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Case report

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Traumatic retroclival subdural hematoma: case report and a review of the literature

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Abstract

Traumatic retroclival subdural hematoma is a rare entity that is more prevalent in the paediatric population. We managed a 3-year-old female with traumatic retroclival subdural hematoma. The mechanism of injury, treatment protocol, and outcome were highlighted. Prompt and accurate diagnosis of retroclival subdural hematoma with the aid of high-resolution computed tomography is key to a satisfactory outcome.

Introduction

Retroclival hematomas are rare types of intracranial hemorrhage that are usually associated with significant head trauma. The majority are epidural retroclival hematoma and children are reported to be most affected. Retroclival subdural hematoma (rcSDH) is not as common as retroclival epidural hematoma and it constitutes about 0.3% of all acute subdural hematomas. The combination of rcSDH and retroclival epidural hematoma is very rare and only four cases have been reported [1]. The mechanism of retroclival subdural hematoma is not fully understood [2]. The etiologies of rcSDH include trauma, spontaneous, pituitary apoplexy, bleeding disorders, abusive head trauma, and post aneurysmal rupture [3]. Acute care physicians, especially neurosurgeons should be aware of this uncommon sequela of head injury to ensure prompt and accurate diagnosis since there are no pathognomonic clinical features, though, abducent nerve palsy has been reported [1, 2]. This report aims to document, perhaps the youngest patient with traumatic rcSDH following road traffic accident and the first case to be reported from the African continent.

Patient and observation

A 3-year-old female was admitted to the emergency department 12 hours post passenger motor vehicle accident. The patient was sitting on the lap of her mother who was a middle row passenger of a bus that had a head-on collision with a truck on the highway. She presented with altered sensorium and had four episodes of vomiting and an episode of generalized tonic clonic seizures on arrival at the emergency room. Examination revealed an ill-looking young girl, the Glasgow Coma Scale Score was 15, pupils were 3mm bilaterally and brisk, there was no cranial nerve deficit and no focal neurologic deficit. She had upper cervical posterior midline nuchal tenderness. The examination of the other systems was normal.

Clinical diagnosis of mild head injury was made. Craniocervical CT Scan revealed retroclival subdural hematoma extending from the dorsum sellae to the C4 cervical spine subdural space and its maximum thickness was 22mm (Figure 1). She had no odontoid fractures. There was associated crowding of the foramen magnum. The brain and brainstem were normal and there was no hydrocephalus. The coagulation profile was within normal limits, but she was transfused on account of anemia (hematocrit 20%). She was managed conservatively and the neck was immobilized with Philadelphia cervical collar. Magnetic Resonance Imaging (MRI) of the Brain and Cervical spine obtained 4-weeks post-trauma demonstrated complete resolution of the hematoma (Figure 2) and the dynamic cervical spine X-rays done did not reveal any abnormality. She was discharged home 6-weeks post-trauma.

Discussion

Retroclival subdural haematoma has been reported to be more common in children than adults, although traumatic rcSDH is rarely reported in the under-five age group. This patient is the youngest to be reported in the literature with rcSDH following a road traffic accident. Forty-six cases have been reported in the English literature (Table 1). Twenty-seven (58.6%) cases were reported in the adult population and 19 (41.3%) cases occurred in children (age less than 18 years). Our patient had retroclival subdural hematoma extending from the dorsum sellar to the C4 vertebral level. The extent of the hematoma is beyond the limit of attachment of the tectorial membrane. The tectorial membrane is the cranial continuation of the posterior longitudinal ligament [2]. Retroclival epidural hematoma is restricted to the midpoint of the clivus superiorly and it reaches inferiorly to the middle of the axis, whereas, retroclival subdural hematoma can extend beyond C2 inferiorly [2, 4].

The etiology of the rcSDH in this patient was a road traffic accident. Trauma accounted for retroclival subdural hematoma in 12 (26%) of the cases reported in the literature, out of which seven

patients were involved in road traffic accident, four patients fell from height and one patient was a victim of an assault. Our patient is likely the youngest patient to be reported with rcSDH following a road traffic accident. Retroclival subdural hematoma following trauma has been reported in six children, which is the same as the number of cases reported in adults. Several hypotheses have been proposed to explain the etiology of the subdural bleed. It may result from injury to the tectorial membrane, dura, and traumatic arachnoid tear [5]. Shearing forces following trauma can rupture the bridging petrosal and small veins close to the foramen magnum thereby causing the rcSDH. It has been suggested that the intracranial subdural hematoma can gradually redistribute into the spinal subdural space [4]. Children have certain structural features that may predispose them to rcSDH such as a large head compared to the body size, small occipital condyles, and weak cervical muscles. Children are also at a higher risk of ligamentous injury, due to greater physiologic flexion and extension of their cervical spine. Retroclival subdural hematoma appears to be more common in abusive head injury and 12 such cases of rcSDH were reported by Silvera *et al.* [5]. Spontaneous rcSDH has been reported in 8 patients [6, 7] and rcSDH in a patient with hemophilia was reported by Myers *et al.* [8].

Our patient presented with generalized tonic-clonic seizures, vomiting, and other injuries, including brachial plexus injury and fractures of the long bones, which suggested that the patient had a high energy impact injury. The clinical presentation of patients with rcSDH can be protean. Most patients report cranial nerve VI deficit, because of its course within the subarachnoid space, and the deficit can be either unilateral or bilateral. Our patient did not have a cranial nerve deficit. The diagnosis in our patient was made with a cranial computed tomography. Computed tomography (CT) is the initial study of choice in the trauma setting but the diagnosis of rcSDH may be missed on cranial CT scan if it is a thin film of subdural hematoma, in restless patients due to bony artifacts, and old generation cranial CT scan [9]. It is also possible that a significant number of patients are not diagnosed because of poor access to CT facility in developing countries. MRI has been adjudged to be more sensitive compared to computed tomography [2] and the associated ligamental injury can also be adequately assessed. The patient was managed non-operatively with a rigid Philadelphia collar and active physiotherapy. The follow-up cervical spine magnetic resonance image four-week post-trauma confirmed complete resolution of the hematoma (Figure 2). Flexion and extension studies of the cervical spinal did not reveal any instability and she was subsequently discharged home. The management of rcSDH depends on the clinical condition of the patient [9, 10]. Most cases are managed non-operatively, however, patients with progressive clinical symptoms may require surgical intervention [2, 9, 10]. Retroclival hematoma usually resolves within 2 to 11 weeks post-trauma [1]. The outcome is good and only two mortalities were reported in the literature [7, 8].

Conclusion

Retroclival subdural hematoma, due to road traffic accidents remains infrequent and high resolution cranial computed tomographic scan and magnetic resonance imaging are needed to make the precise diagnosis. In most cases, patients presenting with good neurologic status can be managed non-operatively with a good outcome.

Competing interests

The authors declare no competing interests.

Authors' contributions

Adefisayo Ayoade Adekanmbi: conception, design, acquisition of data, drafting, revising and final approval of the manuscript. Augustine Abiodun Adeolu: conception, design, acquisition of data, drafting, revising and final approval of the manuscript. All the authors have read and approved the final version of the manuscript.

Table and figures

Table 1: literature review of retroclival subdural hematoma

Figure 1: A) axial CT; B) coronal CT; C) sagittal CT scan demonstrating retroclival subdural hematoma extending from the dorsum sella to the C4 cervical subdural space

Figure 2: A) axial; B) sagittal magnetic resonance imaging at 4 weeks post trauma, demonstrating resolution of the retroclival subdural hematoma

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Table 1: literature review of retroclival subdural hematoma

Author	Year	No of cases	Age	Sex	Mechanism	Clinical presentation	Treatment	Outcome
Casey *et al.*	2009	1	18years	M	Trauma (Assault injury)	Headache, Altered sensorium	Non operative	Good
E. S. Ahn and E. R. Smith	2005	1	4years	M	Trauma (Fall from height)	Altered sensorium	Non operative	Good
S Dayaratne	2015	1	6years	F	Trauma (road traffic accident)	Headache, quadriparesis	Surgery (not mentioned)	Good
Han	2015	1	48years	M	Spontaneous	Headache	Non operative	Good
Krishnan P *et al.*	2013	1	59years	F	Spontaneous	Altered sensorium Coagulopathy disorder	Non operative	Died
Sridhar *et al.*	2010	2	18years 19years	M M	Trauma (road traffic accident)trauma (road traffic accident)	Bilateral abducent palsy Headache and neck pain	Surgery (far lateral approach) Non operative	Good Good
Nguyen	2016	1	8years	M	Trauma (road traffic accident)	Bilateral abducent palsy	Non operative	Good
Myers	1995	1	17years	M	Hemophilia	Headache and neck pain		Died
Silvera *et al.*	2014	12	3 months	M	Abusive head trauma	Not presented	Not presented	
			1 month	F	Abusive head trauma			
			3 months	M	Abusive head trauma			
			1 month	M	Abusive head trauma			
			3 years	M	Abusive head trauma			
			30 months	M	Abusive head trauma			
			7 months	F	Abusive head trauma			
			7 months	F	Abusive head trauma			
			3 months	M	Abusive head trauma			
			4 months	F	Abusive head trauma			
			4months	M	Abusive head trauma			
			30 months	F	Abusive head trauma			
van Rijn	2003	1	72 years	M	Spontaneous	Headache, altered sensorium, bilateral abducent nerve palsy	Not presented	Not presented

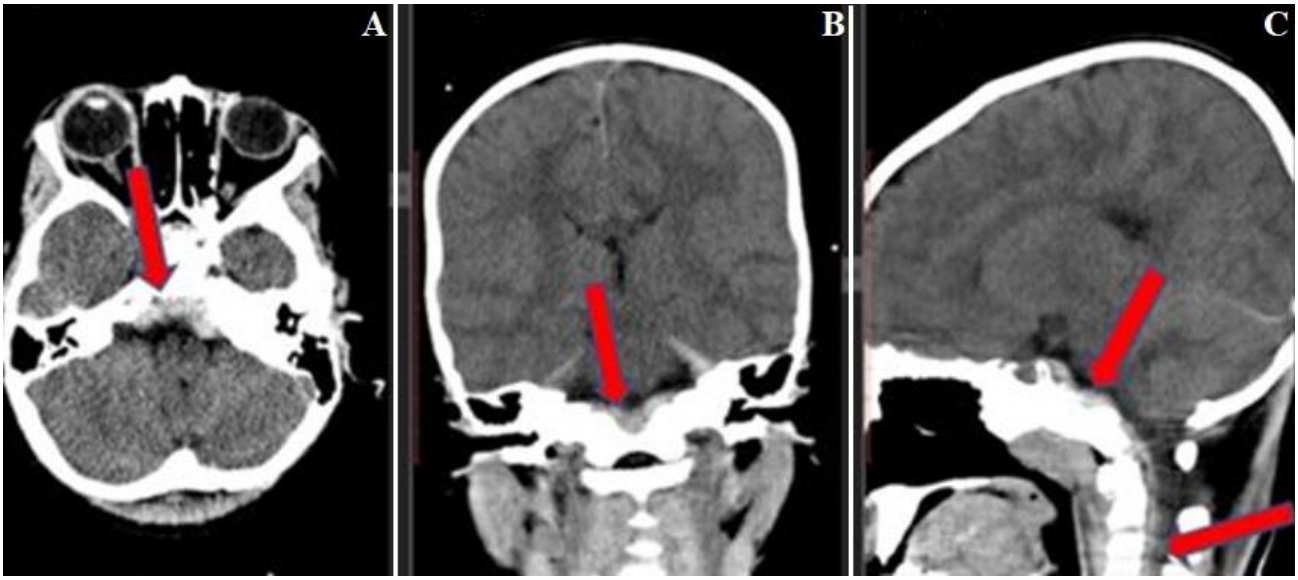

Figure 1: A) axial CT; B) coronal CT; C) sagittal CT scan demonstrating retroclival subdural hematoma extending from the dorsum sella to the C4 cervical subdural space

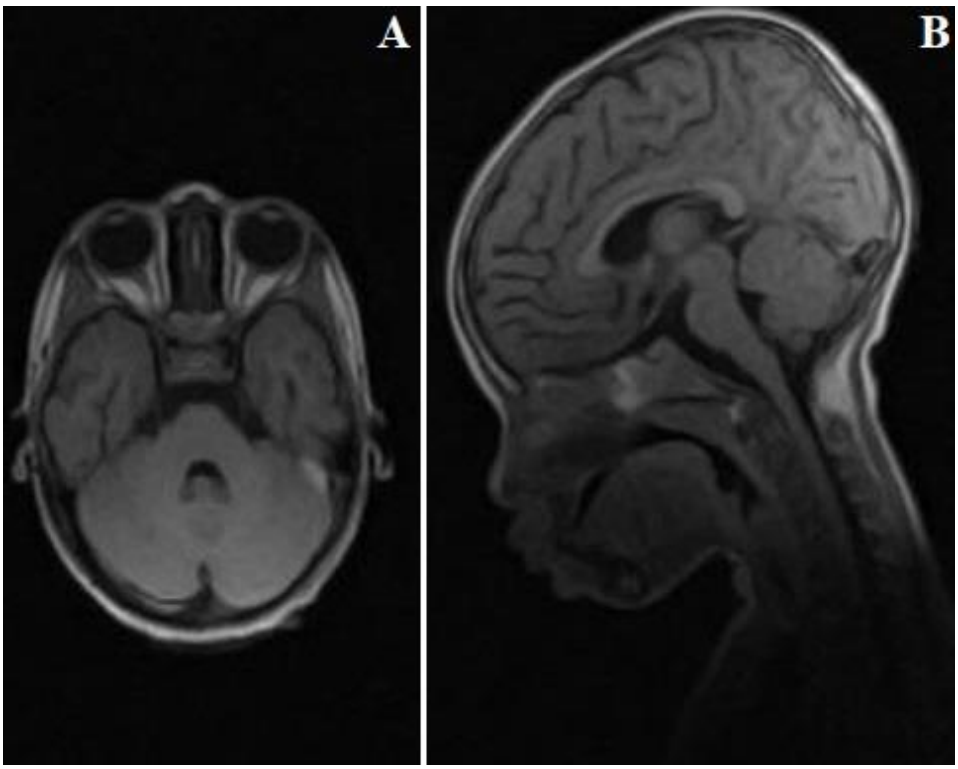

Figure 2: A) axial; B) sagittal magnetic resonance imaging at 4 weeks post trauma, demonstrating resolution of the retroclival subdural hematoma