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Rapid spontaneous resolution of traumatic acute subdural hematoma: A case series and review of literature

Gautam Sachidanand, Shringi Prashant

Government Medical College, Kota Rajasthan, INDIA

ABSTRACT

Introduction: Acute subdural hematoma (ASDH) is the most common type of traumatic intra -cranial hematoma accounting for 24% cases of severe head injuries and caries highest mortality. The mortality rates are seen to be ranging from 40% to 90%, diagnosed on computed tomography (CT) as extra axial, hyperdense, crescent lesion between the Dura and brain parenchyma1. Acute SDH is an acute space occupying lesion to increase intracranial pressure (ICP), and is often complicated by co-existing intracranial lesions, including a variety of diffuse injuries, contusional hematomas, and edema. Acute subdural post-traumatic hematoma's (SDH) continue to have a distressingly high morbidity and mortality.2 Clinical factors like presenting GCS, Pupils, time to operative interval, Hemodynamics and co-morbidities, plays a critical role in overall outcome from acute subdural hematoma.3Careful monitoring of the neurological status is mandatory even for selected acute SDH patients with intact consciousness and no brain shift because of the possibility of the unexpected worsening. Spontaneous resolution of an acute SDH has been reported in rare cases. We report a case series of spontaneous rapid reduction of acute SDH, also we discuss the prognosis of each patient according to a Clinicoradiological Prognostic Score developed by Gautam and Sharma3 as well as mechanisms related to the rapid resolution of acute SDH.

Keywords
traumatic,
acute,
subdural hematoma

Corresponding author:
S. N. Gautam

Associate Professor and Head
Department of Neurosurgery
Government Medical College, Kota
Rajasthan, India

drsachidanandkgautam@gmail.com

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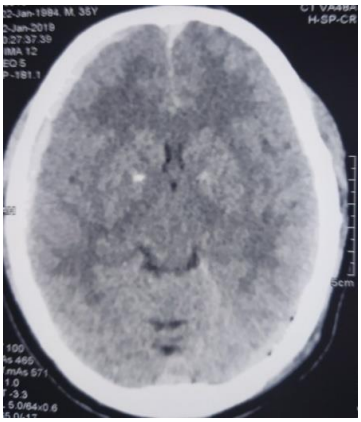
CASE SERIES

Case 1

40 year old male presented with history of RTA followed by loss of consciousness for 30 min and one episode of vomiting , on admission in emergency department Glasgow coma score (GCS) was E3V3M5, both pupils were reactive to light , computed tomography (CT) scan shows acute SDH in right temporoparietal lobe (Fig 1: A). We assess this patient according to Gautam and Sharma score as score is 8 and this patient was managed conservatively. Repeat NCCT head done after 24 hrs showed acute SDH was completely resolved (Fig 1:B) Patient improved and discharge on GCS of E4V5M6.



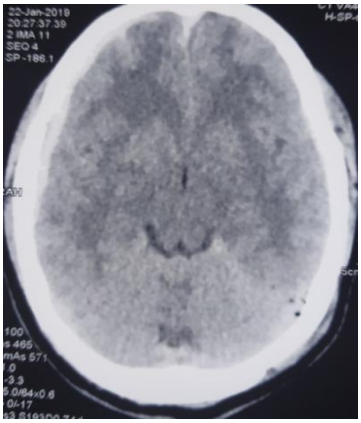


Figure 1 (A): CT scan at admission-shows right temporoparietal SDH.

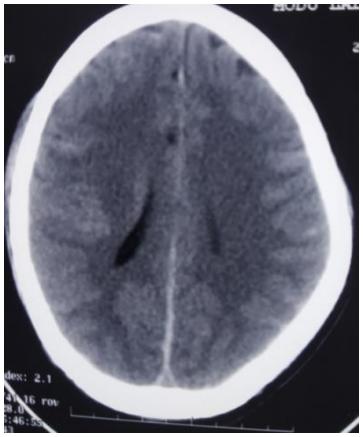
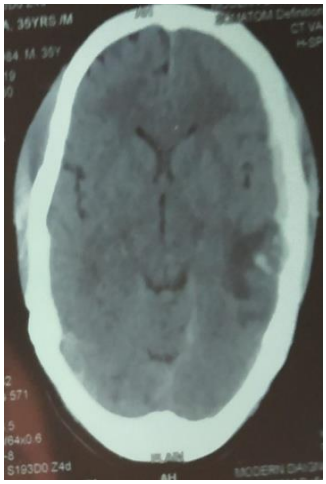


Figure 1 (B): (CT scan after 24 hrs shows rapid resolution of SDH.

Case 2

38 year old male admitted in emergency department with history of RTA with 2-3 episode of vomiting but without any history of loss of consciousness, GCS was E4V5M6.On admission NCCT head shows acute left temporoparietal SDH(Fig 2), his score was 8 on Gautam and Sharma score and we managed this patient conservatively.NCCT head done after 24 hrs which showed significant reduction/resolution in left temporoparietal SDH. He was discharge asymptomatically.



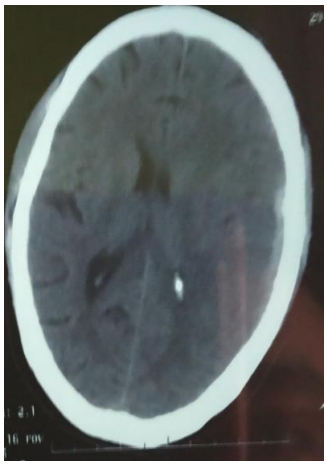


Figure 2: CT scan **(A)** shows left temporoparietal SDH; **(B)** shows repeat CT head reduction of left temporoparietal SDH.

Case 3

17-year-old male presented with history of RTA followed by loss of consciousness, on admission in emergency department patient was intubated, Glasgow coma score (GCS) was E1VtM5, both pupils were reactive to light computed tomography (CT) scan shows acute SDH in right fronto-temporoparietal lobe **(**Fig3). We assess this patient according to Gautam and Sharma score that was 7 and we also managed this patient conservatively.

Repeat CT head was done after 24 hrs which showed complete resolution of acute SDH. After 8 hrs of admission this patient was extubated and within 2 days he was oriented and following all commands, discharge on GCS of E4V5M6.

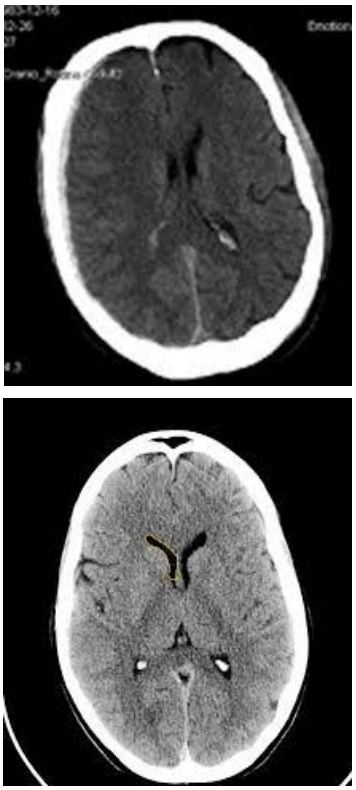


Figure 3: **(A)** NCCT head shows right frontotemporal SDH; **(B)** NCCT head after 24 hrs shows complete resolution of hematoma.

Case 4

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 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.4A). Past medical history is not significant for chronic illness. But his Gautam and Sharma score was 8 so we managed this patient conservatively; 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.4B) performed approximately 24 hrs post admission revealed resolution of hematoma with no midline shift. The patient remained stable and was discharged home without operative intervention with advice of close follow up.

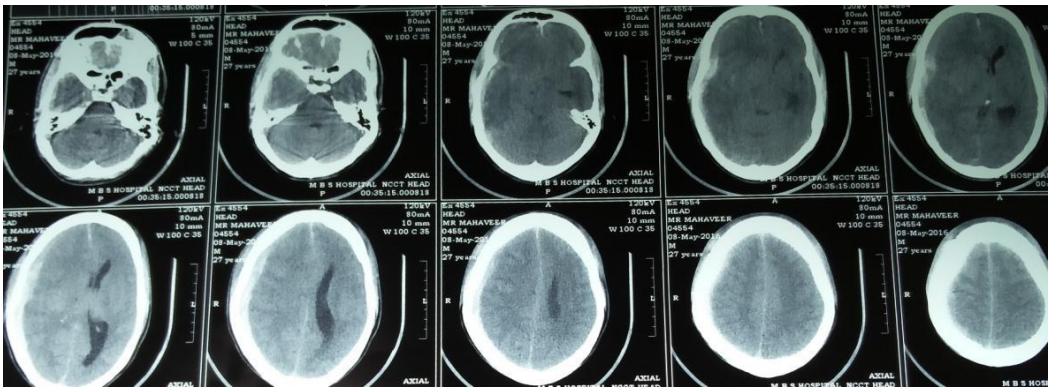


Figure 4 (A): Head CT Scan shows large right temporoparietal SDH with midline shift.

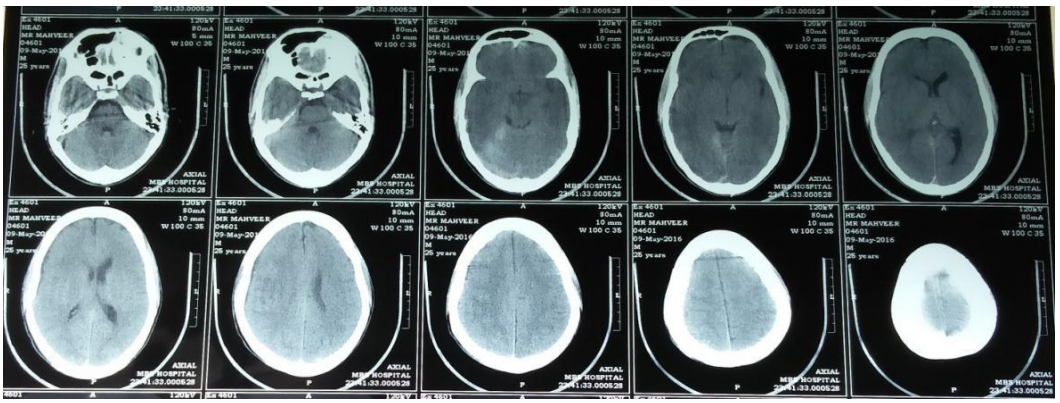


Figure 4 (B): Repeat CT Scan of head resolution of hematoma.

Case 5

14-year-old female presented in emergency room in state of unconsciousness due to road traffic accident with history of ear and nose bleed and history of vomiting, urgently NCCT head was done which showed left temporoparietal acute SDH with midline shift less then 5mm (Fig 5A). On examination her GCS was E1V1M3, her breathing was irregular, both pupils were symmetrical and reactive to light. She was shifted in critical care unit, intubated and put on ventilator her Gautam and Sharma score was calculated that was 6. Managed this patient conservatively, treated with manitol, higher antibiotics like meropenam and amikacin for associated injuries and aspiration pneumonitis. Repeat NCCT head after 48 hours which showed complete resolution of hematoma, continue treated patient conservatively ,patient wean off from ventilator on day 4 of admission and following verbal commands on day 5 ,subsequent repeated CT head were also normal(Fig 5B). She was discharged after 8 days of hospitalization with GCS of 15.

Figure 5 (A): shows left temporoparietal subdural hematoma with midline shift
(5B): shows complete resolution of hematoma.

Case 6

22 year old male presented in emergency department with history of loss of consciousness followed by road traffic accident ,there was also history of vomiting and right ear bleed present .On admission his GCS was E2V1M5 ,irritable , both pupils were symmetrical in size and reactive to light .Urgent NCCT head was done which shows right fronto-temporoparietal acute subdural hematoma(Fig 6A). Gautam and Sharma score was calculated after CT scan which was 8 and we decided to manage this patient conservatively started on manitol and supportive treatment. CT head was repeated after 24 hrs which shows complete resolution of acute SDH(Fig 6B). After 6 days of treatment patient improved significantly and discharged on GCS of E4V5M6.

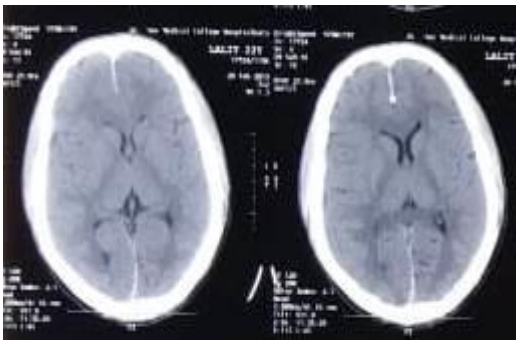


Figure 6 (A): NCCT head shows right frontotemporoparietal acuteSDH with midline shift; **6 (B)** repeat NCCT shows complete resolution of SDH

Prognostic factors	Score 0	Score 1
GCS On Arrival in Hospital	<8	>9
Hematoma Thickness (In mm)in NCCT head on arrival	>5	<5
Presence And/ Or Degree Of Midline Brain Shift (In mm) in NCCT head on arrival	>5	<5
Increase in midline shift and thickness of hematoma in repeatNCCT head after 6 hrs	Yes	No
Pupil Abnormality	Yes	No
Age	>60	<60
Availability Of OT, Neurointensive Care,CT and Other Facilities	No	Yes
Co-Morbidity And Associated Trauma	Yes	No
Time To Arrival In Tertiary Centre (In Hours)	<6 hr	>6hr
Drop Of GCS In Subsequent Examination	>2	<2

Gautam and Sharma Clinic-Radiological Prognostic Score (0 to 10)

Low Score – favours poor prognosis

High score – favours good prognosis, operative intervention not required

Discussion

Acute subdural hematomas are usually neurosurgical emergencies. Small sized hematoma in good neurological grade patients can be managed conservatively. Rapid spontaneous resolution of an acute subdural hematoma is seldom reported. Diagnosis of patients with acute SDH likely to resolve rapidly can avoid unnecessary surgery in some cases[4].

Large ASDH 10 mm or midline shift greater than 5mm on a computed tomography (CT) scan are considered neurosurgical emergencies[5]. 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 series that utilizing a neurological score which is based upon patient clinical profile at the time of arrival to hospital and radiological assessment of consecutive CT scan of head i.e. Clinicoradiological Prognostic Score in making that determination is critical in avoiding an unnecessary craniotomy. Wen et al.[6,7] reviewed the literature and identified 19 cases of spontaneous rapid resolution of ASDH. 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. Two possible mechanisms have been proposed, First, the hematoma may be diluted by flow of cerebrospinal fluid (CSF) through the arachnoid tear, followed by retrograde flow into the subarachnoid space. This is supported by the presence of a low-density band between the ASDH and the inner table of the skull on CT scan. Transient neurological deterioration with subsequent dramatic improvement may be related to CSF influx and efflux within the subdural space. The prominent subarachnoid space with cerebral atrophy may facilitate dilution of ASDH. Second, the compression and redistribution of the hematoma can be induced by cerebral swelling and increased ICP. According Matsuyama et al Spontaneous resolution of the ASDH depends on both dilution due to CSF participation and redistribution of the blood[8].

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. By using a Clinicoradiological Prognostic Score one can make a decision of conservative management to avoid an unnecessary craniotomy on patients having high scores. 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.

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