

Massive Epidural and Interhemispheric Subdural Emphyema as a Complication of Frontal Sinusitis

Frontal Sinüzit Komplikasyonu Olarak Masif Epidural ve Interhemisferik Subdural Ampiyem

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ABSTRACT

A case report of combined epidural and interhemispheric subdural emphyema as a complication of frontal sinusitis was presented. Chart review of a 14-year-old male with complicated frontal sinusitis was conducted. Intracranial abscess was drained by craniotomy and frontal sinus was managed with endoscopic sinus surgery. Patient recovered with a slight weakness in the lower extremities. Intracranial complications may progress to advanced stages with non-specific symptoms therefore a high index of suspicion is necessary for the early diagnosis of the disease. Eradication of the infective focus is very important in the management of intracranial suppuration. In the absence of osteomyelitis, endoscopic approach can be employed successfully for the treatment of frontal sinusitis.

Keywords

*Subdural emphyema; frontal;
sinusitis; complications*

ÖZET

Frontal sinüzit komplikasyonu olarak gelişen kombine epidural ve interhemisferik subdural ampiyem olgusu sunulmuştur. Frontal sinüzit komplikasyonu olan 14 yaşında erkek hastanın dosya taraması yapılmıştır. İntrakraniyal apse kraniyotomi yolu ile drene edilmiş, frontal sinüzit endoskopik sinüs cerrahisi ile tedavi edilmiştir. Hasta alt ekstremitelerde hafif bir güçsüzlük ile iyileşmiştir. İntrakraniyal komplikasyonlar non-spesifik semptomlar ile ilerlemiş aşamalara ulaşabileceğinden hastalığın erken tanısı için yoğun dikkat göstermek gerekmektedir. İntrakraniyal süpürasyonun tedavisinde infeksiyon odağının eradike edilmesi çok önemlidir. Osteomyelit yoksa frontal sinüzitin tedavisinde endoskopik yaklaşım başarıyla uygulanabilir.

Anahtar Sözcükler

*Subdural ampiyem; frontal;
sinüzit; komplikasyonlar*

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INTRODUCTION

The incidence of intracranial complications of paranasal sinuses has decreased in the last decades however it still carries the risk of permanent sequela and mortality.¹ However morbidity, especially neurological deficits continues to be a major problem in these patients.

In order of decreasing frequency, the intracranial complications of rhinosinusitis are subdural empyema, intracerebral abscess, extradural abscess, meningitis and rarely cavernous and superior sagittal sinus thromboses.^{2,3} Herein, we reported a case of a massive epidural empyema as a complication of sinusitis, hereby, its diagnosis and treatment were discussed.

CASE REPORT

A previously healthy 14-year-old male was hospitalized with headache, fever, vomiting and swelling in both of his eyes. Antibiotic treatment was administered and right orbital abscess drainage was performed. After three days, his general status deteriorated and the patient was transferred to intensive care unit after a successful resuscitation following cardiac arrest. The patient was referred to Hacettepe University Hospital, a tertiary referral center with the diagnosis of brain abscess.

On admission, he was alert and oriented. His right eyelid was edematous and ecchymotic; he had hemiparesis on the right side and 2/5 motor function loss at the distal lower extremity. Laboratory tests yielded an increased white blood cell count of 21.300/ μ L, erythrocyte sedimentation rate of 65 mm/h and sodium level of 128 mEq/L. He was hospitalized and parenteral meropenem, vancomycine, cephotaxim, metronidazole, phenytoin and decort were administered. Fluid and electrolyte replacement support was started. He underwent a cranial magnetic resonance imaging (MRI) which revealed multiple epidural abscesses and a large interhemispheric subdural abscess on the left side of falx cerebri (Figure 1a, 1b). With these findings, epidural abscess was drained with an occipital craniotomy and he was consulted to otolaryngology department. An urgent computerized tomography (CT) scan showed sinusitis in both frontal, right maxillary and ethmoid sinuses. Both frontal sinuses were drained with endoscopic approach. Thick mucopurulent drainage was observed

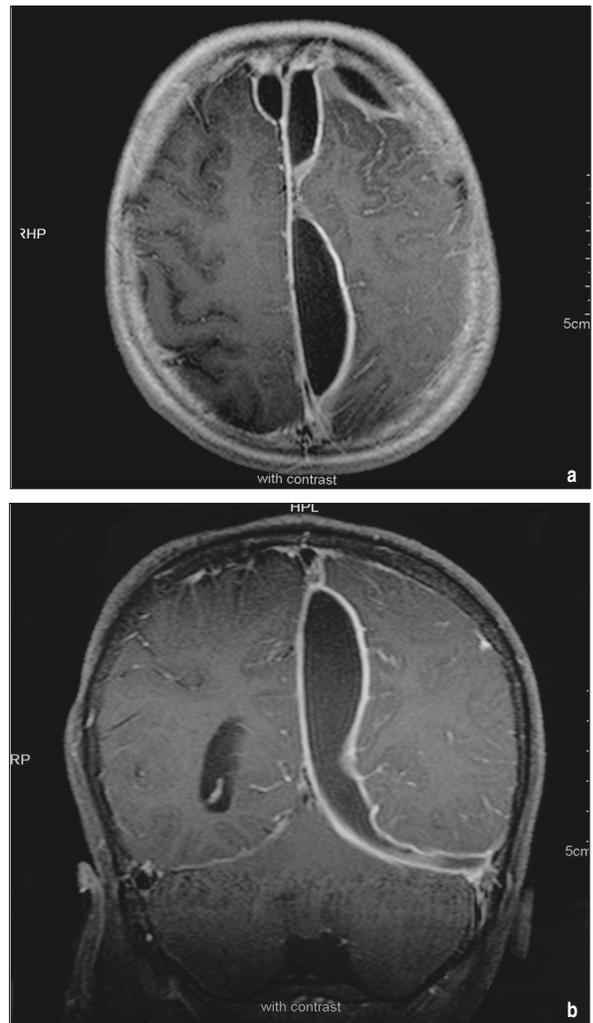


Figure 1. MRI view of interhemispheric subdural abscess (white arrows) a) transverse view, b) coronal view.

when pressure was applied onto frontal sinuses (Figure 2). Draf Type 2b frontal drainage operation was performed under general anesthesia. Postoperatively, antibiotic treatment was continued till 21st day and a control MRI was obtained which revealed resolution of the epidural abscess (Figure 3a, 3b). The patient was discharged on oral antibiotics. The follow-up examination at the 4th week demonstrated that motor function deficit of the lower distal extremity was improved to 4/5.

DISCUSSION

Frontal sinuses are most commonly associated with sinogenic intracranial suppuration, followed in order by the ethmoid, sphenoid and maxillary sinuses.⁴ Infection



Figure 2. Operational view (70° endoscope) of right frontal sinus with mucopurulent drainage (white arrow).

may spread from frontal sinus to intracranial space by direct spread of bacteria through osteomyelitis of the skull, by retrograde propagation of septic thromboemboli (thrombophlebitis) through valveless diploic veins in the posterior table of the frontal sinus (veins of Breschet). If there is history of trauma or there are congenital or surgical defects between the sinuses and cranium, these might be the routes of spread.

The majority of patients reported in the literature are male adolescents.⁵ The increased risk for intracranial complications of sinusitis in adolescence is hypothesized to be due to increased vascularity of the diploic system and rapid development of the frontal sinus in this age group.⁶ The reason for male predominance is unclear.

Symptoms related to frontal rhinosinusitis such as low-grade fever, malaise, frontal headache and forehead tenderness might be absent.^{2,6} Early symptoms of intracranial spread of infection may be nonspecific and may include headache, fever and nausea/vomiting.^{3,4,6,7} Diagnosis is often delayed until advanced symptoms such as motor deficits or seizures develop or until cognitive changes appear. Intracranial complication in the present case was also diagnosed only after these late-onset symptoms developed.

Orbital complications are generally forerunners of intracranial complication and should have warned the clinician in the present case.⁸

Interhemispheric subdural empyema appears to be a very uncommon entity. A clinical “falx syndrome” is characterized by convulsions beginning in the lower ex-

tremity and spreading generally, but sparing the face. Afterwards, hemiparesis develops beginning as sensory disturbance and motor paresis in the lower extremity.⁹

In the diagnostic work up, usually crania CT is the first choice imaging modality which may be normal in up to 50% of patients initially.² Therefore, MRI with gadolinium remains as the gold standard for the diagnosis of sinogenic intracranial complications.¹⁰

Intravenous antibiotic therapy covering streptococci, *S. aureus*, and anaerobes with adequate penetration to the central nervous system should be instituted empirically. Second- or third-generation cephalosporins or metronidazole with clindamycin are the recom-

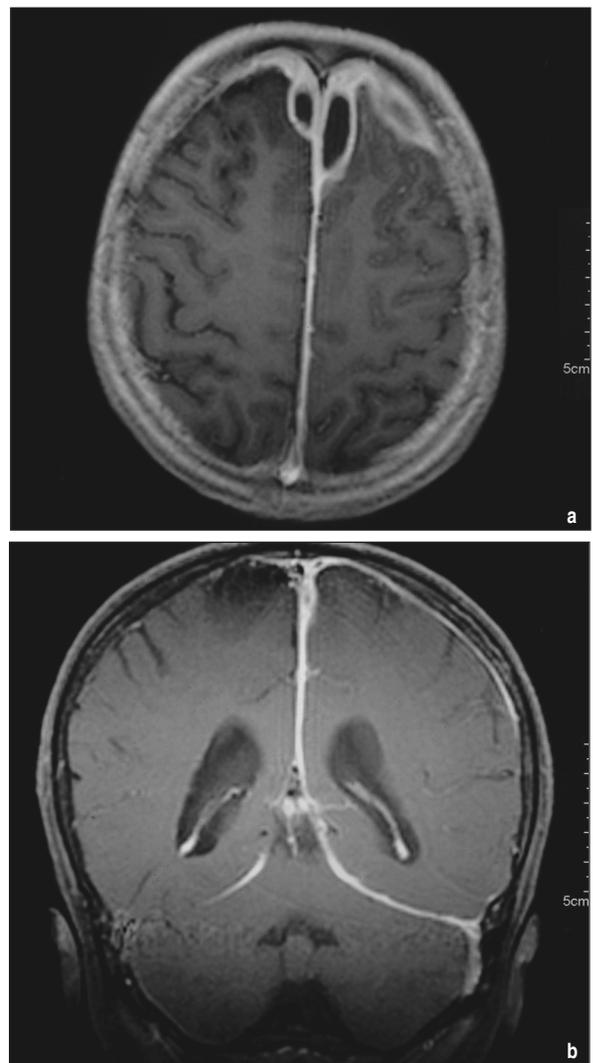


Figure 3. Three weeks after the drainage, interhemispheric subdural abscess resolved. Except the little amount of accumulations (white arrows) in the frontal part which were expected to resolve with antibiotic treatment **a)** transverse view, **b)** coronal view.

mended empirical antibiotics in the treatment of complications of sinusitis. Anti-edematous and antiepileptic drugs may be initiated if necessary.^{4,11} However, empiric antibiotic therapy, may mask symptoms of exacerbation of sinusitis and some neurologic signs.^{11,12} Moreover, initially administered antibiotics may obscure the isolation of bacteria from postsurgical specimens. Hyponatremia may be seen in one third of patients with intracranial suppuration. Appropriate fluid and electrolyte replacement should also be necessary.¹³

Surgical drainage of intracranial infection and suppurative foci is usually required for complete eradication of the disease.^{4,11} Craniotomy is reported to allow better evacuation of pus and decompression when compared to burr hole.¹⁴ However, as in the present case, elimination of sinus pathology is a rule in order to achieve cure.

Recent reports of sinogenic intracranial infection emphasize the use of endoscopic approach for the eradication of sinus infection.¹⁵ Endoscopic approach has advantages of avoidance of facial scars, preservation of the bony superstructure of the frontal sinus infundibu-

lum and preservation of greater amount of mucosa therefore maintaining the anatomic frontal sinus drainage. As superior, lateral and anterior walls of frontal sinus may not be reached adequately by endoscopic procedure, this technique should be limited to a group of patients without osteomyelitis.

Otorhinogenic empyemas have relatively better outcomes with some improvement in neurological function in almost every case (60% of patients exhibited deficits at admission, compared with a final morbidity rate of 25.9% for the entire series).¹⁴ Neurologic signs were also recovered significantly in our case.

Intracranial complications may progress to advanced stages with non-specific symptoms therefore a high index of suspicion is necessary for the early diagnosis of the disease. On the other hand, infective focus, which is the frontal sinus in most of the cases, may be treated by endoscopic approach provided that there is no sign of osteomyelitis. A rare case of subdural empyema as a complication of sinusitis was presented in order to raise the level of suspicion in similar cases.

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