



Spontaneous Chronic Subdural Hematoma: A Case Report and Literature Review

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Abstract

Introduction: Subdural hematoma (CSD), the accumulation of blood below the inner layer of the dura, stems from bleeding of bridging veins or cortical arteries damaged normally by traumas. Chronic subdural hematomas (cSDH) are well documented in infants where it is frequently observed as a single entity.

Case Presentation: Albeit cSDH is rare amongst children older than one year, the current report presents a case of a nine-year-old male with no trauma history developing spontaneous chronic subdural hematoma. Surgical management was performed, and there was a satisfactory resolution.

Conclusions: In spite of the lower incidence of cSDH in children, leading to misdiagnosis, early diagnosis and treatment with craniotomy and drainage suggests excellent prognosis.

Keywords: Chronic Subdural Hematoma, Children, Pediatrics

1. Introduction

Chronic subdural hematoma (cSDH) is regarded as one of the most common neurosurgical entities. CSDH mostly exerts its impact upon old patients. In as much as ageing is on rise, cSDH is a common neurosurgical predicament. From pediatricians' point of view, chronic subdural fluid collection is a group of related conditions called extra cerebral or extra axial fluid collection. Chronic subdural fluid collection can present cSDH or subdural effusion. The term subdural hygroma, subdural hydroma and benign extra cerebral fluid collection are applied very loosely to describe the same entity. This disease is extremely rare in pediatrics and only few cases are reported. The current paper presents a child with no trauma history developing spontaneous cSDH (1, 2).

2. Case Presentation

A nine-year-old male was admitted to the emergency department with complaints of gradual reduction in the level of consciousness, headache and nausea over the last

two days. On neurological examination, his Glasgow coma scale (GCS) score was E2M5V2 (9/15). Pupils were unequal and did not react to light and fundoscopic examination showed bilateral papilledema. There were no signs of meningeal irritation and a motor examination illustrated slight right hemiparesis. There was no history of any trivial head injury and evidence of child abuse. All blood tests and coagulation profiles showed normal results. An urgent brain computed tomography (CT) scan (Figure 1) revealed a left fronto-parietal cSDH giving rise to a midline shift of 10 mm. At this stage, surgery under local anesthesia was proposed. He was managed by emergency burr-hole placement in left frontal and parietal regions with evacuation of altered subdural blood, irrigation with ringer lactate solution, and placement of subdural drainage tubes, which were connected to closed drainage system for 72 hours. Subsequently, his clinical condition improved immediately regaining consciousness. The patient received a course of physical therapy and his right-sided motor deficit promptly improved after seven days when he was discharged from hospital. A follow-up assessment after three months showed that the patient was neurologically

intact with a general well-being and a brain CT scan revealed a complete resorption of the hematoma. Additionally, he underwent brain CT angiography to exclude vascular risk factors for subdural hematoma; however, the findings were unremarkable.

3. Discussion

A cSDH is defined as a chronic (\geq three weeks) intracranial bleeding between the dura mater (adhering to the skull) and the arachnoid mater (enveloping the brain). Two age groups are mostly at risk of developing cSDH, infants and the elderly. Risk factors of cSDH include an age of older than 60 years, male gender, alcoholism, blood dyscrasias and cerebrospinal fluid (CSF) shunts. The patient can present with progressive clinical syndrome characterized by motor deficits, and signs and symptoms of intracranial hypertension (3, 4). The elderly cerebral atrophy causing tension on the veins may also be weaker and more susceptible to injury as a consequence of age. Using anticoagulants in this age group is another great risk factor of SDH. In the infant brain, SDH is caused by tearing of the bridging veins in the subdural space as a result of rotational and deceleration forces, or by other pathological processes. Spontaneous cSDH in the absence of predisposing conditions is rarely observed in the young subjects. Little is known about SDH in the young population, since in this age group it is not uncommon to observe two of the main predisposing factors for its development including brain atrophy and use of drugs that interfere with hemostasis (3-5). In a literature review searching for chronic SDH some pediatric case reports were found. Here, six cases with different predisposing factors for cSDH in children are presented.

Wang et al. (6) reported a 14-year-old female who referred to the emergency room showing a two-week severe headache following blurring of vision obviated after a few minutes. The patient was a music student majoring in flute at middle school with no history of any trivial head injuries. She claimed no previous history of anticoagulant treatment or hematological coagulopathy, and was healthy before this episode. She was alert and fully oriented in neurological examination. Pupils were isochoric and reacted to light. Bilateral papilledema was found by a funduscopic examination, and a slight hemiparesis on the right side was shown by a motor examination. Brain CT scan and magnetic resonance imaging (MRI) showed left-sided mixed density and high signal intensity indicating cSDH. Burr-hole evacuation of the cSDH was operated and the patient made an uneventful post-operative recovery.

In the absence of trauma and any predisposing conditions, subdural bleeding can be triggered by a sudden

rise in intravenous pressure over the Valsalva maneuver, coughing or defecation and blowing. Considering the fact that she played the flute for several months as a student of music, non-invasive measurements showed a rise in intraocular pressure; suggesting high intravenous pressure resulting in cSDH (6).

Shrestha and You (7) reported a 16-year-old female with headache and dizziness for two months. The headache initiated insidiously 4 - 5 times a week and was treated as migraine in a local hospital. The headache, which was associated with dizziness, worsened in the last week occurring several times a day and was aggravated with posture change. No history of head trauma existed and a neurological examination showed normal results. Blood profile showed normal findings, while CT scan results indicated left fronto-temporal cSDH with middle fossa arachnoid cyst (AC). MRI confirmed hypodensity in the left fronto-temporal region indicating left middle fossa AC with fronto-temporo-parietal subdural effusion. Once left temporal craniotomy was performed and tense dura was opened, yellowish hematoma was found and little clotted blood was evacuated. No vascular malformation and old fracture or tearing of dura were observed. The authors argue that cSDH is observed in old patients with a history of mild head injury; nonetheless, it is rare in children.

An AC can also be considered as a cause of cSDH following head injury in the young and is believed to be a risk factor for cSDH in such a population. There are several assumptions to explain cSDH associated with arachnoid cysts. AC may gradually grow owing to CSF being driven in through a ball-valve like opening or by its active secretion from the cyst wall and finally inner pressure of the cyst goes up. An AC can even be spontaneously ruptured. More to the point, the cyst membrane is loosely connected to the convexity dura. The mechanical forces sustained in a moderate head trauma may detach the cyst membrane from the dura and hence lead to a bleeding episode. Last of all, the parietal cyst membrane covers the region where the bridging sylvian veins, or the veins traversing the membrane unsupported by brain tissue, enter the dural venous sinuses in the back of the sphenoid ridge. A mild manipulation of the parietal membrane may cause disruption to these veins resulting in bleeding into subdural space (7).

Wang et al. (8) reported another case of cSDH in children. A nine-year-old male student was admitted to the emergency department for intermittent severe headache over the past month, postprandial vomiting twice in the early morning, dizziness and a single fever episode with no response to previous conservative treatment. The physical and neurological examinations showed no evidence of neurological defects. Electroencephalogram (EEG) results excluded intracranial lesions but indicating epilep-

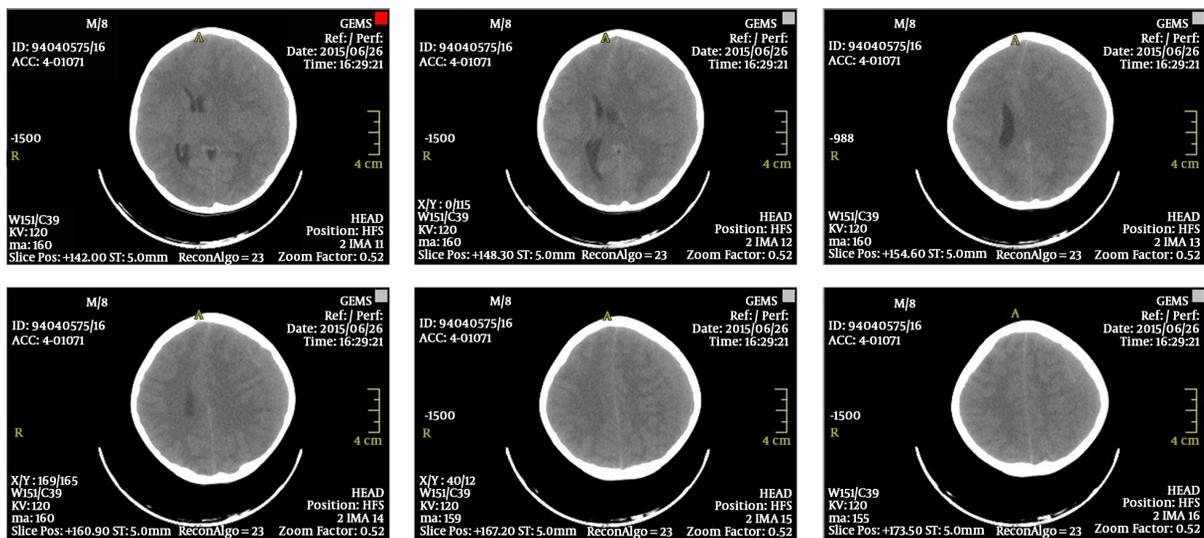


Figure 1. Brain Computed Tomography Scan Showing a Left Side Chronic Subdural Hematoma

tiform discharges over the right parietal and post temporal regions. Brain CT revealed massive left cSDH with midline shift and mass effect. A burr-hole drainage was carried out following exclusion of coagulopathy and a good surgical result was achieved. He recalled the occurrence of repeated minor head injuries over dodge ball exercise at school prior to discharge. The authors concluded that despite the fact that the patient complained about intermittent severe headache and postprandial vomiting, no neurological deficits or evidence of child abuse was demonstrated by physical examination. In addition, the case suggested the importance of the use of imaging techniques such as CT, in early treatment course of young patients with repeated and persistent symptoms of sport head injury. If the underlying pathology was found and promptly treated, permanent long-term damage can be avoided (8).

Basmaci et al. (9) reported a two-year-old patient-known case of acute myeloid leukemia-presenting seizure, vomiting and agitation. The patient had confusion and underwent emergency brain CT scan and a cSDH was explored from the left frontal region to the occipital subdural region. Complete blood count showed a white blood cell count of $157,000/\text{mm}^3$, and a platelet count of $48,000/\text{mm}^3$. There was no history of head injury and trauma. The patient was operated and the hematoma, which had a high pressure, was evacuated with left parietal craniotomy subsequently, a dramatic improvement was observed in the patient's neurological status. The hematoma was evacuated. The patient was thereafter transferred to the department of hematology for leukemia treatment. The authors mentioned that the incidence of

tumor-related subdural hematoma is 0.5% - 4%, which is a high percentage in cancers such as leukemia. Head trauma, coagulopathy, and chemotherapy increase the risk of bleeding. Hemorrhage can result from occlusion of the blood brain barrier by tumor cells, chemotherapy-induced thrombocytopenia, disseminated intravascular coagulation and leukocytosis. In spite of the fact that there may be several etiologic factors in this regard, the condition can be frequently detected incidentally with no clinical symptoms. Seizure, altered mental status, focal neurological deficits, irritability and lethargy are typical in the patients of these age groups. Misdiagnosis of such patients gives rise to delayed treatment and poor prognosis (9).

Glenn et al. (10) reported a previously healthy 45-day-old female with concerns of head trauma due to falling from a chair. Brain CT showed bilateral fronto-parietal hypodense subdural fluid accumulation. These lesions are said to represent benign extra axial fluid collections of infancy. The patient was followed up by a pediatrician assessing serial CT imaging findings for the next two years. The size of the right fronto-parietal extra axial hypodensity minimally fell while the left collection resolved completely. Nearly 30 months after her last visit, she was brought to the emergency department complaining of headache and lethargy, and a non-focal neurological examination. CT scan showed a significant growth in the size of her right-sided subdural collection with several loculated fluid collections and midline shift. The patient then underwent placement of a subdural drain in order to evacuate the large right-sided frontal fluid collection. A small amount of thick, mucinous fluid was obtained from drain

placement. The subdural cathetering attempt in draining a marked portion of the subdural collection was unsuccessful due to its thick and mucinous nature. Thereafter, the patient underwent two craniotomies to evacuate the extensive subdural collections during the following week and was discharged three days later, although she showed acute onset of left lower extremity weakness a week after discharge. Brain MRI detected multiple regions of heterogeneous contrast enhancement in the right frontal, parietal and occipital lobes in addition to multiple cystic fluid collections. Afterwards, she underwent craniotomy to evacuate the subdural collection and for mass resection. Pathologic specimen explored a considerable amount of high grade neoplastic proliferation with mitotically active high grade sarcomatous proliferation. The authors stated that persistence of multiple or asymmetric subdural fluid collections beyond the expected clinical course should encourage us for diseases beyond a cSDH and prompt additional diagnostic investigation. MRI is useful to differentiate chronic hematoma from sarcoma. However, it is unclear that at what point during sarcoma development this distinction is most evident. The authors concluded that even with a reassuring clinical exam and a history of a trauma, MRI should be obtained in patients with atypical appearing or unresolved subdural fluid collections in as much as it may assist to differentiate between hematoma and other cranial pathologies (10).

There are various reports of spontaneous SDH in healthy young adults presenting risk factors such as hypertension, vascular malformations, neoplasia with hematological malignancies causing thrombocytopenia, solid tumor dural metastases, infection, coagulopathy and alcoholism. In addition, spontaneous SDH is reported in patients with abrupt rise in intravenous pressure during coughing, defecation, trumpet blowing and heavy weight lifting. Further, patients following systemic hypotension causing intracranial hypotension resulting spontaneous cSDH were reported but none of these predisposing factors were observed in the patient (11). No evidence of head injury was detected and thus the cause of the bleeding remains unclear confirming a spontaneous SDH. The standard therapy of cSDH is a surgical evacuation, which usually improves the neurological picture. This is carried out by various surgical procedures such as burr-holes evacuation, the most popular technique worldwide, twist-drill craniostomy, craniotomy, endoscopic removal and subdural-peritoneal shunt, although all these procedures are associated with various complications (2, 3, 12).

To sum up, diagnosis of chronic subdural hematomas in young patients is very rare and a few cases are reported in the literature. Lower incidence of cSDH in children compared to adults caused these patients to be missed. Early

diagnosis and treatment with craniotomy and drainage revealed excellent prognosis.

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