

## **Case Report**

### **An uncommon complication of fall in an elderly: interhemispheric subdural haematoma**

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**Abstract**

A 93-year-old woman with an episode of non-syncopal fall with occipital head injury suffered from left inter-hemispheric subdural haematoma, which presented as simple partial seizures with Jacksonian march and falx syndrome. She had been on aspirin and was managed conservatively with platelet transfusion with favorable outcome.

## **Introduction**

Fall is a common problem in the elderly. In a prospective study conducted in Hong Kong involving 1517 subjects aged 65 years and above, the fall rate (number of falls per 100 persons) was 26.4%, the 1-year prevalence of falls (persons with at least 1 new fall) was 19.3% and the prevalence of recurrent fallers (i.e. 2 or more falls per year) was 4.75%.<sup>1</sup> The detrimental consequences of fall include physical injuries with deconditioning, loss of confidence with fear of falling and a subsequent decrease in activity contributing to loss of functional ability, need of supervision or even institutionalization. Physical injuries could vary from soft tissue injuries e.g. bruises, lacerations requiring stitching, fractures and head injuries.<sup>2</sup> The principles in the fall evaluation include identification of acute injuries, multidisciplinary and multifactorial risk factor assessment (MMAI) and prevention of the fall.<sup>3</sup>

Since elderly patients often have brain atrophy, this allows an increased movement of the brain within the skull during acceleration-deceleration of head injury and together with more fragile bridging veins contributing to a higher risk of subdural hematoma.<sup>4</sup> Patients with acute subdural hematoma (ASH) often suffer from underlying brain contusion, laceration, diffuse axonal injury or intra-parenchymal bleeding.<sup>5</sup> ASH most commonly occurs over the frontal or parietal convexities. Patients often presented with a history of head injury, headache, nausea, vomiting, change in mental status, seizures or coma. We reported an elderly lady who suffered from a fall with delayed onset of simple partial seizures and falx syndrome due to ASH occurring in an unusual interhemispheric location (interhemispheric subdural hematoma (ISH)) and was managed conservatively.

## **Case presentation**

A 93-year-old woman was admitted to the Accident and Emergency Department (AED) of Queen Mary Hospital because of fall. The fall happened on a rainy day when the patient was trying to close the window in the balcony. Because of the slippery floor, she hit on the wall in her forehead and bounced back and fell onto the floor hitting her occiput. She suffered from contusion over the right leg, neck and the chest wall. Initial physical examination in the AED showed blood pressure of 174/75 mmHg, normal body temperature and oxygen saturation breathing ambient air was 100%. Glasgow Coma Scale (GCS) of 15 with a 2 cm times 3cm hematoma over the occipital region. Physical examinations including neurological, respiratory, cardiovascular and abdominal examination were unremarkable.

Blood test showed normal complete blood picture, renal and liver biochemistries. The electrocardiogram showed sinus rhythm, left ventricular hypertrophy and Q wave over the lead III. The troponin level was 0.01 ng/ml. The skull, right tibia and pelvic X-rays did not show any evidence of fracture. The chest X-ray showed fibrocalcific changes over the both upper zones, which could represent previous pulmonary tuberculosis infection. Cervical spine X-ray showed osteopenia and degenerative changes with marginal osteophytes noted over multiple levels.

Past medical history of the patient reviewed right ear hearing impairment with ear cerumen requiring repeated removal, hypertension, ischemic heart disease with old inferior myocardial infarction and left femur fracture due to road traffic accident with operation 20 years ago. For the medications, the patient was on aspirin, isosorbide dinitrate, metoprolol, vitamin B complex and sublingual glyceryl trinitrate.

On the third day, the patient was noted to have right lower limb monoparesis (Medical Research Council grade 1) and simple partial seizure with Jacksonian march spreading from the right lower limb to the right upper limb and finally to the right neck muscles over one minute period. The patient was conscious during the seizure. The seizure was stopped by intravenous (IV) 5 mg diazepam. Computed tomography (CT) of the brain showed left ISH (Fig 1a). The patient was subsequently admitted to the neurosurgical unit.

Phenytoin 100 mg Q8H IV and valproate 400 mg Q8H IV were started in the view of eight repeated episodes of simple partial seizures lasting from 30 seconds to two minutes without impairment of consciousness. She was transfused with four units of platelet as she had taken aspirin with intracranial haemorrhage. Neurosurgeons opted for conservative management as patient was alert without secondary deterioration and carried high operative risk because of her advanced age. Her right lower limb power gradually improved from Medical Research Council grade 1 to grade 4. Repeated CT brain on day 7 showed no interval increase in the size of the haematoma. There was no postural hypotension documented. The patient was then transferred to convalescent hospital for rehabilitation. She was subsequently discharged home after another repeat CT brain on day 35 showing resolved haematoma (Fig. 1b). Upon discharge, the patient was able to walk with frame with mild assistance.

## Discussion

Our patient with left ISH presented with simple partial seizures with Jacksonian march and falx syndrome. Falx syndrome is characterized with contralateral monoparesis of the leg or hemiplegia with predominant involvement of the leg.<sup>6,7</sup> Falx syndrome could be present in up to 30% of patients with ISH. Other clinical features include clouding of consciousness, cognitive impairment, language disorders, gait instability and oculomotor dysfunction.<sup>6,7</sup> Just like our patient, trauma especially over the occipital region is the most common etiological factor accounting for 80-90% of the cases.<sup>6,7</sup> Our patient does not have underlying coagulopathy (although she was on anti-platelet), which together with alcohol usage have been reported as well known risk factors predisposing to ISH. In the largest case series involving 35 patients, coagulopathies and alcohol drinking contributed to hemorrhage in 60% and 34% of the patients respectively. It has been postulated that the underlying pathophysiological mechanism was a blow to the occiput with laceration of the parafalcine or parasagittal bridging veins in the interhemispheric fissure that cross anteromedially from the cortex to the midline sinuses resulting in the special location of the hematoma.<sup>6,7</sup>

There has been no agreed guideline on the management of ISH mainly because it is an uncommon complication of head trauma. Only 6% of traumatic subdural haematoma belongs to ISH.<sup>7</sup> Our patient was not operated because she was alert and carried high operative risk, we also expected her lower limb power would improve upon resolution of haematoma. In general, surgery would be indicated if the haematoma is large and patient demonstrates rapidly deteriorating conscious level.<sup>6</sup> Surgical intervention involves craniotomy and clot evacuation which carried high risk regardless of the age

of patient. There are risks of injuring the superior sagittal sinus (SSS) and cortical bridging veins, as well as adjacent brain parenchyma as operation was performed in the narrow interhemispheric fissure. Clot evacuation predisposes to further bleeding as the haematoma provide tamponade effect to prevent further bleeding from bridging veins and SSS, which are low-pressure system. Any attempt of haemostasis like electrocoagulation of bridging veins near their entrance into SSS, or packing with haemostatic materials may result in venous or even SSS occlusion. The result is venous infarct with cerebral edema. Conservative management is preferred most of the time. But surgery may speed up recovery especially the lower limb power in this patient is poorer as well as decreasing the chance of recurrence of seizure by rapid decompression. In brief, the decision to operate or not depends on patient's age and clinical condition. Poor prognostic factors include low GCS, hypovolemic shock, skull fracture, convexity or posterior fossa subdural haematoma and subarachnoid hemorrhage (SAH).<sup>7</sup> Our patient does not have any of the above poor prognostic factors and has a favorable outcome even without operation. Based on the largest case series looking at the outcome of the patients using the Glasgow outcome scale, 47% of the patients have good outcome (i.e. able to return to work), 25% with moderate disability (i.e. live independently but unable to work), 11% with severe disability (able to follow commands but unable to live independently), 3% with vegetative state and 14% with death.<sup>7</sup>

Platelet transfusion to reverse the effect of antiplatelet agents in patient with intracranial haemorrhage after head injury is controversial. This is not a standard practice but carried out frequently in many centers. Despite its popularity, its effectiveness has not been well assessed. From a few reviews and retrospective studies, platelet transfusion was not associated with reduction in mortality.<sup>8-10</sup> The

drawbacks of these studies included small sample size and lack of elaboration of the amount of platelet transfused. Also the transfused platelet might be inactivated by the recent ingestion of aspirin.<sup>11</sup> Naidech et al has reported in a prospective cohort study involving 45 patients with a mean age of 67.3 years old that early platelet transfusions of at least 6 units within 12 hours resulted in a more favorable outcome based on modified Rankin Scale (mRS) with 55% of the subjects receiving early platelet transfusions had mRS less than 4 while those with delayed platelet transfusion none had mRS < 4. Results remained similar even if the analysis was only performed in patients with known usage of aspirin. But this study did not include patients with traumatic intracerebral hemorrhage.<sup>11</sup> So it is a matter of individual preference on when and how much platelet transfusion should be given.

In summary, we reported an elderly woman suffering from a less common type of ASH namely ISH because of occipital injury. The presence of occipital head injury with falx syndrome may point to an underlying diagnosis of ISH. The usage of platelet transfusion in intracerebral hemorrhage is still controversial.

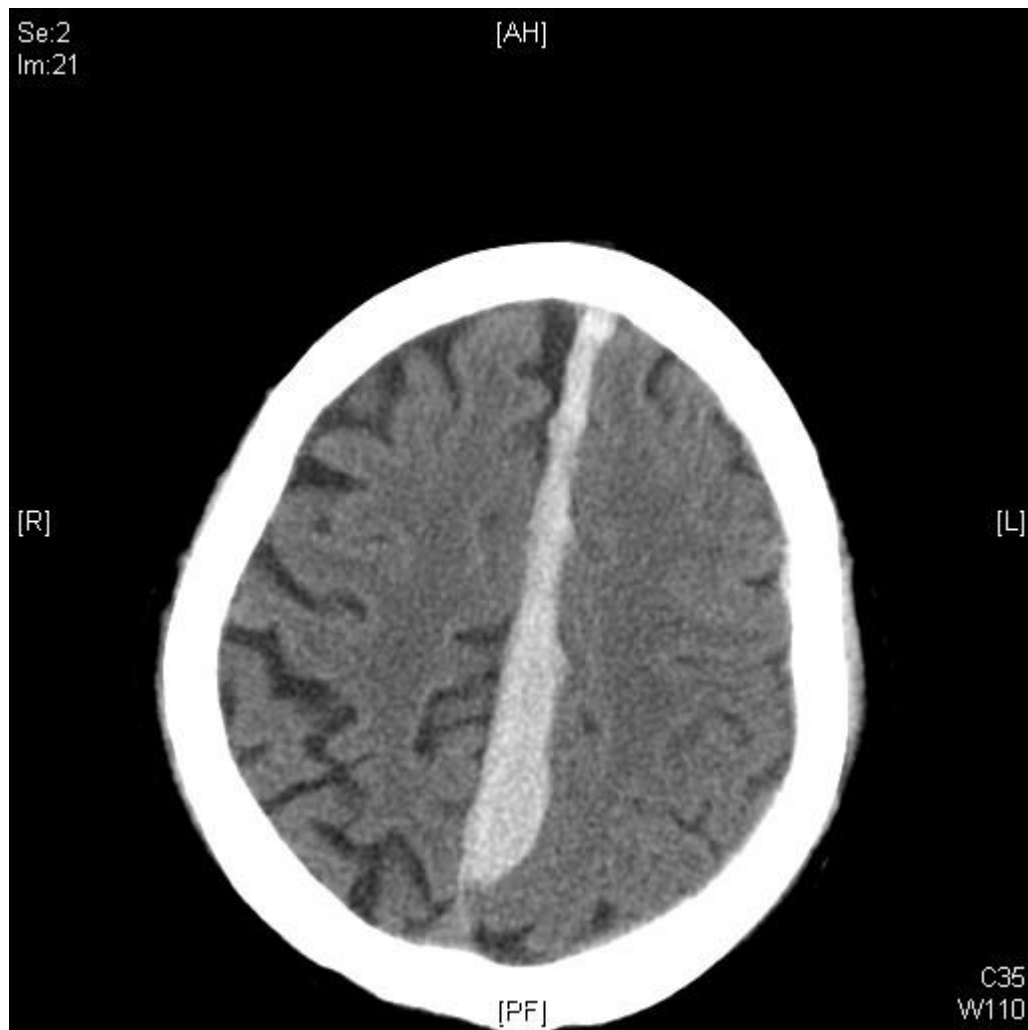


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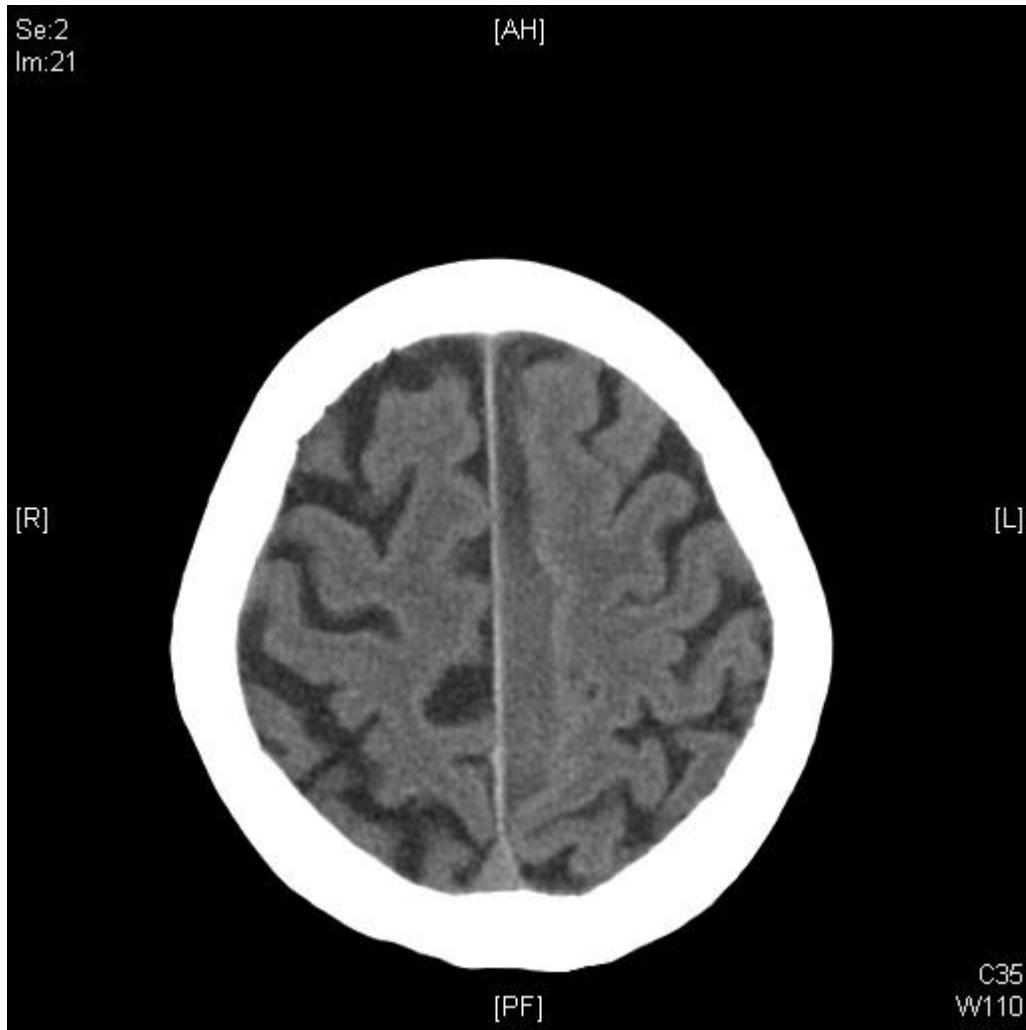
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**Legend**



**Figure 1a: Left interhemispheric subdural hematoma on the CT brain on day 3**



**Figure 1b: Left interhemispheric subdural hematoma resolved on the CT brain on day 35 before discharge**