

Cerebrovascular complication of infective endocarditis complicated with abdominal trauma

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A 9-year-old boy presented to the emergency department with blunt abdominal trauma. Initial assessment was normal except for abdominal tenderness. On day 3, patient was transferred to the pediatric intensive care unit (PICU) for hemodynamic instability, and persistent fever despite antibiotic therapy. On PICU admission, his body temperature was 40 °C, heart rate was 160/min, respiratory rate was 36/min, blood pressure was 85/40 mmHg, and impaired consciousness was noticed. Complete blood count revealed hemoglobin of 11.5 g/dl, white blood cell count of 22,500/mm³ and platelet count of 145,000/mm³. Serum C-reactive protein and procalcitonin were 139 mg/dl and 8.80 ng/ml, respectively. Renal and liver function test results were normal. Cranial magnetic resonance imaging (MRI) was planned because of impaired consciousness and fever. On cranial MRI, multiple infarct areas were detected in both hemispheres and minimal hemorrhagic focus was found in the left temporal region. Because of the cranial MRI findings and fever echocardiographic examination was planned to exclude infective endocarditis. Transthoracic echocardiography successfully visualized mitral valve prolapse, 14x8 mm mobile vegetation on the atrial side of the posterior leaflet of the mitral valve, and severe mitral regurgitation. The left chambers were dilated. There was no evidence of a perivalvular abscess. On control transthoracic echocardiography, after 6 weeks of parenteral antibiotic treatment, there was no significant reduction of the visible vegetation therefore surgery was planned. Infective endocarditis should be considered in the differential diagnosis of fever of unknown origin. Especially during the early stage of disease, cranial MRI may be more useful to prevent fatal complications for patients with neurologic examination findings.

Key words: infective endocarditis, magnetic resonance imaging, cerebrovascular complication.

Infective endocarditis (IE) with an estimated rate of 0.34-0.64 cases per 100,000 per year, is considered as an uncommon disease in childhood¹. However, its higher rates of morbidity and mortality despite of long-term parenteral antibiotic treatment and related complications make it a serious disease in children^{2,3}. The most significant complications of IE are congestive heart failure and cerebrovascular complications (CVC). CVC frequently occur in patients with the active stage of IE, and result from septic embolization of endocardial vegetation. CVC are generally

accepted as a poor predictors of prognosis, and patients with IE have increased mortality^{1,3}. In this case, we present CVC of IE complicated by blunt abdominal trauma.

Case Report

A 9-year-old boy was referred to the pediatric surgery clinic with blunt abdominal trauma. It was learned that the patient lost consciousness and fell in the bathroom 2 days previously. He had no fever or systemic symptoms of chills or poor appetite before this incident. On the physical examination, all vital signs

were normal except for abdominal tenderness. Cranial computed tomography (CT) revealed a contusion in the left temporal region and abdominal CT showed a laceration on the spleen and posterior aspect of the right kidney. The patient was transferred to the pediatric intensive care unit (PICU) on day 3 for hemodynamic instability, and persistent fever despite antibiotic therapy. On PICU admission, his body temperature was 40°C, heart rate was 160/min, blood pressure was 85/40 mmHg, respiratory rate was 36/min and impaired consciousness was noticed. Complete blood count revealed hemoglobin of 11.5 g/dl, white blood cell count of 22,500/mm³ and platelet count of 145,000/mm³. Serum C-reactive protein and procalcitonin levels were 139 mg/L and 8.80 ng/ml, respectively. Renal and liver function test results were also normal. On cranial MRI, multiple infarct areas were detected in both hemispheres and there was minimal hemorrhagic focus in the left temporal region; these results were different from those found on cranial CT (Figs. 1 and 2). Because of cranial MRI findings and persistent fever, echocardiographic examination was planned to exclude IE. Transthoracic echocardiography successfully visualized mitral valve prolapse, mobile 14x8 mm vegetation on the atrial side

of the posterior leaflet of the mitral valve, and severe mitral regurgitation. The left chambers were dilated (Fig. 3). Serial blood culture detected *Staphylococcus aureus* (*S. aureus*). There was no evidence of a perivalvular abscess. After 6 weeks of parenteral antibiotic treatment, control transthoracic echocardiography showed no significant reduction in the visible vegetation; therefore, surgery was planned.

Discussion

The true incidence of neurologic complications is difficult to assess because few studies used systematic neuroimaging. Cranial MRI is necessary to facilitate diagnosis, especially during the early stage, and reveal cranial lesions in IE. MRI revealed broader involvement of the brain than indicated by clinical signs and/or CT scan^{4,5}. MRI also permitted better evaluation of the embolic nature of the vegetation⁶.

In our patient, fever and impaired consciousness were more important clinical findings, as was abdominal blunt trauma. Fever, possibly low-grade and intermittent, is present in 90% of patients with IE⁷. However, heart murmurs are found in up to 85 %, and new murmurs have been recently reported in 48 %^{7,8}. The diagnosis of IE should also be considered for

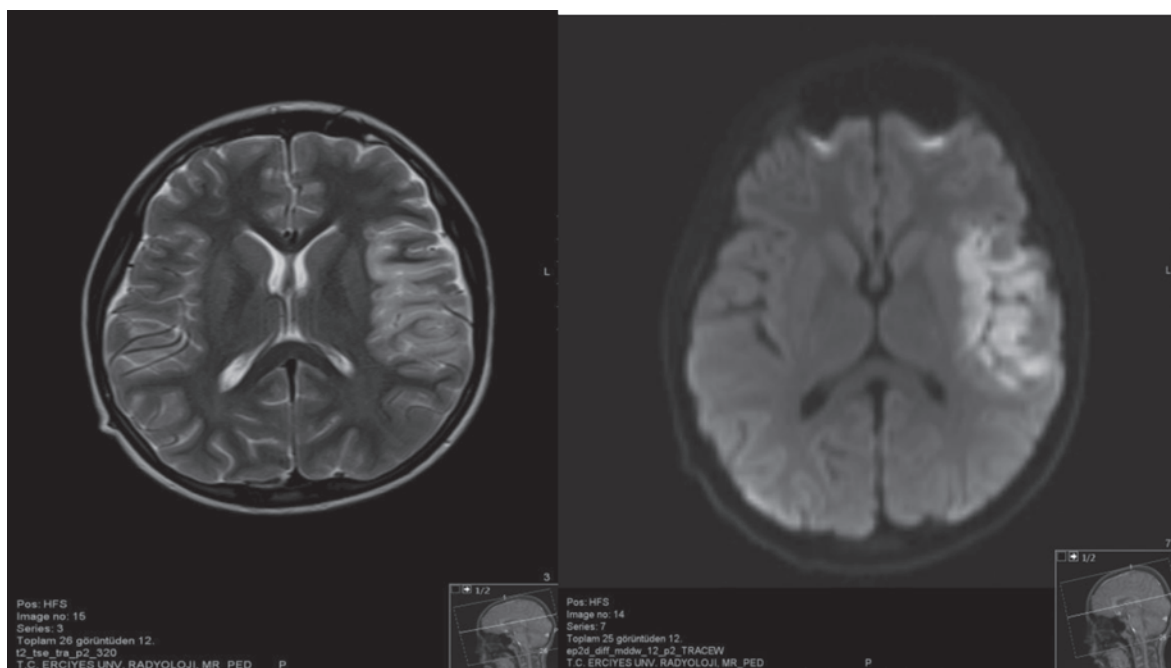


Fig. 1-2. Multiple infarct areas were detected in both hemispheres and minimal hemorrhagic focus in the left temporal region in T2 and diffusion weighted imaging.

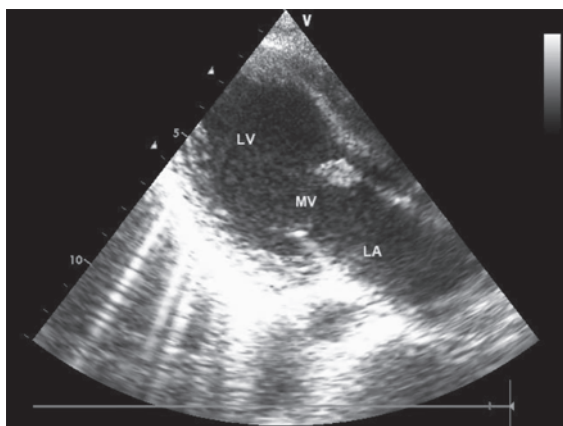


Fig. 3. Transthoracic echocardiography successfully visualized mitral valve prolapse: 14x8 mm mobile vegetation on the atrial side of the posterior leaflet of the mitral valve, and severe mitral regurgitation

patients with a stroke or transient ischemic attack and fever, as in our case. We performed cranial MRI to evaluate neurologic dysfunction in detail. On cranial MRI, multiple infarct areas detected in both hemispheres and minimal hemorrhagic focus in the left temporal region were viewed differently than on cranial CT. Because of these findings, we performed echocardiographic examination and detected mitral valve prolapse, 14x8 mm mobile vegetation on the atrial side of the posterior leaflet of the mitral valve, and severe mitral regurgitation. Mitral valve prolapse is the one of most common heart diseases predisposing to infective endocarditis^{9,10}.

Patients with IE are generally referred to the intensive care unit for one or more organ dysfunctions caused by complications of IE, as in our case. Neurologic complications such as stroke, transient ischemic attack, bacterial meningitis and cerebral embolism are the most severe extracardiac complications of IE^{6,11}. Many of these occur early during the course of IE and are considered major risk factors for increased mortality and morbidity. Therefore, early diagnosis and appropriate medical treatment are essential¹¹⁻¹³. We diagnosed IE on the first day of intensive care hospitalization (the third day of admission).

The timing of surgery for IE sometimes may be difficult to determine. Embolic complications may be seen during any stage of IE; they mostly occur before diagnosis or within 2 weeks after diagnosis. Several studies performed in relation

to the timing of surgery have confirmed that embolic risk decreases dramatically during or after the first 2 to 3 weeks of successful antibiotic therapy¹⁴⁻¹⁶.

The International Collaboration on Endocarditis demonstrated that the incidence of stroke in patients receiving appropriate antimicrobial therapy was 4.8/1000 patient-days during the first week of therapy; this decreased to 1.7/1000 patient-days during the second week and became lower thereafter¹⁷. Our patient's vital signs and clinical situation remained stable after starting antibiotic treatment; therefore intervention was postponed in the short term to allow a brief period of antibiotic therapy under careful clinical and echocardiographic observation.

The rate of IE related CVC is increased in patients with *S. aureus* and fungal infection, vegetation >1 cm, and mitral valve IE such as in our patient. Early and prompt initiation of antibiotic therapy has been the most effective therapy to reduce the rate of the septic embolism¹².

In conclusion, IE may present with many different scenarios and sometimes may be masked by other symptoms, as in our case. Therefore, IE should be taken into consideration in the differential diagnosis of fever of unknown origin to prevent fatal complications.

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