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Case study

Progression of chronic subdural haematomas in an infant boy after abusive head trauma

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ABSTRACT

Abusive head trauma is a serious form of child abuse that can lead to severe neuropsychological sequelae or death in infants. In questionable cases, without a confession from the caregivers and ambiguous clinical information, evidence for the diagnosis of abusive head trauma is often based on typical patterns that have been observed in neuro-imaging. This study shows the progressive evolution of multifocal chronic subdural haematomas, including re-bleedings, in a case of abusive head trauma in an infant boy who was documented with repeated magnetic resonance imaging. The chronic subdural haematomas occurred during closely monitored in-patient rehabilitative care, and repeated maltreatment did not appear to be likely. Due to excessive growth, neurosurgical intervention with endoscopic craniotomy, evacuation of the subdural haematomas and temporal external cerebrospinal fluid drainage was performed with a favourable recovery. This study discusses the current pathophysiological knowledge concerning the development and clinical course of chronic subdural haematomas and draws relevant conclusions for the clinical practice and psychosocial management of caring for victims of abusive head trauma.

1. Introduction

Abusive head trauma (AHT) is a serious form of child abuse and is the most common cause of death and severe neurological impairment in infancy.[1] AHT results from the violent shaking of an infant who is held by his/her torso or extremities, which elicits an acceleration-deceleration motion of the head with a marked rotatory component. Shaking injuries may also be aggravated in an infant by hitting his/her head on a hard surface. Victims often present with a wide, non-specific spectra of clinical symptoms. A diagnosis of AHT is based on the concurrence of encephalopathy, subdural haematomas (SDHs), retinal haemorrhage and an incomplete or inconsistent medical history. Concomitant injuries such as external bruises or fractures in abuse-typical locations corroborate the diagnosis. Several diseases, e.g. glutaric aciduria type 1,

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coagulopathies, Menkes syndrome, meningoencephalomyelitis and others can mimic certain aspects of AHT and have to be diagnostically excluded.

Medical and psychosocial management of AHT cases are often complex and require a concerted interdisciplinary effort to facilitate an optimal outcome for the abused child. This study reports an exemplary case of AHT that was complicated by the growth of chronic SDHs and the occurrence of new haemorrhages that were independent of repeated abusive assaults.

2. Case study

A five-month-old infant boy was admitted to our intensive care unit in a comatose state with apnoea and severe encephalopathy. Upon inspection, the boy had several shaped haematomas on the trunk and the extremities and discretely on the left temple (Fig. 1). The past medical history and psychomotor development were unremarkable. The current history proposed by the parents was inconsistent.

The initial computed tomography (CT) scan showed bilateral frontotemporal fluid collections with multiple SDHs. A minimally dislocated cranial fracture was noted, and the cranial sutures were opened, which suggested an expansive force of the fluid collection. Complementary magnetic resonance imaging (MRI) revealed bilateral occipital SDHs (Fig. 2, first column) and a focal hypoxic-ischaemic lesion of the left frontal white matter, which appeared hyperintense in the diffusion-weighted imaging. Bilateral intraretinal and retrohyaloidal bleedings were identified in the ophthalmological exam. X-rays of the skeleton were inconspicuous except for a metaphyseal hyperintense line of the right femur, where a fracture could not be excluded. The laboratory exam revealed low haemoglobin (7.9 g/dl) but normal coagulation, electrolytes, liver enzymes, kidney enzymes, pancreas enzymes, lactate dehydrogenase, ammonia and creatine kinase. Metabolic screening excluded glutaric aciduria type 1. The boy developed focal epileptic seizures, which were successfully controlled with phenobarbital. Brainstem evoked response audiometry revealed a combined labyrinth and middle ear hypoacusis, which was considered posttraumatic because the neonatal hearing screening had been normal. The general condition and neurological status of the boy steadily improved; however, his head circumference, which was in the 25th percentile at birth, grew from the 90th percentile at the time of admission to the hospital to the 97th percentile three weeks later.

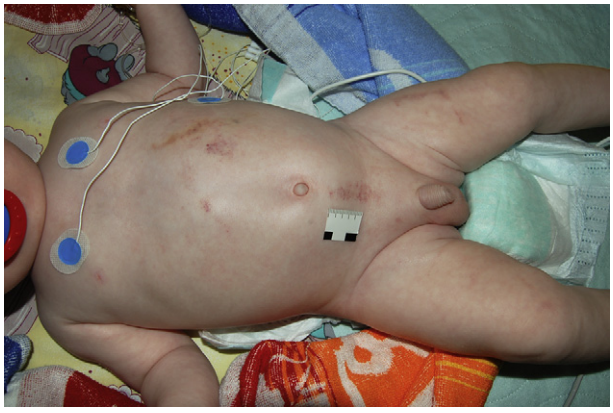

Fig. 1 – At admission, the boy had several haematomas that were located on the stomach and on both thighs. The haematomas were incongruous with the provided history of an accident.

The parents denied any responsibility for the condition of their child and seemed unconcerned by the suggestion that he might develop a persisting handicap. The youth welfare office had been in contact with the mother before and had suspected neglect of two older siblings from a different father. Nevertheless, the youth welfare office considered discharging the boy to the parents with home help and counselling. However, after concerns were raised by the treating paediatricians and a child abuse team, the mother and child were referred to a child rehabilitation hospital. A psychological assessment and evaluation of the mother–child interaction revealed that the mother had been abused during childhood, and she felt emotional ambivalence towards her son. The boy was finally dismissed into a children's home.

We observed the boy for a follow-up exam after two months, and his head circumference had remained in the 97th percentile. Cranial MRI revealed pronounced global brain atrophy. The chronic SDHs had grown in size and had accumulated increased protein density. At the follow-up exam, a new SDH of the temporoparietal left hemisphere and small new haemorrhages had developed at the border of the chronic SDHs in close proximity to the cortex (Fig. 2, second column). The interdisciplinary team was concerned about the expansion of the growing SDHs and decided to perform a neurosurgical intervention. After bilateral endoscopic craniotomy, the SDHs were evacuated and fenestrated, and drainage of some of the external cerebrospinal fluid (CSF) was maintained for several days. The child recovered without complications. After six weeks, an MRI showed that the SDH sizes had remained constant, but small new haemorrhages had occurred in the left hemisphere and in spatial proximity to the neurosurgical access (Fig. 2, third column). Psychomotor development was delayed for about three months. The next follow-up occurred when the boy was 13 months old; the SDHs were clearly regressive, and no additional haemorrhages were evident (Fig. 2, fourth column). In addition, the head circumference was now in the 90th percentile. Emotional, cognitive and motor development remained impaired.

3. Discussion

This study presented an unusual case of AHT that was complicated by the progressive evolution of SDHs, including re-bleedings without adequate trauma, which required neurosurgical intervention. The diagnosis of AHT was highly conclusive at admission after considering all of the relevant criteria, namely encephalopathy, SDHs, retinal haemorrhage and an inconsistent medical history. Surprisingly, a longitudinal MRI depicted growth of the initial SDHs and the formation of a new SDH despite hospitalisation and professional