

## Rapid Spontaneous Resolution of Traumatic Acute Subdural Hematoma in a Young Patient - A Case Report

Sachidanand Gautam<sup>1\*</sup>, Shyam C. Meena<sup>2</sup>, Dulara S. C.<sup>3</sup>

<sup>1</sup>Department of Neurosurgery, Govt. Medical College, Kota, Rajasthan, India.

<sup>2</sup>Department of Anaesthesiology & Intensive care, Govt. Medical College, Kota, Rajasthan, India.

<sup>3</sup>Department of Anaesthesiology, Govt. Medical College, Kota, Rajasthan, India.

**Correspondence Address:** \*Dr. Sachidanand Gautam, Department of Neurosurgery, Govt. Medical College, Kota, Rajasthan, India.

### Abstract

Acute subdural hematoma (ASDH) constitutes one of the most critical emergencies in neurosurgery and rapid spontaneous resolution of ASDH is an infrequent phenomenon. Several mechanisms have been attributed to explain this phenomenon including redistribution of subdural blood, dilution by cerebral spinal fluid and brain atrophy. We report on a patient with severe head injury following road traffic accident, which showed rapid resolution of ASDH and also discuss the mechanism of spontaneous resolution and the value of neurological exam in conservative management of such patients with good neurological status.

**Keywords:** Acute subdural hematoma, Spontaneous resolution, Conservative management, Neurological examination

### Introduction

Acute subdural hemorrhage (ASDH) needs emergent neurosurgery or close observation because it associated with a 60-80% mortality rate. Sometimes, it is treated with emergent surgical decompression, patients may be managed conservatively when they are neurologically intact or the hematoma is small. Rapid spontaneous resolution of ASDH has rarely been reported because it takes several weeks or months for spontaneous resolution without neurosurgical interventions.<sup>(1,2,3)</sup> Moreover, the true incidence of rapid spontaneous resolution of ASDH is underestimated due to the routine use of emergency decompression. The underlying

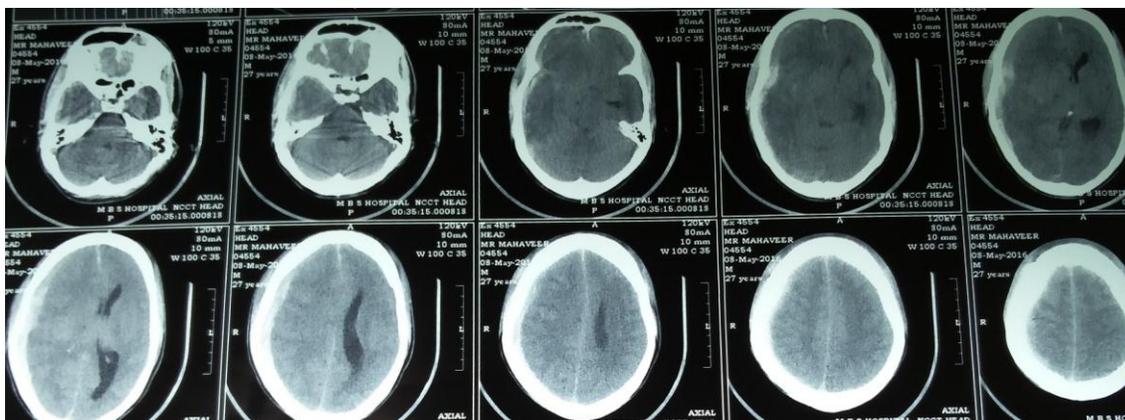
pathophysiology is not well understood, but probably more than one mechanism is responsible for this phenomenon. Two possible mechanisms for spontaneous resolution of ASDH have been put forward to explain this phenomenon including redistribution of subdural blood and dilution by cerebral spinal fluid (CSF).<sup>(4)</sup> Here in, we present a young patient with road traffic accident, who showed an unexpected rapid resolution of ASDH spontaneously within 1 day after severe head injury and discuss the mechanism related to the redistribution of subdural blood and dilution by cerebral spinal fluid contributed to the spontaneous resolution of the hematoma. In addition to the radiologic indicators, careful monitoring

of the neurological examination is vital in determining the optimal management in these cases.

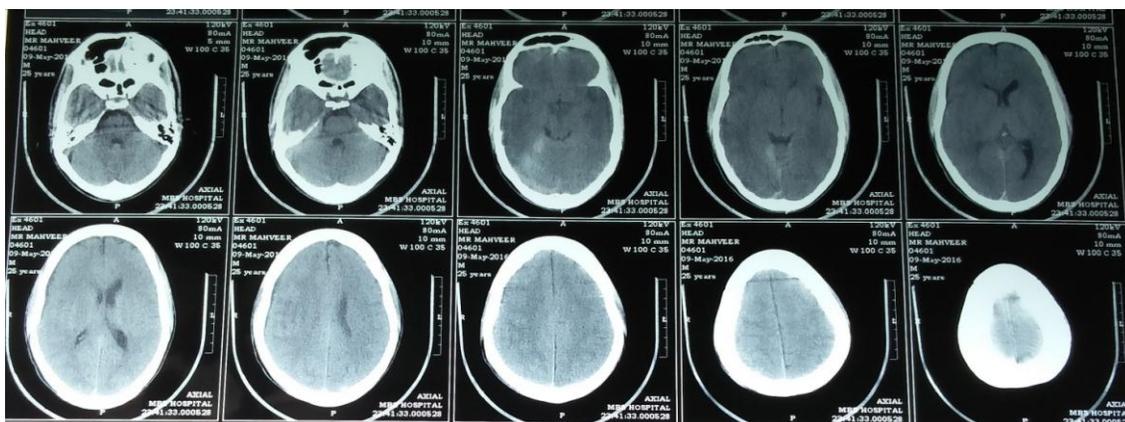
**Case report**

25 year old male presented after a road traffic accident with a brief loss of consciousness and minor facial injury. His condition declined in the emergency room necessitating a STAT head computed tomogram (CT). At that point the patient was conscious but disoriented, his pupils were reacting and symmetric, was following commands, was able to say some words and he had movements in all extremities on verbal commands; Glasgow Coma Scale of 14 (E4V4M6). The scan demonstrated a large (1.1cm) right sided ASDH with significant mass effect and midline shift

towards left side (Fig. 1). Past medical history is not significant for chronic illness. Patient was started on manitol and was admitted for observation in neurosurgical ICU. Overnight the patient was remained in same neurological status and no deterioration in consciousness. Repeat head CT (Fig. 2) performed approximately 24 hrs post admission revealed resolution of hematoma with no midline shift. Again, given the patient’s age, co-morbidities and non-focal neurological exam the decision was made to continue observation and conservative management. The patient remained stable and was discharged home without operative intervention with advice of close follow up. Three weeks later the patient presented with neurological status of conscious and fully oriented.



**Fig. 1 (Head CT Scan - At the time of admission).**



**Fig. 2 (Repeat CT Scan of head).**

## Discussion

Large ASDH 10 mm or greater are considered neurosurgical emergencies. There are reports of spontaneous resolution of the ASDH with various theories as to why this phenomenon occurs. Radiologic characteristics can be helpful in determining which ASDH is mostly likely to spontaneously resolve. As clearly illustrated in this case, utilizing the neurological examination in making that determination is critical in avoiding an unnecessary craniotomy. Wen et al. reviewed the literature and identified 19 cases of spontaneous rapid resolution of ASDH.<sup>5</sup> Based on their review, most patients who developed rapid resolution shared 5 characteristics: (1) transitory coma lasting no longer than 12 h, (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. They concluded that conservative management with careful monitoring may be appropriate for conscious patients who show a simple thin ASDH distributed broadly without marked brain shift. Although the patient in this case shared the some of the characteristics described by Wen, he did not have the imaging characteristics to suggest possible spontaneous resolution. Various hypotheses have been discussed related to rapid resolution of ASDH. Compression of the hematoma due to acute brain swelling could redistribute the ASDH into spaces such as subarachnoid, intracranial subdural, spinal subdural, and extra-cranial.<sup>6</sup> Another hypothesis relates to tearing of the arachnoid membrane which leads to dilution of the hematoma by the CSF. Presence of hypodensity on the lateral side of the ASDH, beaking into sulcus or cistern and evidence of subarachnoid hemorrhage were discussed as important factors in rapid resolution.<sup>7</sup> Brain atrophy has also been discussed as a

possible contributing factor to rapid reduction of ASDH. This theory suggests that dissociation between the skull and brain may be a factor in the movement of the hematoma to the supratentorial subdural space.<sup>8</sup> Liu et al. discussed these hypotheses and also proposed what they call the “Piston theory”.<sup>6</sup> They propose that fluctuation of intra-parenchymal cerebral pressure related to agitation or vomiting acts as a piston to redistribute the ASDH. In this patient, multiple factors could have contributed to the rapid resolution of the ASDH. Dilution of the hematoma with CSF and redistribution is a possible mechanism in this case.

In such cases, where patient is neurologically and haemodynamically stable along with fully equipped critical care ICU if available; than simple anti edematous drugs, close monitoring of the neurological examination and observation with repeat imaging can result in avoidance of emergency craniotomy in young patients with good neurological status.

## 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. Our patient did not fit the radiologic criteria previously described that would suggest rapid resolution of ASDH; however, close monitoring of the neurological exam in this case helped evade emergent craniotomy. Simple anti edematous drugs, close monitoring of the neurological examination and observation with repeat imaging can result in avoidance of emergency craniotomy in young patients with good neurological status.

**References**

1. Ahn ES, Smith ER. Acute clival and spinal subdural hematoma with spontaneous resolution: clinical and radiographic correlation in support of a proposed pathophysiological mechanism. Case report. *J Neurosurg* 103(2 Suppl):175-179, 2005
2. Bortolotti C, Wang H, Fraser K, Lanzino G. Subacute spinal subdural hematoma after spontaneous resolution of cranial subdural hematoma: causal relationship or coincidence? Case report. *J Neurosurg* 100(4 Suppl Spine):372-374, 2004
3. Kapsalaki EZ, Machinis TG, Robinson JS 3rd, Newman B, Grigorian AA, Fountas KN. Spontaneous resolution of acute cranial subdural hematomas. *Clin Neurol Neurosurg* 109:287-291, 2007
4. Watanabe A, Omata T, Kinouchi H. Rapid reduction of acute subdural hematoma and redistribution of hematoma: case report. *Neurol Med Chir (Tokyo)* 50:924-927, 2010
5. Wen L, Liu WG, Ma L, Zhan RY, Li G, Yang XF. Spontaneous rapid resolution of acute subdural hematoma after head trauma: Is it truly rare. *Irish J Med Sci* 2009;178:367-71.
6. Liu B, Zhuang Z, Jianming L. Fluctuation of intra-parenchymal cerebral pressure may drive the rapid spontaneous resolution of acute subdural hematoma. *Med Hypotheses* 2013;81:159-62.
7. Yadav YR, Agarwal M, Namdev H, Parihar V. Rapid resolution of acute subdural hematoma: a case report and review of literature. *Indian J Neurotrauma* 2011;8:45-8.
8. Watanabe A, Omata T, Kinouchi H. Rapid reduction of acute subdural hematoma and redistribution of hematoma. *Neurol Med Chir* 2010;50:924-7.