

Brain Abscess Complicating Foreign Body Aspiration

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KEY WORDS: brain abscess, foreign body, children
IMAJ 2009;11:564–565

Foreign body aspiration is rarely complicated by brain abscess. We describe a child with a brain abscess associated with pulmonary foreign body aspiration and present a brief review of the literature, stressing the need for thorough investigation of this rare potential problem, mainly in children younger than 3 years old.

PATIENT DESCRIPTION

A 2.5 year old boy presented to another hospital with headache, vomiting and facial nerve paralysis that began 10 days previously. His history included culture-negative septic arthritis of the left knee at age 6 months that was treated for 6 weeks. Since then he has

been healthy. Two months before the current admission he presented to his primary physician with cough. He was treated with amoxicillin-clavulanate for 2 weeks, oral glucocorticoids and terbutaline inhalations that resulted in mild improvement. About 10 days before the present admission he experienced ear pain and mild facial nerve palsy and was treated for 6 days with oral glucocorticoid for presumed peripheral facial nerve palsy; his symptoms subsided. On admission, he was vomiting and had left hand paralysis and drowsiness and was referred to the emergency room. He had no fever and was in good general condition. He had mild left hemiparesis and left central facial nerve palsy. Laboratory evaluation was unremarkable except for leukocytosis of 17000 cells/ μ l, 80% of them segmented and 5% band forms. A computed tomography of the brain demonstrated a right temporoparietal brain lesion surrounded by edematous brain, producing a severe "mass effect"

[Figure A]. At that point, he was referred to our hospital for emergency surgery.

During surgery a large amount of foul-smelling pus was drained. Cultures were taken from the purulent material and full marsupialization was performed. The patient was transferred to the pediatric intensive care unit with a diagnosis of brain abscess. He was treated empirically with vancomycin, ceftriaxone and metronidazole. Gram stain of the purulent material revealed gram-positive cocci and gram-negative rods. *Fusobacterium* and *Streptococcus intermedius* (milleri group) were isolated and the child was treated with ceftriaxone and metronidazole for 6 weeks according to the susceptibility pattern.

To evaluate the source of the brain abscess, the child was assessed by a cardiologist. No heart anomaly was demonstrated and his echocardiogram was normal. He did not have any dental or ear pathology, but he did have a disturbing cough, halitosis and mild wheezing after he recovered from surgery. On chest X-ray, bronchopneumonia was suspected [Figure B]. CT of the chest demonstrated small peripheral consolidations and hyperinflation. Rigid bronchoscopy revealed a foreign body (a sunflower seed) in the right intermediate bronchus which was removed without complications. The parents, who denied any possibility of foreign body aspiration, then remembered an event of cough and respiratory difficulties during swimming nearly 3 months previously that had passed unnoticed.

Since this was the second major infectious disease in this child's young life (after septic arthritis), a brief immunological evaluation was performed, including immunoglobulin level and

[A] Contrast-enhanced CT scan showing abscess in the right temporoparietal area



[B] Chest X-ray raising the suspicion of bilateral bronchopneumonia



specific antibodies for vaccine preventable diseases and lymphocyte subgroups. All tests were within normal range.

The patient had an uneventful hospital course. His neurological status improved and, after 6 weeks of antibiotic therapy, his physical examination and follow-up were unremarkable. Another CT scan, 6 weeks after presentation, demonstrated significant improvement. At the 6 month follow-up evaluation, he had recovered and had complete neurological and functional rehabilitation.

COMMENT

Brain abscess is an uncommon infection in children. The development of brain abscess is through a hematogenous source or contiguous focus. Predisposing factors for the development of abscess are well known [1]. Overall, 25% of brain abscess cases occur in children, mostly in the 4–7 years age group, and are extremely rare in patients younger than 2 years old. In almost 15% of the cases no predisposing factor was found [1].

Pulmonary origin as a predisposing condition for the development of brain abscess has been seen occasionally. Agarwal et al. [2] reviewed 1112 cases of brain abscess (adults and children), 110 (9.8%) of which had a pulmonary etiology. Pulmonary origin of brain abscess is usually chronic pyogenic lung disease, abscess, empyema or bronchiectasis [1]. Foreign body aspiration as an etiology for brain abscess is extremely rare. Recently however, five papers reporting seven cases were summarized and published [3]. In the first report, a 19 month old boy developed

a right parietal lobe abscess that grew *Streptococcus viridans*. Because of persistent right lung infiltrates with negative results from the bronchoscopy, the right lower lobe was removed and two heads of barley grass were recovered from the removed lung. *Escherichia coli*, *Eikenella corodans* and *Streptococcus viridans* were cultured from the lung tissue. The second report described an 18 year old patient who presented with right hemiplegia and a left cerebral abscess that grew *Staphylococcus aureus*. Chest radiographs demonstrated a pin penetrating the posterior wall of the right main stem bronchus. The third paper described two patients (both 2 years old) with *Eikenella corodans* brain abscess after foreign body aspiration. One child had a metallic needle in the left lower lobe and the other had two sunflower seeds in his right main bronchus, all removed endoscopically. The fourth report described a 2 year old boy with a brain abscess and a sharp pin in the left lower lobe [2]. The fifth publication described two males (10 and 2 years old), one with a safety pin and alpha-hemolytic *Streptococcus* and the other with a thumbtack and *Actinomyces* and *Haemophilus aphrophilus* [3].

Foreign body aspiration can be a life-threatening emergency or it may be asymptomatic and unnoticed for years, with a peak incidence in the second year of life [4]. Signs and symptoms may be vague, but retrospectively there are sufficient data and clinical signs to raise the suspicion of foreign body aspiration. In children, the foreign body is often lodged in the proximal airways and not always in the right bronchus [4]. Chest X-ray usually shows air trap-

ping but may be normal. However, in patients with a high index of suspicion these findings should not rule out the possibility of a foreign body. The peak incidence of foreign body aspiration is the second year of life, but brain abscess is rare in children under the age of 2. Almost all the children described in the literature with a brain abscess of foreign body aspiration origin were males in their second or third year of life.

Interestingly, foreign body aspiration is very common in children, but a complication of brain abscess is rare. This connection demonstrates the significance of lung tissue in filtering pathogens originating from mouth flora. A high index of suspicion is needed in these cases to identify rare but treatable predisposing factors for developing brain abscess.

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“When I see God, he has a lot of explaining to do”

Mother Theresa (1910-1997), Albanian Roman Catholic nun with Indian citizenship who founded the Missionaries of Charity in Calcutta, India in 1950. For over 45 years she ministered to the poor, sick, orphaned and dying, while guiding the Missionaries of Charity's expansion, first throughout India and then in other countries. By the 1970s she was internationally famed as a humanitarian and advocate for the poor and helpless, winning the Nobel Peace Prize in 1979.

“In other countries poverty is a misfortune – with us it is a crime”

Edward Bulwer-Lytton (1803-1873), English novelist, poet, playwright and politician