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CASE REPORT

Traumatic Paediatric Retroclival Epidural Haematoma

MH Al-Omari, OM Albtoush, LA Rousan

Department of Radiology, King Abdullah University Hospital, Jordan University of Science and Technology, Irbid, Jordan

ABSTRACT

Retroclival epidural haematoma is a very rare type of haematoma that occurs mainly in the paediatric age-group, as a result of ligamentous laxity at the craniocervical junction. All previously reported cases were pedestrians or cyclists hit by a motor vehicle and most were treated conservatively. Reconstructed computed tomography or magnetic resonance imaging is essential for diagnosis. We describe a 5-year-old boy with retroclival epidural haematoma who presented with a unilateral abducens nerve palsy.

Key Words: *Brain injuries; Cranial fossa, posterior; Dislocations; Hematoma, epidural, cranial*

中文摘要

小兒外傷性斜坡後方硬膜外血腫

MH Al-Omari、OM Albtoush、LA Rousan

斜坡後方硬膜外血腫是一種極為罕見的血腫，主要發生在小孩身上，因顱頸交界處有韌帶鬆弛而引致。文獻中報告的病例全都是因為行人或單車人士被汽車撞倒，大部分傷者都施以保守治療。重建CT或磁共振影像對於診斷此病有莫大幫助。本文報告一名五歲男孩出現斜坡後方硬膜外血腫，病發時有單側外展神經麻痺。

INTRODUCTION

Posterior fossa epidural haematoma is uncommon, whilst retroclival epidural haematoma (REH) is extremely rare. There are 16 reported cases in the paediatric age-group; first being in 1986.[1] Ligamentous laxity at the craniocervical junction appears to be the predisposing factor. All previously reported cases shared the same features. These were trauma in the paediatric patients (aged 5-12 years), and most of whom were treated conservatively, though the condition could very rarely be fatal.[1,2] Three previously reported cases presented with bilateral abducens nerve palsies,[3-5] while our patient is the first to do so with unilateral abducens nerve palsy (Table[3-5]).

CASE REPORT

History and Examination

A 5-year-old boy was hit by a bus on his right side and thrown about 5 metres from the impact point. On arrival at our hospital wearing a neck collar, he was crying and actively moving all limbs, but there was no history of loss of consciousness or vomiting. On examination, his

Correspondence: *Dr Omar Mohammed Albtoush, Department of Radiology, King Abdullah University Hospital, Jordan University of Science and Technology, Irbid, Jordan.*
Tel: (962) 7 7774 5006; Fax: (962) 7 2720 0627; Email: o.albtoush@yahoo.com

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Table. Reported cases of traumatic epidural haematoma in the paediatric age-group giving rise to bilateral abducens nerve palsies.[3-5]

Source	GCS / MOT	Neurological findings	Outcome
Papadopoulos et al,[3] 1991	4 / RTA	Bilateral abducens nerve palsies, tetra paresis	Good
Mizushima et al,[4] 1998	6 / RTA	Pareses of upper limbs, bilateral abducens nerve palsies	Good
Agrawal and Cochrane,[5] 2006	7 / RTA	Bilateral abducens nerve palsies	Good
Present case	9 / RTA	Right abducens nerve palsy	Good

Abbreviations: GCS = Glasgow Coma Scale score; MOT = mechanism of trauma; RTA = road traffic accident.

Glasgow Coma Scale (GCS) score was 9; vital signs were stable, and there was left forehead skin ecchymosis and small right orbital skin laceration. He opened his eyes in response to painful stimulation, had normal reactive pupils but limited lateral movement of the right eye. Moreover he could produce sounds and was able to localise pain.

Imaging

Computed tomography (CT) of the brain revealed multiple foci of haemorrhagic contusions in both parietal and left temporal areas, and minimal haemorrhage within the third ventricle. Haemorrhagic contusion was also noted in the septum pellucidum, with evidence of a retroclival haematoma measuring about 9 mm in thickness extending from the odontoid process to the posterior clinoid process with effacement of the basal cisterns (Figure 1). CT cervical spine showed a small thin epidural haematoma anterior to the cord at the C2 level with normal alignment of the cervical spine and no suspicion of a fracture line or atlantoaxial dislocation. Chest and abdomen CT showed lung contusions and a small left scapular fracture at the medial edge of the spine and a subcapsular splenic haematoma measuring about 7 mm in thickness.

Follow-up

On the next day his right eye movement had returned to normal, but with no change in his GCS score. A cervical spine magnetic resonance image (MRI) showed a REH (maximum thickness, 9 mm) that extended inferiorly to the tip of odontoid process and superiorly to the posterior clinoid process that was limited by the membrane tectoria (Figure 2). A small thin epidural haematoma anterior to the cord at the C2 level was also noted. Brain CT showed no interval changes.

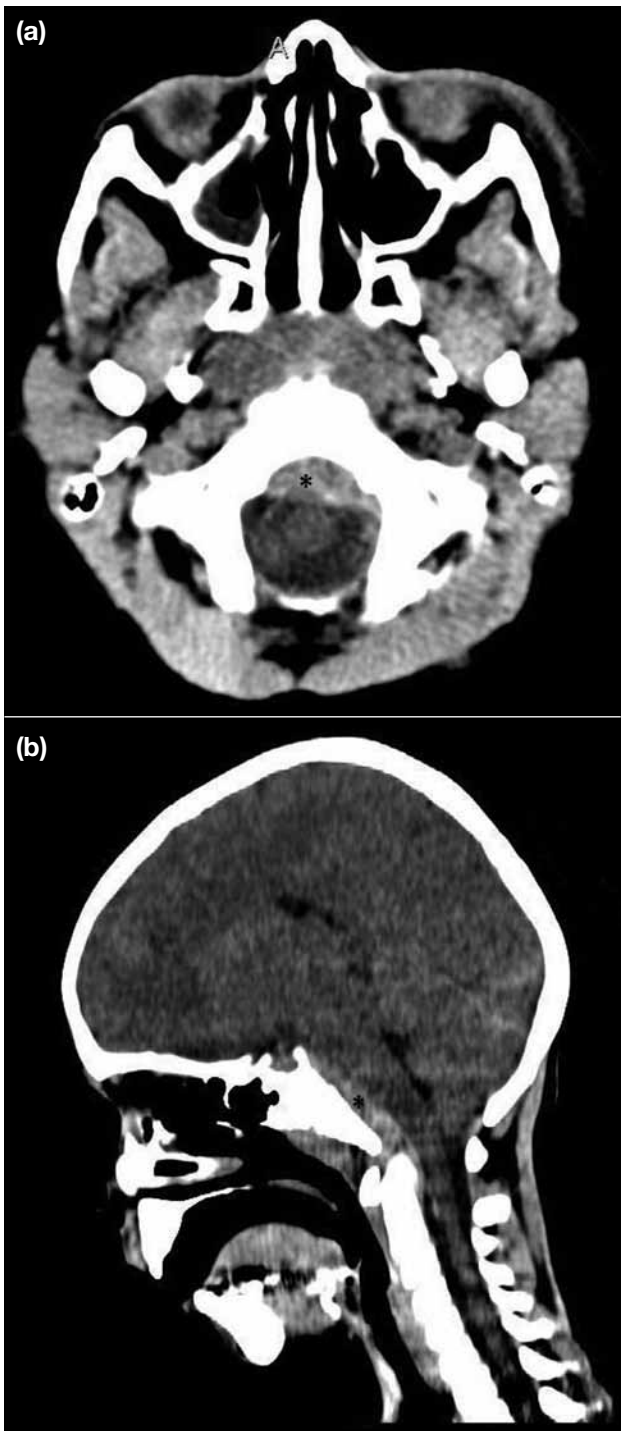

Figure 1. Initial (a) axial and (b) sagittal computed tomographic scans showing the retroclival epidural haematoma (*) anterior to the brain stem and posterior to the clivus and obliterating the prepontine cistern, measuring 9 mm in thickness.

On the seventh day, the patient's level of consciousness improved with a GCS score of 11. He was able to open his eyes spontaneously, produce sounds, and localise pain.

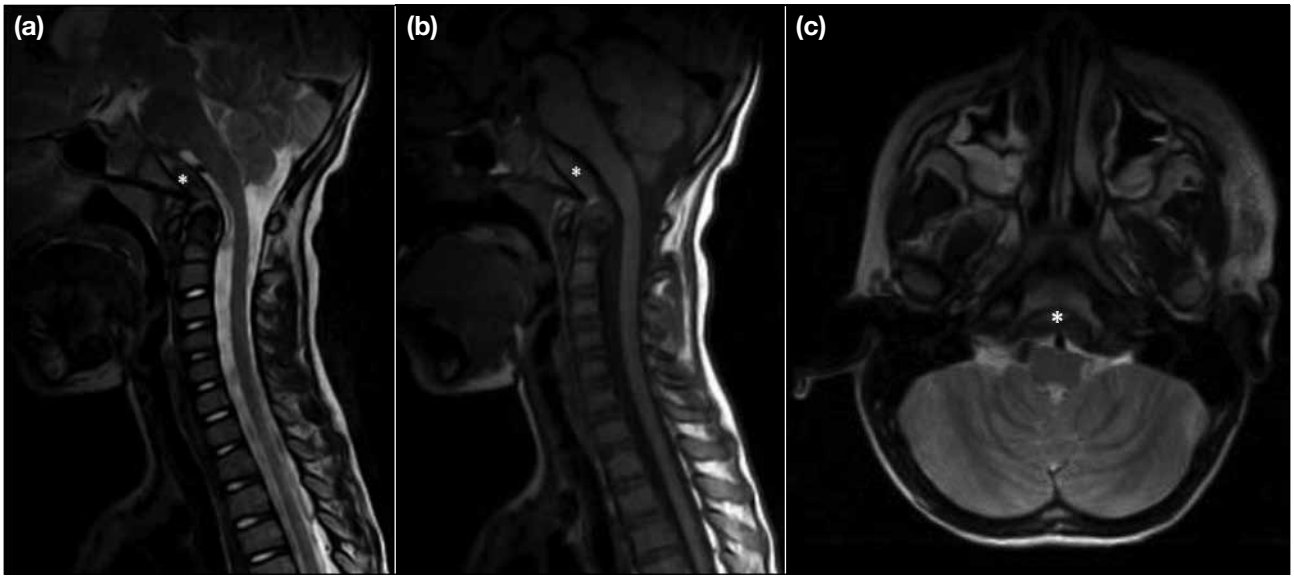

Figure 2. (a) Sagittal T2, (b) sagittal T1, and (c) axial T2 magnetic resonance images showing the retroclival epidural haematoma (*) anterior to the brain stem and posterior to the clivus obliterating the prepontine cistern, and measuring 9 mm in thickness.

On the eighth day, the patient remained stable with the same GCS score. Follow-up brain and cervical spine CT showed a significant decrease in the haematoma thickness measuring about 5.5 mm (Figure 3).

At day 11, GCS score had improved to 13 and the patient started producing incomprehensible words and obeying commands, and was transferred to the paediatric floor.

After two weeks, a follow-up CT revealed nearly complete resolution of the REH (Figure 4), while the patient became clinically normal with a GCS score of 15.

DISCUSSION

REHs are rare, always following trauma, and only 16 cases of REH have been reported in the paediatrics literature; most have occurred in the paediatric age-group after a motor vehicle accident. The mechanism of haematoma development is not well-understood but could be due to the craniocervical junction being less stable in children owing to ligamentous laxity, relatively smaller occipital condyles than in adults, and the horizontal articulation between the cranium and the atlas.[6] Moreover, the dura is more easily displaced from the skull, leading to venous haemorrhage.[7] A few cases have been reported in adults.[8]

REH may be associated with bone fracture or ligamentous injury at the craniocervical junction. It seems that the most frequently affected cranial nerve is the abducens, which was affected bilaterally in all previously reported cases.[3-5] This is considered a non-specific sign related to the increased intracranial pressure, however, this is the first reported case with unilateral palsy.

Of all the cranial nerves, the abducens nerve has the longest subarachnoid course that consists of intracisternal, intracavernous, and intraorbital parts. Its nucleus is located in the pons. It innervates the ipsilateral lateral rectus muscle to abduct the ipsilateral eye, and about 40% of its neurons also innervate the contralateral medial rectus subnucleus participating in contralateral eye adduction. Patients with abducens nerve palsy usually present with binocular horizontal diplopia and esotropia (inward squinting) of primary gaze.

The differential diagnosis of abducens nerve palsy as the main presenting symptom includes vascular disorders (30%), inflammatory disorders (19%), tumours (11%), as well as trauma (3%).[9] The differential diagnosis of traumatic lateral gaze palsy includes brain stem lesions such as diffuse axonal injury, peripheral nerve injury with or without basilar skull or cervical fracture, and lateral rectus muscle injury or entrapment.[10] Bilateral sixth nerve palsy can occur due to increased intracranial pressure, dural puncture, and following trauma to the craniocervical region.[11]

Figure 3. Follow-up (a) axial and (b) sagittal computed tomographic scans after 7 days.

Figure 4. A follow-up sagittal computed tomographic scan after two weeks.

Abducens nerve palsy following trauma can be attributed to mechanical or ischaemic injury. The former results from nerve compression by a haematoma or a surrounding structure (such as ligament or dura matter). The latter results from nerve ischaemia due to vessel compression or vasospasm. In our patient, the mechanism of the right abducens palsy was presumed to be direct mechanical nerve compression by the REH.

Meticulous physical examination combined with evaluation for basilar and cervical fractures, axonal injury, and appropriate imaging of basilar cisterns, the cavernous sinus and orbital region can aid in the identification of the cause of traumatic gaze palsies. Special types of imaging include high-resolution multiplanar CT scan (Figure 1) or MRI (Figure 2).

Most cases of REH are treated conservatively and result in good outcome. However, if there is expansion of the haematoma and brain stem compression, there may be a fatal outcome.

CONCLUSION

In addition to previously reported cases, our case showed that this unique type of haematoma should be kept in mind especially in paediatric victims of trauma. If suspected, MRI should be performed to facilitate a more accurate diagnosis with a view to avoid missing the diagnosis.

REFERENCES

1. Orrison WW, Rogde S, Kinard RE, Williams JE, Torvik A, Sackett JF, et al. Clivus epidural hematoma: a case report. Neurosurgery. 1986;18:194-6.
2. Vera M, Navarro R, Esteban E, Costa JM. Association of atlanto-occipital dislocation and retroclival haematoma in a child. Childs Nerv Syst. 2007;23:913-6.
3. Papadopoulos SM, Dickman CA, Sonntag VK, Rekate HL, Spetzler RF. Traumatic atlantooccipital dislocation with survival. Neurosurgery. 1991;28:574-9.
4. Mizushima H, Kobayashi N, Sawabe Y, Hanakawa K, Jinbo H, Iida M, et al. Epidural hematoma of the clivus. Case report. J Neurosurg. 1998;88:590-3.
5. Agrawal D, Cochrane DD. Traumatic retroclival epidural hematoma — a pediatric entity? Childs Nerv Syst. 2006;22:670-3.
6. Bucholz RW, Burkhead WZ. The pathological anatomy of fatal atlanto-occipital dislocations. J Bone Joint Surg Am. 1979;61:248-50.
7. Robertson JH, Clark WC, Acker JD. Bilateral occipital epidural hematomas. Surg Neurol. 1982;17:468-72.
8. Kwon TH, Joy H, Park YK, Chung HS. Traumatic retroclival epidural hematoma in a child: a case report. Neurol Med Chir. 2008;48:347-50.
9. Berlit P, Reinhardt-Eckstein J, Krause KH. Isolated abducens paralysis — a retrospective study of 165 patients [in German]. Fortschr Neurol Psychiatr. 1989;57:32-40.
10. Baker RS, Epstein AD. Ocular motor abnormalities from head trauma. Surv Ophthalmol. 1991;35:245-67.
11. Kim MS, Cho MS, Kim SH. Delayed bilateral abducens nerve palsy after head trauma. J Korean Neurosurg Soc. 2008;44:396-8.