Introduction

The first sinusitis related Intracranial Epidural Hematoma (IEH) was reported by Kelly in 1968 and the most recent was a review article in 2014 by Aviner et al. [1,2]. As IEH generally occurs due to trauma, rarely coagulation defects, dural vascular malformations, craniofacial tumors and intracranial infections should be investigated. With this case our aim was to report a rare case of pediatric intracranial epidural hematoma as a result of sinusitis.

Keywords: Epidural; Hematoma; Pansinusitis

Case Presentation

A fifteen year old male patient presented with rhinorrhea, fever, headache and swelling of the forehead. No history of trauma or bleeding disorders was present. There was no other neurological finding other than neck rigidity. The laboratory findings were as follows: C-Reactive Protein (CRP) 51.4 mg/L (reference range 0 to 6), WBC: 11.88 K/mm³ (reference range 4.5 to 11), Mon: 13.27% (reference range 3% to 8%), Baso: 0.79% (reference range 0% to 3%). Coagulation panel, liver and kidney function tests, and electrolytes were all normal. On Computerized Axial Tomography Scan of the Brain (CT); on the left frontal area a highly attenuated epidural collection with 27 mm thickness, and millimetric air densities compatible with hemorrhage were detected. Maxillary, ethmoidal and frontal sinusitis were also present (Figures 1a-1c). On the Magnetic Resonance Imaging of the Brain (MRI); a hyperdense left frontal epidural hemorrhagic collection with millimetrica air densities, accompanied by infection, thickening of the neighbouring dura and contrast enhancement, maxillary, ethmoidal and frontal sinusitis (Pansinusitis) was detected (Figure 2). The patients were operated, and the hematoma discharged with a burr-hole. The specimens obtained from the hematoma were evaluated on direct microscopy; showing 95% of polymorphonuclear leucocytes, 4% of lymphocytes. No microorganisms were grown on culture.

In the postoperative period the patient was admitted to the pediatric department for antibiotic treatment without any neurological deficits. After a 14 days course of empirical Ceftriaxone, Metronidazole and Vancomycin treatment CRP was <3 mg/L, WBC 9.15 K/mm³ and the patient was discharged in a good general condition. In one month follow-up the patient’s cranial CT findings were compatible with postoperative findings (Figure 3).

Discussion

In the neurosurgical practice IEH is a condition that needs fast diagnosis and emergency surgery. On contrary the possibility of morbidity and mortality is very high. It is known to occur often due to trauma. Otherwise, rarely the causes are bleeding disorders, dural vascular malformation, neighbouring infections and tumors [3,4].

Sinusitis, may lead to intracranial complications such as meningitis, subdural abscess/empyema, epidural abscess/empyema, cerebral abscess, deep and superficial vein thromboses [5-8]. However IEH is a rare condition caused by sinusitis.

In previous cases of sinusitis and intracranial epidural hematomas various microorganisms (Hemophylus influenzae, Staphylococcus aureus, Streptococcus anginosus ve miliyeri, Pseudomonas...
cepacia) have been grown in the cultures from the specimens obtained from the hematoma during surgery [2]. This could also be one of the theories proving that IEH is caused by sinusitis through neighbouring.

The mechanism of sinusitis that leads to IEH has not yet been clearly described. It was tried to be explained with the process of retrograde advancement of inflammation through the diploic vascular canals reaching the intracranial space and rupturing the vessel via inflammation [5,8].

It can be envisioned that sinusitis erodes the posterior wall of the frontal sinus, and chronic polymorphonuclear infiltration and irritation causes the vessels in the epidural space to rupture. In our case it is in our opinion that the inflammation reached the epidural area eroding the vessels and causing IEH. The free air densities in the intracranial space supports the theory that sinusitis may have eroded the posterior wall of the frontal sinus. As a matter of fact, in Aviner et al. [2] review, 13 patients were included of which 9 were children; thus the thin bone structure at this age group makes us believe that inflammation leads to sinus wall erosion more easily [2]. This also supports our theory.

The patient history should be integrated with radiological findings. Headache, fever and neurological findings; hemorrhage and air densities on CT and MRI, contrast enhancement of the paranasal sinuses and the dura, bone destruction or osteomyelitis are all findings that would help make the diagnosis [2].

**Conclusion**

High fever, headache and change in mental state particularly in childhood should suggest of sinusitis and IEH as a complication. Emergency surgery after a fast diagnosis is of ominous significance. On contrary besides the morbidity and mortality; more difficult to treat and fatal complications such as epidural/subdural empyema, cerebral abscess may develop.

**References**