

Case Report

Rapidly progressing interhemispheric subdural empyema showing a three-fold increase in size within 12 hours: Case reportMehmet O. Yüksel, Mehmet S. Gürbüz¹, Numan Karaarslan², Tezcan Caliskan²Department of Neurosurgery, Erzurum Bolge Training and Research Hospital, Erzurum, ¹Department of Neurosurgery, Safa Hospital, Istanbul, Turkey, ²Department of Neurosurgery, Namık Kemal University Faculty of Medicine, Tekirdag, TurkeyE-mail: Mehmet O. Yüksel - dr.onur_yksl@hotmail.com; *Mehmet S. Gürbüz - mehmetsabrigurbuz@gmail.com;Numan Karaarslan - numikara@yahoo.com; Tezcan Caliskan - dtzcan_07@hotmail.com

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Abstract**Background:** Subdural empyema is a rare form of intracranial infection. It is described as accumulation of purulent infective material between the inner layer of dura mater and outer layer of arachnoid membrane.**Case Description:** A 17-year-old girl was admitted to the emergency department with acute left hemiplegia and was diagnosed with interhemispheric subdural empyema that showed a three-fold increase in size within 12 hours. Complete recovery was achieved with emergency surgical evacuation and additional 3 weeks of antibiotic treatment.**Conclusion:** Subdural empyema should be diagnosed and managed early in time since it may progress very rapidly and can cause high morbidity and mortality. Complete recovery can be achieved if it is diagnosed early and treated in time.**Key Words:** Increase in size, interhemispheric, rapidly progressing, subdural empyema**Access this article online****Website:**www.surgicalneurologyint.com**DOI:**

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Quick Response Code:**INTRODUCTION**

Subdural empyema is an intracranial infection characterized by the accumulation of infective material between the inner layer of dura mater and outer layer of arachnoid membrane.^[1,6] Subdural empyema accounts for 15–25% of all intracranial infections.^[8,9] It may develop secondary to infections of the middle ear and paranasal sinuses. Subdural empyema may also occur as a complication of brain abscesses and cranial operations that involve paranasal sinuses.^[3,4,12]

Timely diagnosis and treatment of subdural empyema is very essential since it can progress very rapidly and can cause severe neurological impairment. Full recovery can be achieved when it is diagnosed and treated in time.^[4,5,13] Any delay in the diagnosis or management may result in considerable morbidity and mortality.^[5] Here, we report the case of a 17-year-old girl admitted to the emergency

department with acute hemiplegia who was diagnosed with interhemispheric subdural empyema that showed a three-fold increase in size within 12 hours of admission.

CASE REPORT

A 17-year-old girl was admitted to the emergency department with the complaint of rapidly progressing

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weakness of her left arm and leg. Her medical history was unremarkable other than a history of intermittent sessions of antibiotic treatment for sinusitis. Her physical examination revealed a temperature of 37.6°C, pulse of 96, respiratory rate of 14, blood pressure of 118/74 mmHg, and an oxygen saturation of 100% on room air. Her head and neck examination demonstrated no sign of meningeal irritation, but showed sinus tenderness. She had left hemiplegia with a Glasgow coma score of 15 and normal pupillary examination.

Laboratory examination revealed elevated erythrocyte sedimentation rate (80 mm/h), a high level of C-reactive protein (7.8 mg/L), with $16 \times 10^9/L$ white blood cells and 84% neutrophils. Cranial computed tomography (CT) and cranial magnetic resonance imaging (MRI) scans of the patient revealed interhemispheric subdural empyema and accompanying frontal and paranasal sinusitis [Figure 1a-f]. At the 12th hour of admission, during observation in the inpatient clinic, she had a tonic-clonic seizure lasting for 2 minutes. She was taken to the intensive care unit, an anticonvulsive was started, and a new cranial CT scan was taken. This cranial CT scan revealed interhemispheric subdural empyema with a three-fold increase in size within 12 hours compared to the CT taken on admission [Figure 2].

The patient was immediately taken to the operating theatre and subdural empyema was evacuated via parasagittal interhemispheric approach. Bone flap was not repositioned because it was seen to be contaminated with the infective material. Postoperative CT scan of the patient revealed that the empyema had been evacuated successfully [Figure 3]. Ceftriaxone (at a dose of 100 mg/kg/day), metronidazole (at a dose of 7.5 mg/kg every 6 hours), and vancomycin (at a dose of 15 mg/kg every 6 hours) were given empirically for 3 weeks. No microbial yield was detected in the culture of the material evacuated from interhemispheric subdural space. After 3 weeks of antibiotic treatment and close observation, clinical and laboratory examinations of the patient confirmed successful treatment of empyema, and the patient was discharged from the hospital with no neurological deficit.

DISCUSSION

The most common causes of subdural empyema are meningitis in children and otolaryngeal infections in adults.^[2,7,9] History of trauma and cranial operations involving sinuses are other causes of subdural empyema. Subdural empyema should be considered in patients who have a history of meningitis, otolaryngeal infections,

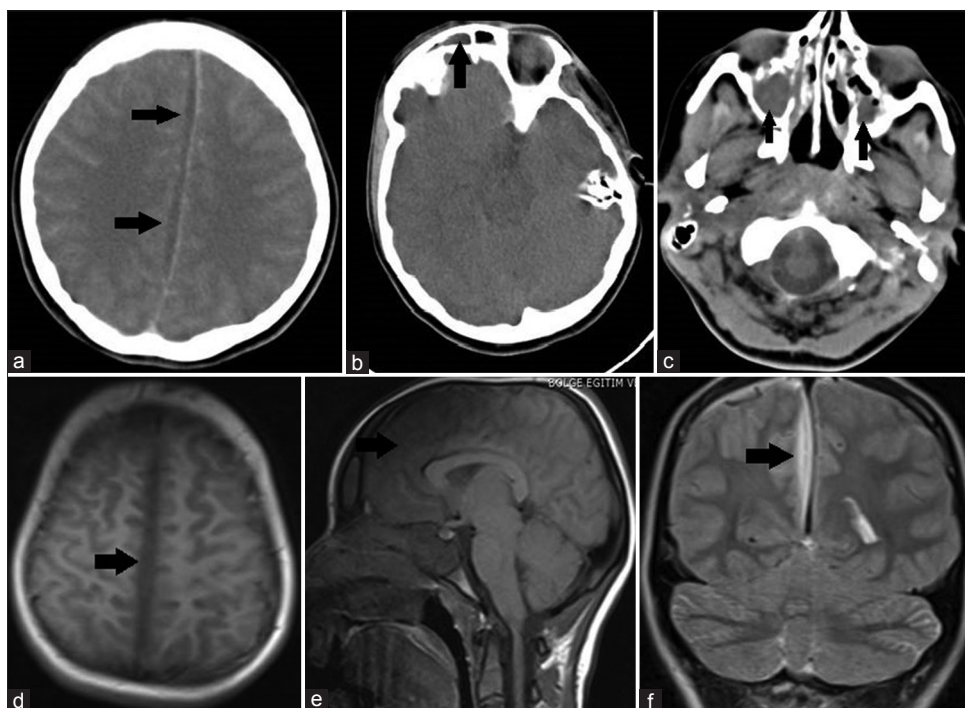


Figure 1: (a) Contrast-enhanced cranial axial computed tomography (CT) scan immediately taken on admission reveals interhemispheric subdural empyema indicated with black arrows. (b) On cranial axial CT scan immediately taken on admission, black arrow indicates frontal sinusitis. (c) On cranial axial CT scan immediately taken on admission, black arrows indicate bilateral paranasal sinusitis. (d) Cranial T-1 weighted axial magnetic resonance imaging (MRI) scan taken on admission reveals interhemispheric subdural empyema indicated with black arrow. (e) Cranial T-1 weighted sagittal MRI scan taken on admission reveals interhemispheric subdural empyema indicated with black arrow. (f) Cranial T-2 weighted coronal MRI scan taken on admission reveals interhemispheric subdural empyema indicated with black arrow

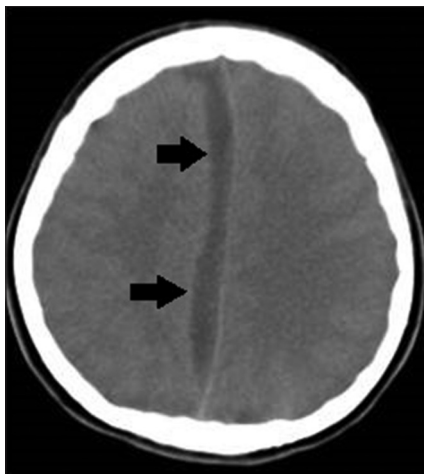


Figure 2: On cranial axial computed tomography scan taken following seizure, at the 12th hour of admission, reveals a 3-fold increase in the preexisting interhemispheric subdural empyema, indicated with black arrows

trauma, and cranial operations because they are predisposing factors for the development of subdural empyema.^[5,12,13] In case of prolonged fever, convulsion, focal neurological deficit, or altered consciousness in such patients, the likelihood of subdural empyema should be kept in mind. The history of untreated sinusitis was the most probable risk factor in the etiology of subdural empyema in our case.

CT and MRI are the diagnostic tools of choice in subdural empyema.^[1,7] Even though subdural empyema can usually be diagnosed with CT, the diagnosis may be overlooked in mild cases. They may mimic subdural hematoma in the early periods when capsulation has not been completed yet.^[5,8] MRI has high sensitivity in the detection of small subdural empyemas and high specificity in differentiating subdural empyema from subdural effusion.^[1] In our case, the diagnosis was made with CT scan whereas MRI was utilized for excluding other possible etiologies and for establishing an accurate surgical plan.

The goal of the treatment is the complete evacuation of the empyema and successful treatment of infection.^[4,5,7] Medical therapy alone may be effective in selected cases. However, an additional antibiotic treatment regime is usually required following the surgical evacuation of empyema. When infections of the paranasal sinuses are considered in the etiology, antibiotic treatment should be covering both gram negative and gram positive bacteria. A broad-spectrum antibiotic regime was administered to our patient following surgery.^[2,6,7,10] Because there was no microbial yield in cultures of our case, ceftriaxone, vancomycin, and metronidazole were administered empirically to cover both aerobic and anaerobic pathogens.

Debate still exists regarding the ideal surgical technique. Though successful results with burr-hole drainage have

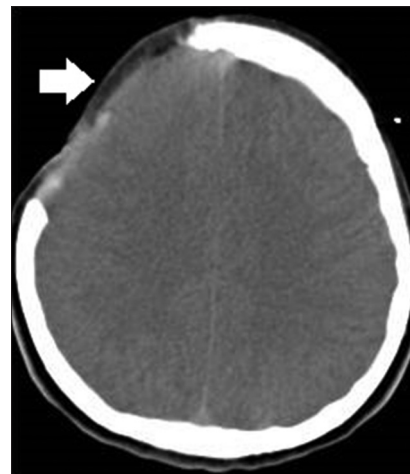


Figure 3: Postoperative cranial axial computed tomography scan reveals successful evacuation of interhemispheric subdural empyema. White arrow indicates the right parasagittal craniotomy defect

been reported, surgical evacuation via craniotomy is still the most commonly preferred technique.^[1,4,13] Craniotomy has the advantages of wide exposure, complete evacuation of purulent material, and chance of reaching intracranial spaces that are nonviable with burr-hole.^[7,8] Gordon *et al.*^[3] reported better results in cases operated via craniotomy than the cases operated via burr-hole drainage. Our case was a rapidly progressive subdural empyema reaching a large size in a relatively short time. For this reason, we evacuated subdural empyema via a parasagittal craniotomy and achieved successful evacuation of empyema.

Because of improved diagnostic tools such as CT and MRI, early diagnosis and treatment has reduced the morbidity and mortality rates.^[1,5,7] However, confirming the diagnosis may still be very difficult since the symptoms might be very mild at the beginning. Rapid diagnosis and management are very crucial in subdural empyema because timely diagnosis and management give the patient a chance of full recovery with little or no neurological impairment.^[2,6] On the other hand, delayed establishment of the diagnosis may result in a dramatical outcome. In our case, the diagnosis was made early in time and rapid progression was detected on second cranial CT. Emergency evacuation of subdural empyema and additional antibiotic treatment resulted in the complete recovery of the patient.

CONCLUSION

It should be noted that subdural empyema may have a rapidly progressive course, reaching a relatively large size in a very short time. Nonetheless, subdural empyema can be treated with excellent results in case of early diagnosis and timely management.

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Conflicts of interest

There are no conflicts of interest.

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