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

ABSTRACT

A case report of combined epidural and interhemispheric subdural empyema 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 empyema; frontal; sinusitis; complications

ÖZET


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Subdural ampiyem; frontal; sinüzit; komplikasyonlar
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. 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. 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/µL, erythrocyte sedimentation rate of 65 mm/h and sodium level of 128 mEq/L. He was hospitalized and parenteral meropenem, vancomycin, 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 falk 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. Thick mucopurulent drainage was observed 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. Infection
may spread from frontal sinus to intracranial space by
direct spread of bacteria through osteomyelitis of the
skull, by retrograde propagation of septic thromboem-
boli (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 con-
genital or surgical defects between the sinuses and cra-
nium, these might be the routes of spread.

The majority of patients reported in the literature
are male adolescents. The increased risk for intracra-
nial complications of sinusitis in adolescence is hy-
pothesized to be due to increased vascularity of the
diploic system and rapid development of the frontal
sinus in this age group. The reason for male predomi-
nance is unclear.

Symptoms related to frontal rhinosinusitis such as
low-grade fever, malaise, frontal headache and forehead
tenderness might be absent. Early symptoms of in-
tracranial spread of infection may be nonspecific and
may include headache, fever and nausea/vomiting.
Diagnosis is often delayed until advanced symptoms
such as motor deficits or seizures develop or until cog-
nitive 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.

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.

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

Intravenous antibiotic therapy covering strepto-
cocci, S. aureus, and anaerobes with adequate penetra-
tion to the central nervous system should be instituted
empirically. Second- or third-generation cephalosporins
or metronidazole with clindamycin are the recom-
mendation.
mended empirical antibiotics in the treatment of complications of sinusitis. Anti-edematous and antiepileptic drugs may be initiated if necessary. However, empiric antibiotic therapy, may mask symptoms of exacerbation of sinusitis and some neurologic signs. Moreover, initially administered antibiotics may obscure the isolation of bacteria from postsurgical specimens. Hyponatremia may be seen in one third of patients with intracranial suppurative drainage. Appropriate fluid and electrolyte replacement should also be necessary.

Surgical drainage of intracranial infection and suppurative foci is usually required for complete eradication of the disease. Craniotomy is reported to allow better evacuation of pus and decompression when compared to burr hole. 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. Endoscopic approach has advantages of avoidance of facial scars, preservation of the bony superstructure of the frontal sinus infundibulum 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 neurologic 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). 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.

REFERENCES