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Case Report

Retroclival and spinal subdural hematoma after traumatic brain injury - A case report and literature review

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ABSTRACT

Background: Retroclival hematomas are rare and occur mostly in the pediatric population. They are variously attributed to trauma, apoplexy, and vascular lesions. With motor vehicle accidents (MVAs), the mechanism of traumatic injury is forced flexion and extension. There may also be associated cervical spinal and/or clivus fractures warranting fusion.

Case Description: A 35-year-old male sustained a traumatic brain injury after a fall of 5 m at work. His Glasgow coma scale (GCS) on admission was 13 (M6V3O4). He had no cranial nerve deficits. The brain computed tomography (CT) showed a retroclival subdural hematoma that extended to the C2 level.

Conclusions: Most retroclival hematomas are attributed to MVAs, and cranial CT and magnetic resonance studies typically demonstrate a combination of posterior fossa hemorrhage with retroclival hematomas (intra or extradural). Patients with retroclival hematomas but high GCS scores on admission usually have better prognoses following traumatic brain injuries attributed to MVA. Notable however is the frequent association with additional cervical and/or craniocervical injuries (e.g. such as odontoid fracture) that may warrant surgery/fusión.

Keywords: Retroclival hematoma, subdural hematoma, traumatic brain injury

INTRODUCTION

Retroclival hematomas are rare, occurring mostly in the pediatric age group.[7] They are variously attributed trauma (motor vehicle accidents [MVAs] and forced flexion/extension injuries), apoplexy, vascular lesions, and anticoagulants.[1] They are typically classified as epidural or subdural and are often associated with cervical spine and/or clivus fractures.[3] Many patients present with sixth cranial nerve palsies that typically recover. Rarely, patients require posterior fossa decompression, cervical fusion, and/or occipitocervical

Table 1: Comparative table of traumatic cases with retroclival hematomas.

Authors	Year	Age	Sex	Mechanism	Neurological findings	Epidural/ subdural	Vascular injuries	Associated injuries	Follow-up	Treatment
Fuentes[4]	2000	47	Female	MVA	Tetraparetic; Left abducens paralysis	Epidural	NA	Bilateral occipital condyle fracture	GR	Suboccipital craniectomy and laminectomy C1
Khan[6]	2000	19	Male	MVA	Right III, bilateral VI, right VII, palsy	Epidural	NA	Clivus fracture	GR	Conservative treatment
Ratilal[4,6]	2006	26	Female	MVA	Bilateral VI palsy; Bilateral V paresthesias; Left XII palsy	Epidural	NA	Right transverse process of C6	GR	Conservative treatment
Casey *et al.*[2]	2009	18	Male	Assaulted	GCS 13, no focal deficits	Subdural to C2	NA	None	GR	Conservative treatment
Garton *et al.*[4]	2010	38	Female	MVA	GCS15, Right VI palsy	Epidural	NA	Left condyle fracture and occipital instability – C1	GR	Occipitocervical fusion to C2
		44	Female	MVA	GCS8, mild right hemiparesis. Right VI palsy	Epidural	No	Subluxation C1–C2 and C5–C6	GR	Occipitocervical fusion to C2 and C5–C6
		20	Male	MVA	Respiratory arrest and intubation, GCS NA, quadriplegia, bilateral VI palsy	Epidural	NA	Occipital-atlantoid luxation	GR after 5 years	Occipitocervical fusion to C3
		67	Female	MVA	GCS NA, Bilateral VI palsy. Quadriparesis, center medullary pattern	Epidural	NA	Luxation C1–C2	GR	Fusion C1–C2
Sridhar *et al.*[7]	2010	18	Male	MVA two-wheeler	GCS 15; Bilateral VI palsy	Subdural to C1	No	None	GR	Hematoma drainage by far right lateral approach
		19	Male	Fall from a moving bus	GCS 15, Headache and neck pain	Subdural to C1	No	None	GR	Conservative treatment
Ayberk[6]	2011	47	Female	Fall from 3 m	GCS 13, right otorrhea	Subdural	NA	Sphenoid sinus fracture	GR	Drainage of right frontoparietal epidural hematoma
Pérez-Bovet[6]	2013	68	Male	MVA	GCS 15 at first and then a cardiac arrest	Epidural to C2	NA	Odontoid fracture	Dead	Cardiorespiratory arrest
Datar *et al.*[3]	2013	75	Male	Tripped on rug.	Normal	NA	NA	Odontoid fracture	Dead	Posterior fusion
Nguyen *et al.*[6]	2017	32	Female	MVA	GCS 15	Subdural to C7	No	C1 fracture	GR	Suboccipital craniectomy, C1–C3 laminectomy, and occipitocervical fusion.
Izumida and Ogura[5]	2017	64	Male	Sincope	Normal	Epidural	No	None	GR	Conservative treatment
Present case	2018	35	Male	Fall from 5 m	GCS 13, cranial nerves normal	Subdural to C2	No	Left wrist fracture	GR	Conservative treatment

MVA: Motor vehicle accident, GR: Good recovery, NA: Not available, GCS: Glasgow coma scale

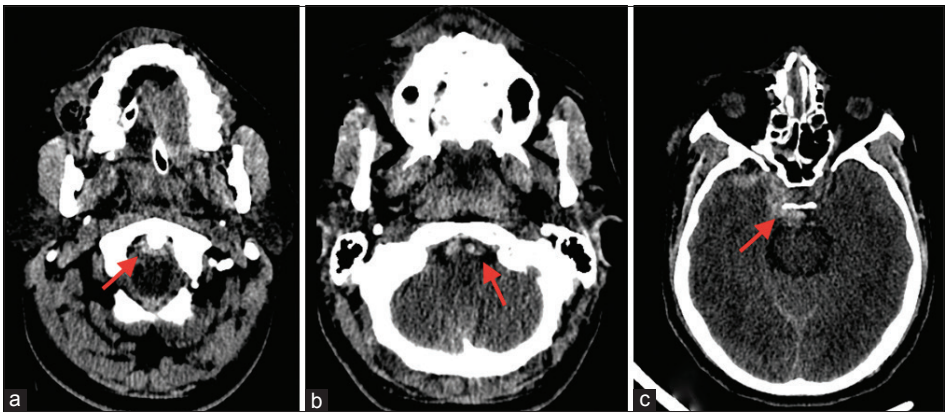

Figure 1: Axial computed tomography scan with subdural hematoma (red arrows). (a) Odontoid level, (b) bulbar level, (c) mesencephalic level.

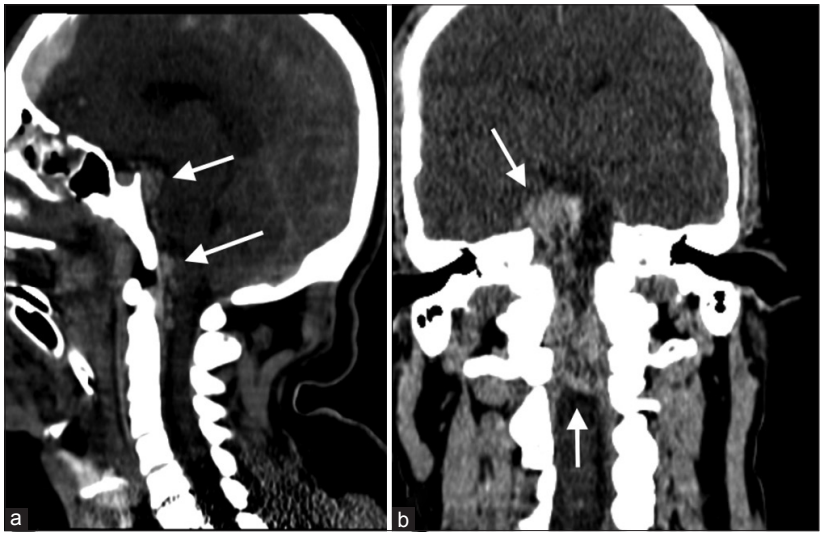

Figure 2: Computed tomography scan with subdural hematoma (white arrows). (a) Sagittal, (b) coronal.

fusion (e.g., if an odontoid fracture is also present).[3,4,6] Here, we present a 35-year-old male who did well following a traumatic brain injury, resulting in a retroclival hematoma extending to the C2 level that did not warrant surgical intervention.

CLINICAL CASE

A 35-year-old male sustained a traumatic brain injury (Glasgow coma scale [GCS] of 13) following a fall of 5 m. On admission, he was delirious and had bilateral pupils measuring 3 mm without attendant cranial nerves palsies. The skull X-ray showed a non-displaced right frontotemporal fracture and fractures of the right orbital floor, lateral wall/roof, and nasal bones. The brain computed tomography (CT) documented a posttraumatic subarachnoid hemorrhage, right frontal subdural hematoma, and retroclival subdural hematoma extending to the C2 level with partial collapse of the infratentorial cisterns [Figures 1-3]. There was also a left mandibular ramus fracture, plus a distal metaphyseal fracture of the left wrist; none of these warranted operative intervention.

Following a hospital stay of 11 days, the patient fully recovered (i.e., GCS of 15 points [M6V5O4]) and exhibited no residual neurological deficits. Further, he remained intact 12 months later.

DISCUSSION

Most retroclival hematomas are attributed to MVAs and generally carry a good prognosis [Table 1]. A significant subset will exhibit attendant cervical spine and/or occipitocervical injuries with vertebral instability that may warrant fusion. Most cases can be treated conservatively.[5] Garton *et al.* reported four cases of retroclival hematomas in patients exhibiting sixth cranial nerve paralysis.[4] Diagnostic studies for retroclival hematomas include magnetic resonance (MR) and CT evaluations to best document the extent of posterior fossa hemorrhage and intra- or extra-dural retroclival hematoma, along with craniovertebral ligament injuries, clot migration, and/or occipitocervical fractures.[2,3]

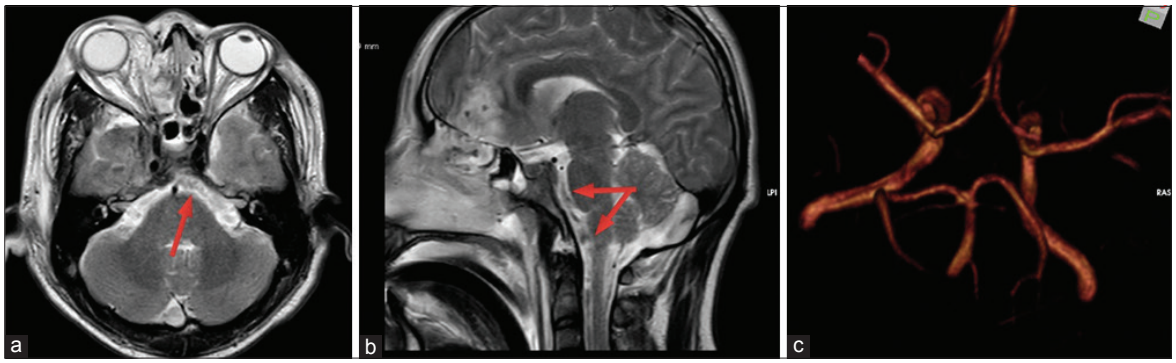

Figure 3: T2 magnetic resonance (MR) with subdural hematoma (red arrows). (a) Axial at pontine level, (b) sagittal, (c) MR angiography without vascular malformation.

In the case presented, the patient had no cranial nerve palsies and required no surgery despite CT-documented posttraumatic subarachnoid hemorrhage, a right frontal subdural hematoma, a retroclival subdural hematoma extending to the C2 level, and partial collapse of the infratentorial cisterns. Notably, he was fully intact on discharge 11 days later.

CONCLUSIONS

Retroclival hematomas are rare in adults. These patients should undergo both CT and MR studies to document the location/extent of these hematomas along with other cranial/cervical pathology (e.g., hematomas, fractures, and ligamentous injuries). The majority of patients do well without surgical intervention; only a few warrant posterior fossa decompression for clot evacuation with/without cervical and/or craniocervical fusion.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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