

## Rapid Resolution of A Traumatic Venous Epidural Hematoma In A 4-Year-Old Child: Illustrative Case

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### ABSTRACT

**Background :** Posterior fossa epidural hematoma rarely occurs in children after traumatic head injury. There is ongoing discussion about appropriate treatment, yet the radiological features regarding the time to resorption of the hematoma or required follow-up imaging are rarely discussed. **Observations :** We present the case of a 4-year-old child who was under clinical observation and receiving analgetic treatment in whom near-complete hematoma resorption was shown by brain CT scan imaging as soon as 24 hours after diagnosis. The child was neurologically stable at all times and showed no deficit after observational treatment. Hematoma resorption was much faster than expected. We discussed hematoma drainage via the sigmoid sinus. **Conclusion:** Epidural hematomas in children can be treated conservatively and are resorbed in a timely manner the moisture content as normal level they automatically dehumidify the room area. Also it's have auto regulator system.

**Keywords:** pediatric, trauma, epidural hematoma, observation, resorption.

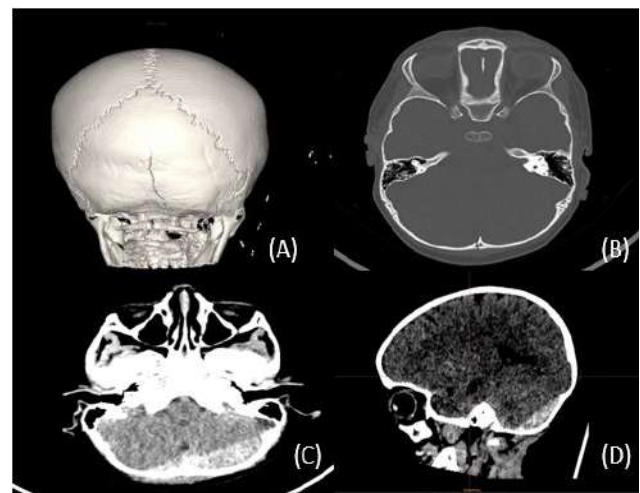
### INTRODUCTION

Posterior fossa epidural hematoma (PFEDH) rarely occurs in children after traumatic head injury and comprises 5% of epidural hematomas (EDHs) in children. Incidence has become slightly higher, mostly because of more sensitive radiological diagnostics (1). Especially in cases of venous hematoma of the posterior fossa, there is ongoing discussion as to whether surgery or observation is the appropriate treatment. Few reports describe the time to resorption in conservatively treated cases or give recommendations concerning the timing of follow-up imaging.

### Illustrative Case

A 4-year-old boy was admitted to the emergency department after an occipital trauma due to a fall down the stairs, with a history of initial loss of consciousness. Upon admission, the clinical examination revealed a fully conscious child, hemodynamically and respiratorily stable, with equal and reactive pupils, moderate headaches, and no sensory-motor deficits. He underwent a brain scan 4 hours after the trauma, which revealed a posterior fossa epidural hematoma (PFEDH) of 13 mL, associated with a right-sided occipital fracture extending towards the right transverse sinus, which remains patent. This hematoma exerts a mass effect

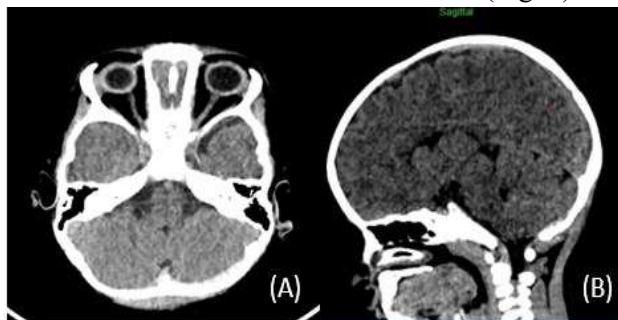
on the left cerebellar hemisphere as well as on the collapsed fourth ventricle, without affecting the ventricular system upstream.(Fig. 1) Due to the suspected venous genesis of the bleeding, with oozing from a lesion in the transverse sinus, and considering the stable neurological state, an observational approach was chosen. The child remained neurologically unchanged. No additional neurological deficit occurred.



**Figure.1** CT scan approximately 4 hours after initial trauma (A) and (B) Bone window showing an occipital fracture extending to the left transverse sinus. (C)Axial CT and Sagittal (D) showing the left occipital PFEDH, Volume:13 cm<sup>3</sup>.

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After the initial scan, the child underwent a follow-up scan 8 hours after the trauma, which showed spontaneous resorption with a reduction in the hematoma volume from 13 mL to 5 mL. (Fig. 2)



**Figure.2. CT scan approximately 8 hours after initial trauma (A) Axial CT and Sagittal (B) showing almost complete resolution of the hematoma**

After 24 hours of monitoring following the trauma, another brain scan was performed, showing complete resorption of the hematoma and the child was discharged from the hospital after an additional 48 hours of observation. (Fig. 3)



**FIG. 3. CT scan approximately 24 hours after initial trauma (A) Axial CT showing almost complete resolution of the hematoma.**

## DISCUSSION

EDH is a well-known sequela of blunt trauma to the head in children. PFEDH comprises <10% of all EDH in children and is considered to be rare(1). There is an ongoing discussion regarding whether to choose surgical evacuation or conservative treatment, taking into account neurological deficits, increasing size, and absolute volume of the hematoma as well as its localization. Increased cerebellar pressure and brainstem compression have been described as life-threatening complications that require surgical evacuation(2,3). In neurologically stable patients, observational treatment remains a valid option(4). In younger infants, specific clinical parameters for

conservative treatment have been proposed (5). Although intraoperative blood loss after injury of the transverse or sigmoid sinus can be a critical complication, fatal outcomes have been rarely described (6). Further rare complications are venous sinus thrombosis (7) and chronification. In the present case, the child showed no focal neurological deficit but suffered from moderate headaches. The volume of the hematoma was considerable but did not result in excessive displacement of the cerebellar structures and remained within a volume range suitable for conservative treatment. Prasad et al. reported an average volume of 37.1 mL (18–100 mL) in surgically treated patients, while the observational group had an average volume of 10.3 mL (8–16 mL). Other studies proposed a critical volume of 10 mL as an indication for surgical treatment or a hematoma thickness greater than 5 mm. To our knowledge, follow-up studies and imaging have not been regularly conducted, and in particular, no distinct time-point recommendations have been proposed. Given the limited understanding of the time required for complete resorption of PFEDH in children, the nearly complete disappearance after 2.5 days provides important background information. Nonetheless, the time course of resorption is rather astonishing, considering the proposed venous or sinusoidal origin of the bleeding, which is likely tamponading itself. Low sinusoidal pressure prevented further growth of the hematoma once pressure equilibrium was established. Furthermore, we believe that sinusoidal drainage largely contributed to the rapid resorption, leading to quick recovery.

## CONCLUSION

Through the imaging presented here, the resorption of the hematoma can be quite rapid and nearly complete. Regardless of the duration of resorption, observational treatment remains a valid option in cases of pediatric venous PFEDH. In this specific case, the potential surgical risk and trauma outweighed the short period of hematoma presence. The observations and conclusions in this case are limited by its unique character and the specific location behind the transverse sinus. Furthermore, rapid resorption does not justify observational treatment in cases of neurologically symptomatic hematoma. In any case, regardless of how quickly the hematoma is reabsorbed, surgical evacuation should

always be favored in cases with neurological deficits, as it is generally faster in all cases.

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