범부비동염에 합병된 경막외농양을 보인 11세 환자 1례

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Intracranial Epidural Abscess and Pansinusitis in an Eleven Year Old boy

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We reported a case of an 11-year-old boy with an intracranial epidural abscess and pansinusitis. He developed headache and fever and a diagnosis of sinusitis was made in the emergency room (ER). Two days later, the symptoms persisted and the right eye was swollen with tenderness around the right eyelids and fronto-temporal head. Cerebrospinal fluid (CSF) examination showed no abnormal values except for CSF pressure above 20 cmH₂O. Emergency enhanced brain computed tomography (CT) showed pansinusitis and small areas of air level density in the right frontal convexity. However, according to magnetic resonance imaging (MRI) the air level density lesion adjacent to the frontal sinusitis was an epidural abscess. Intravenous antibiotics were administered for 4 weeks without surgery, since the diameter of the abscess was 0.6 cm and follow up MRI showed noticeable improvement. His sinusitis and intracranial epidural abscess were completely resolved without sequelae at 6 weeks after medication. This report is a useful reference for cases of acute onset headache and may be helpful in diagnosis and treatment decisions for severe childhood sinusitis-related intracranial abscess.

Key Words: Sinusitis, Epidural abscess

Introduction

Sinusitis is a common illness of childhood and adolescence of significant acute and chronic morbidity with the potential for serious orbital and/or intracranial complications¹⁾. The conventional treatment of intracranial abscesses is neurosurgical drainage⁵⁾, but conservative treatments such as endoscopic sinus drainage and long-term antibiotic administration are successful in some patients with epidural abscesses^{3,6)}. We reported a child with intracranial epidural abscess due to pansinusitis, and described the clinical course of successful treatment.

Case report

An 11-year-old boy visited our emergency room with sudden onset headache and fever. A diagnosis of acute sinusitis was made and the patient was discharged with medication. Two days later, the patient revisited our out-patient

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clinic with persistent symptoms, and a swollen right eye. Meningitis and orbital cellulitis were suspected as sinusitis complications and he was hospitalized.

On admission, the patient had a temperature of 36.6°C, blood pressure of 100/60 mmHg, pulse of 100/min and a respiratory rate of 22/min. He showed alert mental state. There was tenderness around the right eyelids and fronto-temporal head, but no meningeal signs. Blood and CSF examination showed no abnormal values, except for CSF pressure above 20 cmH₂O. Blood examination revealed a white blood cell count of 14,300/mm³, a C-reactive protein level of 15.03 mg/dL and an anti-streptolysin O (ASO) titer of 1105IU/dL.

Brain computed tomography revealed soft tissue density in the right frontal, ethmoid, and maxillary sinus (Fig. 1A), as well as orbital cellulitis (Fig. 1B) and areas of air level density (ALD) in the right frontal convexity (Fig. 1C). We suspected mild pneumocephalus with orbital complication due to pansinusitis. On follow up MRI, Air level density in CT showed a diameter of approximately 0.6 cm (Fig. 2A, 2B) and fluid attenuated inversion recovery (FLAIR) iso/high signal intensity. The rim of ALD was enhanced on post contrast T1-weighted image (Fig. 2C). The

ALD appeared to press the dura inward. The spherical shape of ALD led to the suspicion of epidural abscess. Focal pachymeningeal enhancement around the epidural abscess was also observed (Fig. 2D). We reached a diagnosis of pansinusitis, orbital cellulitis and identified the ALD as an epidural abscess. In Otiomeatal Computed Tomography showed pansinusitis without anatomic defect of skull base.

Intravenous (IV) antibiotics (ceftriaxone and metronidazole 4 weeks and nafcillin weeks) were administered for 4 weeks without surgery, sinus puncture and aspiration. Bacterial cultures of the CSF, blood, and purulent post-nasal drip were negative. Headache and fever were dramatically improved and orbital swelling was resolved within 5 days. The size of the abscess has been a noticeable improvement in follow-up MRI (2 weeks after admission, Fig. 3A, B, C). Four weeks later, he had no symptoms and no abnormal MRI finding, except mild maxillary sinusitis. (Fig. 3D, E, F) The patient was treated only medical treatment and discharged with 3rd-generation cephalosporin (cefepodoxime).

Fig.1. Enhanced CT on admission show (A) soft tissue density lesion on right maxillary sinus (B) abnormal extraconal soft tissue infiltration between the right medial rectus muscle and right orbit wall, strongly suggestive of orbital cellulitis. (C) Small sized pneumocephalus on right frontal convexity.

Fig.2. Initial MRI (A) ALD in CT showed a diameter of approximately 0.6cm T1-weighted (TR: 540, TE:13) image low, (B) T2-weighted (TR:4400, TE:111) image high and inward displacement of dura. (C) focal pachymeningeal enhancement and frontal sinusitis in contrasted sagittal T1-weighted image. (D) The rim of ALD was enhanced on post contrast T1-weighted image.

Discussion

The patient had a history of recurrent sinusitis before the onset of this episode. Intracranial and orbital complications occur via direct extension from the sinuses or by hematogenous spread. Approximately 3% of pediatric patients hospitalized with rhinosinusitis develop intracranial complication¹¹. Orbital complications are commonly caused by bacterial ethmoiditis. Intracranial complications can include epidural abscess, meningitis, cavernous sinus thrombosis, subdural empyema, brain abscess and epidural abscess^{1,6}. Epidural abscesses are reported as the predominant intracranial complications of sinusitis in children^{2,3}. Some studies noted an association between frontal sinus disease and intracranial complications². Furthermore, severe osteomyelitis of the posterior wall of the frontal sinus can cause erosion within the epidural space, inducing an epidural abscess¹².

Signs and symptoms of intracranial complications are altered mental status, nuchal rigidity, signs of increased intracranial pressure (headache, vomiting), or signs of cortical damage, loss of consciousness (LOC), seizure, confusion, dysarthria³. Study on intracranial complication with sinusitis in South Africa, showed that 17 patients had extradural empyema (n=17/219), 13 had associated orbital inflammation (76%), and 5 forehead swelling (29%)⁷. Furthermore, total orbital inflammation was

associated with intracranial complications in 91 patients (41.5%), and forehead swelling in 47 patients (21.5%)⁷.

Bacterial pathogens that cause acute sinusitis in children and adolescents include *Streptococcus pneumonia* (30–41%), non typable *Haemophilus influenza* (20–35%), and *Moraxella catarrhalis* (4–20%)^{1,8}. However, 50% of intracranial abscesses are polymicrobial infection¹; and another study identified aerobic and anaerobic mixed infection as common (41% (n=5/12)¹⁰). A recent study suggested that *streptococcus anginosus* infections are more likely to cause severe intracranial complications and permanent neurologic deficits¹¹.

Bacterial cultures of the CSF, blood, and purulent nasal secretion were negative, but ASO titer was elevated in the study patient. Prior to admission oral antibiotics were administered for 2 days.

Diagnosis of intracranial abscess is by brain CT. However, many intracranial complication cases have normal findings on brain CT. A study showed that 50% brain CT results were normal in cases of epidural and subdural abscess due to sinusitis⁹. A Korean publication indicated that 62% (n=5/8) brain CT results were normal, but all the case showed intracranial complication on brain MRI (N=8/8)³.

Antibiotics therapy without surgery is indicated if the abscess is focal (<1.5–2 cm), illness of short duration (<2 wks), and when there are no signs of Increased intra cranial pressure (IICP). A

Fig.3. (A)(B)(C) T2WI(TR:4400, TE:111) at 2 weeks after admission, shows improvement in pansinusitis and a decrease in size of epidural abscess. (D)(E)(F) T2WI(TR:4400, TE:111) at 4 weeks after admission, epidural abscess is not observed and pansinusitis is improved.

combination of vancomycin or nafcillin, a 3rd-generation cephalosporin, and metronidazole are commonly used when the cause is unknown^{1,6}). Nowadays, for use of appropriate antibiotics, intracranial complications due to sinusitis is very rare. But Intracranial complications should be considered, despite normal brain CT results in sinusitis patients with acute onset headache, IICP sign, periorbital or frontal swelling, and multiple sinus involvement. Our case is a good example of successful non-surgical treatment.

요약

부비동염은 소아 및 청소년에서 급성 또는 만성 경과를 보이는 흔한 질환이지만 심각한 안와 또는 두개 내 합병증을 야기할 수 있는 잠재적 위험성이 있다. 하지만 국내에서 부비동염에 동반된 두개 내 합병증이 보고된 경우는 극히 드물다. 환아는 급성 부비동염의 과거력이 있던 환아로 내원 당일로부터 발생한 두통 및 발열증상으로 응급실 내원하여 급성 부비동염 진단 하 항생제 처방 후 귀가 하였던 11세 남아로 2일 후 증상 지속되고 오른쪽 눈의 부종 및 통증 있어 외래 통해 입원하였으며 뇌척수액 검사상 압력 20 cmH₂O 이상 측정된 것 외 특이소견 없었으며 시행한 brain CT에서 범부비동염과 대뇌전엽의 소량의 기저증을 의심할 수 있는 공기수준의 밀도가 관찰되었다. 하지만 이후 시행한 MRI상에서 공기수준의 밀도로 관찰되었던 부위는 전두동 바로 뒤에 발생한 장경 0.6 mm의 두개내 경막외농양으로 진단되었다. 추적검사에서 항생제 치료에 반응 양호하여 이비인후과 및 신경외과적인 수술 치료 없이 4주간 항생제 요법 시행하였다. 항생제 투여 전 시행한 혈액 및 뇌척수액, 간헐적으로 관찰되었던 화농성 후비루에 대한 세균검사는 모두 음성을 보여 원인 병원체를 규명하지는 못하였다. 6주 후 시행한 MRI에서 범부비동염 및 농양은 더 이상 관찰되지 않았다. 항생제의 적절한 사용으로 현재에는 부비동염에 동반된 두개 내 합병증은 매우 드물지만 안와 또는 이마부위가 부어 오르거나 범부비동염, 뇌압증가 소견, 갑작스러운 두통이 있을 경우 CT 소견이 정상이라도 두개 내 합병증을 감별해야 하며 크기가 작고 항생제에 반응이 좋을 경우 비수술적인 치료를 고려할 수 있겠다.

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