

## **Case report on the spontaneous resolution of a traumatic intracranial acute subdural haematoma; evaluation of the guidelines**

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## **Abstract**

Rapid spontaneous resolution of traumatic acute subdural haematomas (ASDH) can occur but is rare. We present an 88-year-old female who presents with a large left acute subdural haematoma (ASDH) measuring 18 mm in thickness with midline shift of 10.7 mm. We managed her conservatively based upon good consciousness level and absent neurological deficits. Repeat CT the following day demonstrated near complete resolution of ASDH and midline shift regression; a further CT confirmed resolution. Most patients with large ASDH require surgical evacuation, however, in rare cases they can resolve with extreme rapidity spontaneously. Conservative management can be a valid option in carefully selected cases.

## **Keywords**

Acute subdural haematoma, midline shift, conservative management, spontaneous resolution.

## **Abbreviations:**

ASDH – acute subdural haematoma

BTF – Brain Trauma Foundation

CSF – cerebral spinal fluid

CT – Computed Tomography

GCS – Glasgow Coma Scale

MLS – midline shift

MRI – magnetic resonance imaging

TBI – traumatic brain injury

## **Introduction**

Traumatic acute subdural haematoma (ASDH) with midline shift is a neurosurgical emergency with a high morbidity and mortality rate[17]. Acute SDH occur in 10-30% of all traumatic brain injuries (TBI) and often lead to neurological deficits and/or intracranial hypertension, requiring emergency surgical decompression in most patients[3]. Clear guidelines regarding the treatment of ASDH exist[3]. However, rapid spontaneous resolution of large ASDH has been reported therefore a possible role for conservative management in clearly selected elderly, neurologically intact patients or patients with minimal neurology (e.g. GCS 14) exists[1,2,4-11,14,15,17-19,21,24,25]. We report one case treated conservatively along with a review of current guidelines.

## **Case Report**

An eighty-eight-year-old lady presented to our emergency department after a fall downstairs, resulting in a head injury with scalp wound. No loss of consciousness was reported however, the patient suffered from retrograde amnesia. On neurological examination, the patient was conscious but confused with a Glasgow Coma Score (GCS) of 14 (score of 4 for verbal response). Her pupils were small and sluggishly reactive and no focal neurological deficit was detected. Her GCS later improved to 15. Her past medical history included breast cancer, treated with mastectomy six years before. She was not on any antiplatelet or anticoagulant medication.

The Computed Tomography (CT) scan of her head-on arrival demonstrated a large left sided acute fronto-parieto-temporal ASDH with local mass effect and midline shift (MLS) of 10.7 mm, compressing the ipsilateral lateral ventricle with subfalcine herniation and contra-lateral ambience cistern compression (figure 1a). In view of her good conscious level and absence of neurological deficits she was treated conservatively with continuous neuro-observations, with

neurosurgical intervention immediately available in case of clinical deterioration. A repeat CT head scan the following day (34.6 hours after the initial CT) demonstrated almost complete resolution of the ASDH with reversal of the MLS (Figure 1b) with only a small rim of blood left over the left convexity. A third CT head prior to the patient's discharge demonstrated no recurrence.

## **Discussion**

We report this case because of the rapidity of the ASDH's spontaneous resolution. The Brain Trauma Foundation (BTF) guidelines state, among other criteria's, that ASDH with a thickness greater than 10 mm or a MLS greater than 5 mm on CT should be evacuated, independently of the presenting GCS[3]. Additionally, surgical intervention has been suggested in comatose patients (GCS <9) with a haematoma thickness of <10mm, MLS of <5mm, in cases where GCS drops by 2 or more points from the time of injury until hospital admission and/or presenting with anisocoric or fixed/dilated pupils and/or intracranial pressure (ICP) >20[3]. As such, managing our patient conservatively (with a measured thickness of 18 mm and MLS of 10.7 mm) could be considered against the reported guidelines.

The natural history of large ASDH remains widely unknown as the majority undergo emergency surgical evacuation[23]. Acute subdural haematoma associated with parenchymal injury have a high morbidity rate[13]; those associated with MLS and compression of the brain stem have a high mortality rate in addition to a high morbidity[12]. Clear guidelines exist regarding the indication for surgical interventions in patients with ASDH[3]. Surgery and evacuation of haematoma as soon as possible has been recommended[3,16]. Studies have suggested that early surgical intervention (within 4 hours) has a better outcome[23]. Nevertheless, timing and specific procedure (craniotomy versus craniectomy) can be challenging, especially in elderly patient where the frequency of comorbidities increases, which

might in turn increase the risk of a surgical intervention. The literature has several reports on spontaneous resolution of ASDH's under conservative management[1,2,4-11,14,15,17-19,21,24,25]. Conservative management of these haematomas includes the use of hyperosmolar agents (such as mannitol and hypertonic saline) and steroids[20,22].

Two main theories have been postulated with regards to the spontaneous resolution of ASDH's. The first theory postulates that the initial rapid development of brain swelling following the head injury forces the haematoma out into other spaces[2]. A second theory suggests that the haematoma could be diluted with cerebrospinal fluid (CSF) following an arachnoid membrane tear with redistribution into the subarachnoid and or subdural spaces, which could be confirmed on a magnetic resonance imaging (MRI) scan[11]. The relative increase in CSF volume in subarachnoid spaces in patients with cerebral atrophy could facilitate sub redistribution[4]. The theory of blood washing out by CSF is unlikely in our case due to the patient not having a fracture, thus making the presence of an arachnoid tear improbable, though not impossible. We cannot make any strong suggestions regarding the mechanism of spontaneous ASDH resolution as in our case no MRI was performed.

The possibility exists, that our patient did not suffer from a true ASDH but a haematoma in the subarachnoid space mimicking an ASDH, in which case the rapid resolution would not be surprising. We discussed this option with the neuroradiological team and labelled the haematoma as a true ASDH for the following reasons: presence of a CSF cleft on the medial margin of the collection, prominent cortical vein that can be seen on the medial margin and no extension of the blood into the depth of the sulci at any sites.

## **Conclusion**

This case is interesting in that there were no parenchymal contusions, no skull fracture, and the large acute subdural haematoma along with MLS resolved surprisingly rapid, confirmed on

repeated CT scan. A haematoma of the subarachnoid space, mimicking an ASDH was considered as a differential diagnosis but ruled out. We want to emphasize that in a rapidly increasing elderly population, where brain atrophy is present allowing for more space occupation by the haemorrhage before causing symptoms, conservative management of ASDH despite mass effect should be considered in selected patients with absent focal neurological deficits and a normal level of consciousness, if an immediate neurosurgical intervention can be performed in case the patient deteriorates. These patients need to be closely monitored alongside repetition of head CT scans. The need for a large series remains to be able to evaluate the predictors and factors influencing a conservative management.

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### **Consent**

The patient has consented to the submission of the case report for submission to the journal.

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