted.

**Case Report.** A 25-year-old male patient, resident of Yemen, presented with discharge from the left ear of 10 years duration, with severe headache, fever, vomiting, blurring of vision, and neck stiffness for the last 5 days. On examination, he was conscious, oriented with neck stiffness. A left ear examination revealed swelling of the external auditory canal, which was full of pus, but not blood stained, foul smelling in nature and thick in consistency. Aural pus was taken for culture and sensitivity. A suction clearance was carried out, which revealed a whitish mass in the attic region. The posterior meatal wall near the attic region was eroded; the right ear tympanic membrane and all cranial nerves were intact. Fundoscopic examination revealed papilledema. Routine investigations carried out included complete blood count, urine analysis, blood glucose, bleeding profile, liver and renal function tests; all were within normal limits except for leucocytosis. The left aural pus culture revealed *Citrobacters*. An audiogram revealed an air bone gap on the left side. Lumbar puncture was carried out, CSF was taken and sent for detailed report and culture sensitivity. According to D/R, the sugar level was raised, and according to culture, no growth was seen. An emergency CT scan of the temporal region and brain was carried out and showed that the left mastoid area was sclerotic, with soft tissue density in the attic area (Figure 1). The scan also revealed a single large well-defined low-density lesion seen with peripheral enhancement in the posterior fossa on the left side along with 2 small locules of abscess in the left cerebellopontine angle (Figure 2). The features were suggestive of left cerebellar abscess formation, secondary to left chronic suppurative otitis media. An emergency evacuation of the left cerebellar abscess was carried out by a neurosurgeon via craniotomy followed by left radical mastoidectomy by the ENT surgeon. During mastoid exploration, it was noted that the lateral wall of the left antrum was eroded, with cholesteatoma present, which was removed and sent for histopathology. Postoperatively no facial nerve weakness was seen. A repeat CT scan showed a successfully drained cerebellar abscess (Figures 3). On a regular monthly follow up visit, he was free from any ear discharge with a dry mastoid cavity.

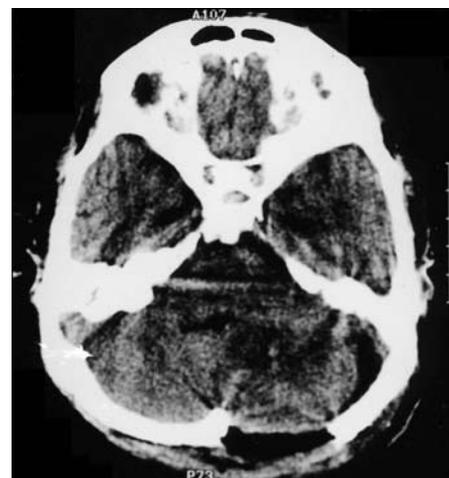
**Discussion.** The incidence of intra cranial complication is higher in males, particularly in those younger than 20 years of age.<sup>4,5</sup> Most complications



**Figure 1** - A CT scan showing sclerotic mastoid with soft tissue density in the attic area indicating granulation tissue.



**Figure 2** - A CT scan showing a large cerebellar abscess with peripheral enhancement, and 2 small pus locules in the left cerebellopontine angle.



**Figure 3** - Post-operative CT after drainage of the cerebellar abscess.

arise from chronic rather than acute otitis media. Factors causing complications include high virulence of organism, poor resistance of the patient, presence of chronic systemic diseases, and resistance of the organism to antibiotics. A report by Fisher et al,<sup>7</sup> of their experiences during the 1970s described a mortality of 14%, and this is a typical figure in recently reported series. Taylor<sup>8</sup> achieved a figure of 6% in 50 patients. It is still estimated to occur frequently, with the annual risk of an adult with active chronic otitis media developing an abscess approximately 1 in 10,000.<sup>9</sup> Currently, brain abscess accounts for 6-66.4% of otogenic intra cranial complications; 0.5% of the patients with acute otitis, and 3% with chronic otitis media develop brain abscesses. In children, 25% of all brain abscesses are otogenic, while in the adults, with a greater predominance of chronic ear disease, it is greater than 50%. In one recent series,<sup>10</sup> 73% of intracranial abscess were caused by chronic middle ear disease. Temporal lobe abscesses usually occupy the middle third of the temporal lobe, cerebellar abscess occupy the anterior part of the lateral lobe of the cerebellum, and only 3% are multiple. Some authors have reported 33% of the intra cranial complications from their series to be brain abscess, 69% developed in the temporal lobe and 31% in the cerebellum. All abscesses developed in patients with chronic otitis media, and 90% of patients had cholesteatoma. This trend has been observed by others; Nunes and Browning<sup>9</sup> reported that 95% of otogenic brain abscesses are from chronic otitis media. Of patients with otogenic brain abscesses, 41% were found to have cholesteatoma.<sup>9</sup> Culture from brain abscesses yield no growth almost 50% of the time.<sup>11</sup> Culture positive abscesses often show polymicrobial infection, with a high incidence of anaerobes,<sup>11</sup> of which streptococci are the common organisms.<sup>12</sup> Pyogenic *staphylococci*, *streptococci*, *pneumococci* and *streptococci haemolytics* are often found. *Gram negative Bacilli*, *Proteus*, *Escherichia Coli* and *Pseudomonas* are cultured with increasing frequency, reflecting the higher incidence of otogenic abscesses from chronic ear disease. There are reports of otogenic brain abscesses with intact tympanic membranes. where an acute infection has presumably been treated effectively with antibiotics.<sup>13</sup> A brain abscess progresses through 3 clinical stages; initial encephalitis, which usually lasts a few days and may be attributed to a viral syndrome. A latent or quiescent stage, in which there are no localizing neurologic changes, which lasts several weeks or rarely several months. The third stage of manifestation, the expanding abscess, is caused by compression as a result of edema and encephalitis around the abscess

rather than by the space occupying abscess itself. Symptoms of brain abscesses may be generalized or localized. Generalized symptoms include fever, irritability, drowsiness, headache, personality changes, and altered mental status. Continuous and severe headache is the most constant generalized symptom of brain abscess.<sup>14</sup> Signs and symptoms associated with cerebellar abscess include suboccipital headache, vomiting, ataxia, gaze nystagmus, past pointing, intention tremor, dysdiadochokinesis, weakness, and incoordination of ipsilateral muscles. Ipsilateral ataxia is the most constant sign of a cerebellar abscess. The CT scan with and without intravenous contrast is no doubt the most important investigation in the diagnosis of brain abscess, and is also the most valuable method for observing the progress of an abscess during treatment. The MRI has further improved the diagnosis.<sup>15</sup> The conditions to be differentiated from brain abscess include meningitis, subdural abscess, lateral sinus thrombophlebitis, and otic hydrocephalus.

Brain abscess is the ultimate otogenic complication, both in severity and difficulty of management.<sup>14</sup> Initial management consists of stabilization of the patient as continued in the management of the patient with meningitis. Management requires a combined neurosurgical and otologic approach, along with the use of large doses of systemic antibiotics. Surgery of the abscess includes aspiration through a burr hole or formal craniotomy, open drainage, or rarely total excision. This may occur simultaneously with the surgical approach to the ear, or it may precede management of the ear if the intracranial problem is of such severity that it should be managed first. Surgical management of associated chronic otitis media is based on the extent of the underlying disease. For patients with acute otitis media, wide myringotomy and drainage are performed, and mastoidectomy is performed in the presence of coalescent mastoiditis. Antibiotic therapy should be maintained for several weeks, and the response of the abscess should be followed by serial contrast enhanced CT.

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