

# Very Rapid Resolution of Posttraumatic Acute Subdural Hematoma in a 2-Year-Old Girl: A Case Report

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## Abstract

### Keywords

- ▶ acute subdural hematoma
- ▶ resolution
- ▶ spontaneous
- ▶ conservative management
- ▶ midline shift

The diagnosis and management of acute subdural hematoma is important in neurosurgery practice as it is encountered in 10 to 20% of the severe traumatic brain injury cases. Rapid spontaneous resolution of acute subdural hematoma within few hours is seen rarely on the computed tomography scan. We present a case of 2-year-old girl in whom acute subdural hematoma resolved spontaneously within hours of injury.

## Introduction

Posttraumatic acute subdural hematoma (PTASDH) is a neurosurgical emergency with mortality as high as 60 to 80%. Most of these patients, undergo urgent neurosurgical intervention except for those with poor general condition or with irreversible brain damage. The natural history of the ASDH is not fully understood because of the early surgical intervention.

Slow and progressive resolution of SDH occurs in patients treated conservatively. Rapid resolution of acute SDH is rare and many mechanisms have been proposed for it. We report a rare case of rapid resolution of acute SDH in a 2-year-old girl with an associated fracture overlying the SDH.

## Case Report

A 2-year-old girl suffered with a blunt head injury due to fall from 14 ft height and presented with loss of consciousness and vomiting at the emergency department of a nearby hospital. She was comatose with a score of 9/13 on the Glasgow coma scale (pediatric) and had left hemiparesis with normal size reacting pupils. Skull X-ray and computed

tomography (CT) scan (2 hour postinjury) demonstrated a right frontal bone fracture with right frontotemporoparietal acute subdural hematoma and midline shift of about 1 cm (▶Figs. 1 and 2). Patient was given a loading dose of fosphenytoin and was transferred to our hospital for further management within next 6 hours. When she was admitted to our emergency department she was comatose with Glasgow coma scale of E3M5V2. A large subgaleal hematoma was found over the scalp at the right temporoparietal region. No motor deficits or pupillary abnormalities were noted. Because the scan was done at other hospital, it was repeated as per our protocols. Repeat CT scan at 9 hours of injury on the same day showed that the acute subdural hematoma seen on previous CT scan had resolved significantly with reduction of the mass effect (▶Fig. 3). It was decided, therefore, to manage the patient conservatively under close observation in the neurointensive care unit. Repeat CT scans obtained after 12 hours again revealed the same findings. Of importance was presence of overlying right frontal fracture, with subgaleal hematoma in both repeat scans. The patient was managed conservatively and later discharged in satisfactory condition. Repeat scan done just before discharge showed same findings with appearance of thin subdural hygroma (▶Fig. 4).

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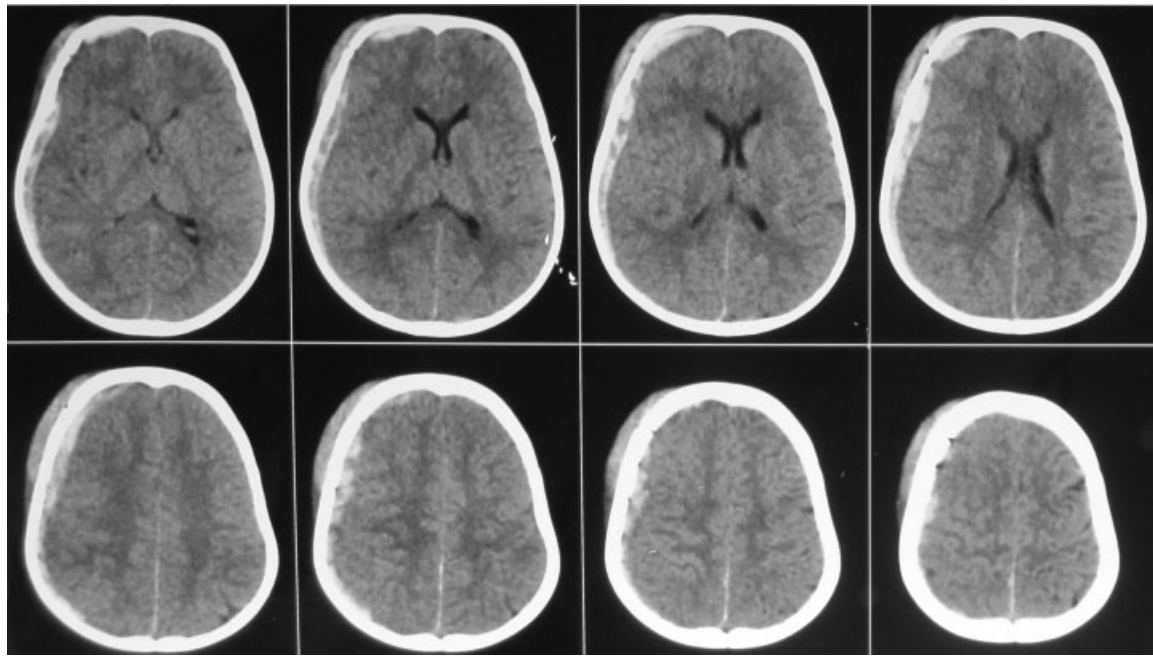
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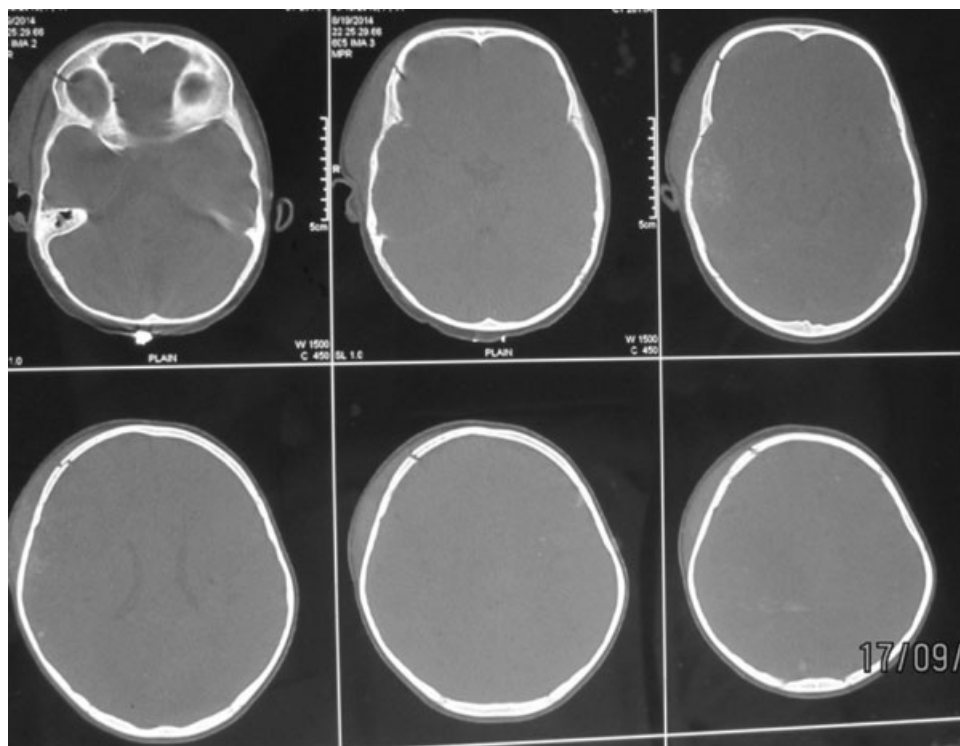


**Fig. 1** CT brain plain at admission, 2 hours after trauma. CT, computed tomography.

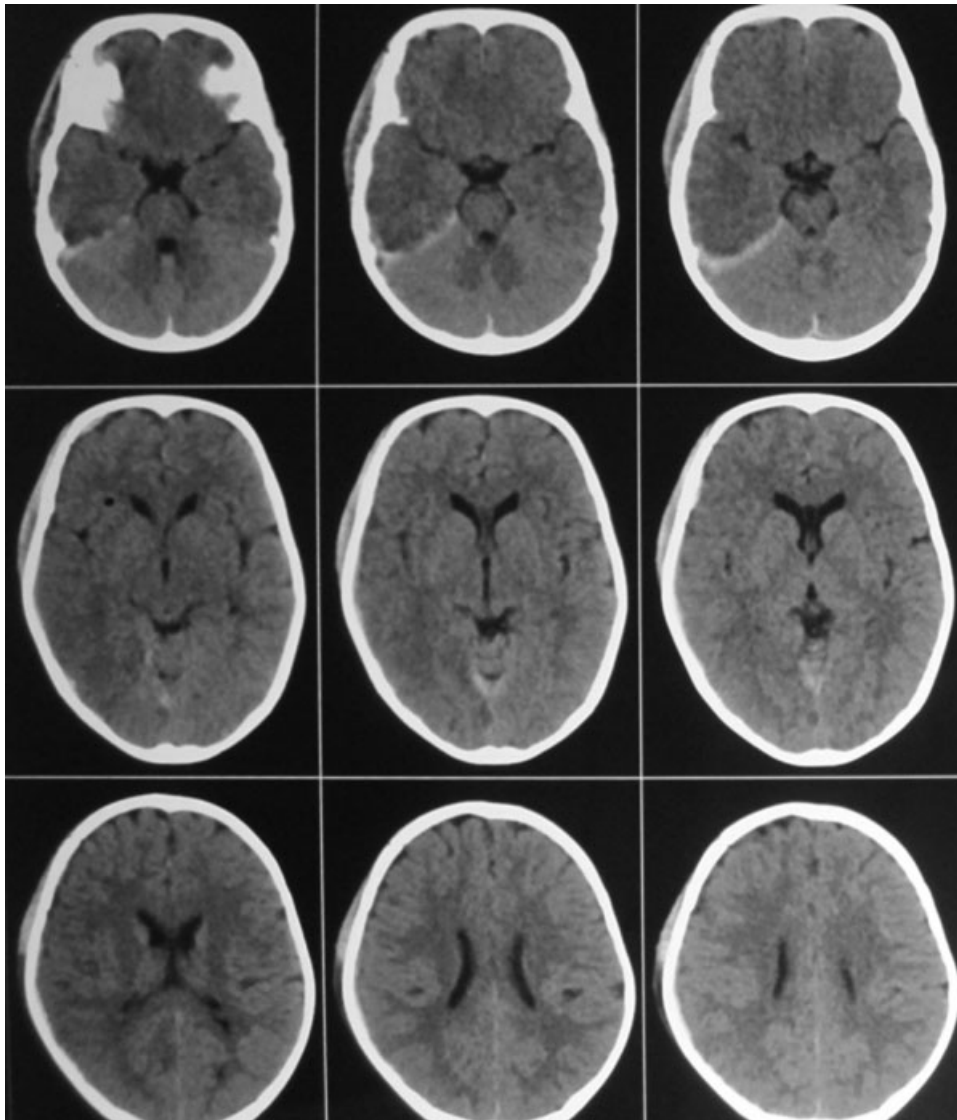
**Discussion**

An acute PTASDH is defined as a collection of fresh blood under the dura. It is a common occurrence in severely head-injured patients (10–20% of major head trauma cases) and is a significant cause of morbidity and mortality.<sup>1</sup> Simple SDHs are hematomas where there is no injury to the brain

parenchyma. Successful, early evacuation of these lesions generally results in rapid recovery, and these patients have the highest likelihood of a good outcome. On the other hand, complicated SDHs are associated with surface lacerations, intracerebral hematomas, and parenchymal contusions.<sup>1</sup> An ASDH with significant midline shift and deteriorated Glasgow coma scale is a neurosurgical emergency.



**Fig. 2** CT brain plain (bone window) showing the fracture. CT, computed tomography.



**Fig. 3** CT brain plain done 9 hours later showing resolution of acute SDH. CT, computed tomography; SDH, subdural hematoma.

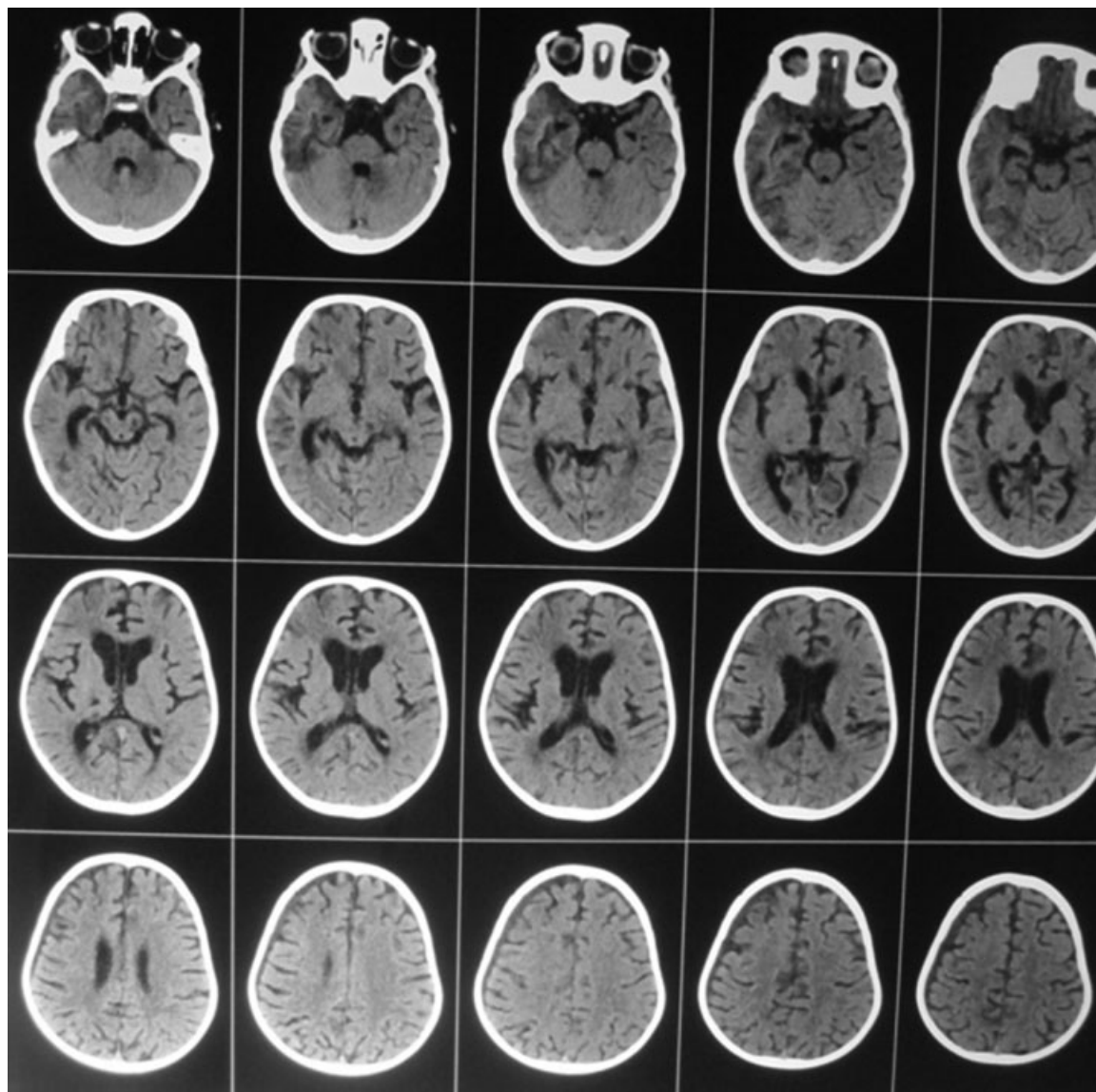
Spontaneous resolution of ASDH is rare and there are few case reports in literature. Wen et al reviewed the literature and identified 19 cases of spontaneous rapid resolution of ASDH. Based on their review, most patients who developed rapid resolution shared five characteristics<sup>1-3</sup>:

1. Transitory coma lasting no longer than 12 hours,
2. Exclusion of cerebral contusion,
3. Band of low density between the skull and the hematoma on (CT) imaging,
4. Thin width which is widely distributed, and
5. Glasgow Coma Scale >8 on admission.

The mechanism of the PTASDH resolution has been attributed to intracranial redistribution of the hematoma rather than disappearance in the subdural space. Also, washing out of the hematoma by cerebrospinal fluid through the torn arachnoid membrane has been proposed by Nagao et al.<sup>2</sup> A similar phenomenon has also been reported by Matsuyama et al and was believed to be due to cerebrospinal fluid dilution in the subdural space.<sup>2</sup>

Aoki emphasized the potential for communication between intracranial and epicranial hematoma through a fracture.<sup>2</sup> Cerebral atrophy may facilitate accommodation and redistribution of ASDH. Liu et al discussed these hypotheses and also proposed what they call the "Piston theory."<sup>2</sup> They propose that fluctuation of intraparenchymal cerebral pressure related to agitation or vomiting acts as a piston to redistribute the ASDH.<sup>2</sup>

In our report, this patient had a linear right frontal bone fracture with PTASDH. The linear fracture might have facilitated the redistribution of the ASDH and improvement of the brain shift. This process may be explained by the prolapse of dura mater in to the fracture sites by the force of the SDH. This phenomenon in turn could have caused tearing of the arachnoid, and washing out of the hematoma by cerebrospinal fluid. Another possibility is that diploic veins at the fracture sites might have drained the subdural space with anatomical connections between the diploae and dural sinuses.<sup>2</sup>



**Fig. 4** CT brain 12 hours after second scan showing complete disappearance of SDH. CT, computed tomography; SDH, subdural hematoma.

## Conclusion

It is well noted that a large ASDH and a deteriorated neurological examination should lead to emergent craniotomy. Spontaneous resolution of ASDH is a rare phenomenon with only a few reported cases in the literature, such as the one illustrated here. Predicting which patient may have a spontaneous rapid resolution of ASDH, thus preventing emergent surgical evacuation, can be challenging. In our case patient's weakness on one side had improved, and CT showed resolution of ASDH as a result craniotomy was avoided. This further highlights the need of periodic neurological assessment in ASDH patients.

## Conflict of Interest

The authors have nothing to declare.

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