CASE REPORT

DELAYED POSTTRAUMATIC UNILATERAL OCCIPITAL EPIDURAL HYGROMA IN EARLY CHILDHOOD

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ABSTRACT
An extremely rare case of posttraumatic epidural hygroma in the left occipital supratentorial and infratentorial region is reported. A year and five months old child was admitted to the Clinic of Neurosurgery with sustained occipital head injury. She presented with drowsiness and vomiting due to intracranial hypertension. Initial computed tomography scan revealed left-sided fracture of the squamous part of the occipital bone without associated traumatic changes to the brain. A second spiral computed tomography scan was obtained two days later because of persisting symptoms of increased intracranial pressure. It demonstrated a newly formed left-sided epidural hygroma adjacent to the skull fracture in the left supratentorial and infratentorial occipital region. The case is discussed with emphasis on the mechanism of formation of epidural hygroma and an attempt has been made to outline the major predisposing factors leading to the development of this traumatic disease. Necessity for computed tomography follow-up is pointed out in order to diagnose delayed posttraumatic hygromas. The recommended surgical approach should include craniotomy centered at the site of the epidural hygroma and obligatory dural elevation by means of traction sutures to eliminate the posttraumatic epidural cavity.

Key words: epidural hygroma, occipital skull fracture, posterior cranial fossa

INTRODUCTION
Less than 3% of head injuries involve the posterior cranial fossa (PCF).1 Few cases of subdural hygroma in PCF in children had been described until now.2 Cerebrospinal fluid (CSF) accumulation in PCF causes rapid clinical deterioration as a result of compression on the brain stem and fourth ventricle.3,4 The patients with occipital skull fracture and vomiting must be closely observed and followed up by CT, even if the initial scan is negative in order to exclude the development of delayed posttraumatic lesions.5

We report on a case of unilateral epidural hygroma in the left infratentorial and supratentorial occipital region. Only three cases of epidural hygroma has been reported in the world medical literature and none has been described in our literature.6-8

CASE REPORT
A year and five months old girl was admitted to the Clinic in Neurosurgery, having sustained occipital head injury 9 hours earlier. While playing, the child fell down the stairs, hit her head in the occipital area and lost consciousness for 5 minutes. Soon she regained full alertness but was anxious and vomited repeatedly. At the regional hospital plain skull X-rays followed by brain CT had been performed. CT scan showed left-sided skull fracture of the occipital squama without injury to the brain parenchyma. A subtle hypodense sickle-like lesion adjacent tightly to the skull fracture had been initially considered as normal (Fig. 1A). The child was later transferred to our clinic because of gradual clinical deterioration including somnolence, vomiting, subcutaneous swelling in the occipital region and fever up to 38°C.

Initial antiedematous treatment failed to improve child’s condition and she underwent a second spiral brain CT. It clearly demonstrated evidence of hypodense extracerebellar CSF effusion in the left supratentorial and infratentorial occipital region with density similar to that of the CSF (5 Hounsfield Units) and associated small cortical contusion-haemorrhagic lesion in the left occipital lobe. The bone window confirmed the presence of left occipital skull frac-
ture with well-visible depressed bone fragment in the PCF area (Figs 1B, 1C, 1D).

**Surgery**

A single burr hole was placed in the left paramedian occipital area. The dura mater was bluish in color. Its incision revealed contused occipital lobe cortex without subdural collections. Subsequently, the craniectomy was extended caudally toward the left suboccipital region. We came across a fracture line with detached periosteum from the external cranial lamina in this area, forming a subperiosteal cavity, filled with slightly xanthochromatous CSF. After elevation of the periosteum, the CSF collection started to flow out under high pressure from the subperiosteal cavity at first and then through the fracture line which run obliquely in caudal direction. The dura mater was thinned without

![Figure 1](image_url)

**Figure 1.** A: An initial CT image showing left-sided fracture of the occipital squama with discrete adjacent hypodense sickle-like lesion (black arrows). B: Presence of depressed bone fragment in the PCF (black arrows). C: Sagittal spiral CT reconstruction showing the supra-infratentorial localization of the epidural hygroma as well as its extracranial propagation through the fracture line (black arrows). D: Left occipital epidural effusion with a density of 5 Hounsfield Units (black arrows).
apparent tear. It was separated from the internal lamina of the occipital squama on a broad extent around the fracture line. After the evacuation of approximately 70-80ml of CSF, an epidural dead space, measuring 5cm by 4.5cm, was formed which necessitated the circumferential application of duroperiosteal traction sutures at the craniectomy site to eliminate it.

Postoperative Period

During the next few days, there was a marked amelioration in the child's clinical condition. She regained consciousness, neurological and physical examinations were intact, the subcutaneous swelling subsided entirely and the child returned her daily routine. A postoperative spiral CT of the head confirmed the evacuation of the epidural hygroma (Fig. 2). Follow-up examinations on the 1st and 6th postoperative month did not reveal neurological abnormalities. The child had normal physical and psychomotor development. Electroencephalogram performed at 6th postoperative month was also normal.

Discussion

It is well known that a great percentage of depressed skull fractures can cause a tear of the brain meninges. CSF accumulation in the epidural space requires an impairment of the integrity of both dura and arachnoid mater. Subdural CSF collections have been described as a result of neurosurgical procedures but epidural accumulation was not observed in these cases. Perhaps, this is due to the fact that the outer layer of the dura is tightly adherent to the internal cranial lamina and the CSF circulates freely in both directions.

In order to form “free” space for epidural CSF accumulation, the dura mater have to be separated from the internal cranial lamina at the time of head injury. In the case described by K. S. Mann et al., it had been attributed to the formation of a small blood clot. In our case, the separation of dura mater is probably a result of the depressed bone fragment which additionally had torn the underlying dura and arachnoid mater on a minimal extent in close vicinity to cisterna magna (Fig. 1B). It is precisely the disruption of the integrity of the meninges that can facilitate the formation of a ball-valve mechanism, allowing one-way CSF escape toward the epidural space under the pressure generated by brain pulsations. The findings from the CT scans support the above mentioned mechanism. There is no visible epidural CSF accumulation on the first CT scan obtained soon after the head injury (Fig. 1A), whereas on the second CT scan, approximately 48 hours later, the epidural CSF collection is obvious (Figs. 1C, 1D). A similar hypothesis for a ball-valve mechanism was shared by K. S. Mann et al.

As the case reported by J. Vilalta et al., our patient had no focal neurological deficit which is typical of space-occupying process in the PCF. It is probably due to the pathological communication between the epidural and the extracranial space via the fracture line which results in extracranial CSF outflow and leads to partial spontaneous decompression (Fig. 1C). The enlargement of the subcutaneous swelling in the preoperative period as well as the intraoperatively verified subperiosteal cavity filled with CSF give additional proof of that.

We would like to draw reader's attention to the striking similarities between our case and those described by K. S. Mann et al. and J. Vilalta et al. Each case presents children less than 2 years old who had sustained direct head trauma to the occipital region causing skull fracture in the PCF and the presence of subcutaneous swelling overlying the fracture zone.

In general, the weaker adhesion of dura mater to the internal cranial lamina in children predisposes its separation at the time of head injury. The

Figure 2. Postoperative spiral CT scan which confirms the evacuation of the epidural hygroma.
minimal tear of dura and arachnoid mater in close proximity to cerebellomedullary cistern creates favourable conditions for one-way CSF leakage into the epidural space under the pressure generated by brain pulsations.

REFERENCES