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Original Research Article

A Retrospective Assessment of Traumatic Posterior Fossa Extradural Hematoma: An Observationla Study

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Abstract

Aim: The aim of the present study was to assess the traumatic posterior fossa extradural hematoma in UP region.

Methods: The present study was conducted at Department of Neurosurgery, Kashi Neuron Multispeciality Hospital ,Ramnagar ,Varanasi UP, India for one year . We found a total of 596 cases of EDHs, of which only 50 (8.38%) were located in the posterior fossa. The records were retrospectively analyzed for clinical presentation, admission Glasgow Coma Scale (GCS), mode of injury, radiological findings, any other associated intracranial traumatic lesion, type of intervention and postoperative outcome.

Results: The mean age of patients was 29.7 years (4–43 years). 20 (40%) of them were below 18 years. 14 (28%) of them were females. Most common mode of injury was road traffic accident (n = 35, 70%), rest were either fall from height (n =12, 24%) or assault (n = 3, 6%). Post-resuscitation admission GCS varied from GCS 15 in 31 (62%) cases, GCS 13–14 in 9 (18%), GCS 9–12 in 7 (14%), and GCS 3–8 in 3 (6%) cases. Two patients died. Mean follow-up duration was 68.2 months. At 6 months follow-up, 44 (88%) patients had a good recovery (GOS 5) and at 12 months follow-up, 45 (90%) patients had GOS 5. In addition, patients with isolated PFEDH (n = 43) had a much better outcome. 30 out of 43 were discharged with GCS 15. At 6 months and 12 months follow-up, all 43 had good recovery (GOS 5).

Conclusion: PFEDH are rare. They may be rapidly fatal due to the expansion of hematoma and compromise of the posterior cranial fossa space leading to brainstem compression, tonsillar herniation, and/or obstructive hydrocephalus. Early diagnosis and emergent evacuation lead to good outcome. They are usually associated with occipital bone fractures and may also have associated injuries in form of supratentorial or infratentorial subdural hematoma, intraparenchymal hematoma or intraventricular hemorrhage.

Keywords: Extradural hematoma, posterior fossa, surgery, trauma

Introduction

Posterior fossa injuries is uncommon and accounts for less than 3% of all head injuries. [1] Among that traumatic posterior fossa injuries extradural hematoma (EDH) is the most common, accounting for 10% of all extradural hematomas. [2] Before the emergence of CT scan, posterior fossa extradural hematomas were rarely diagnosed in alive patients. [3] It was very difficult to diagnose based on clinical picture alone and is unfortunate since it is an easily preventable cause of mortality. [4] Posterior fossa EDH has a very high morbidity and mortality rates. [5] Improvement in diagnostic methods, management protocols: and treatment modalities have resulted in substantial reduction in mortality and morbidity and improvement in outcome. [6]

Posterior fossa extradural haematoma (PFEDH) is known for the vague signs and symptoms and a notorious course that varies from recovery to sudden death. Extradural posttraumatic posterior fossa hematoma is a rare condition estimated to complicate about 0.3% of all craniocerebral injuries, and represents 4% to 12.9% of the entire group of extradural hematomas. [7] Due to the small volume of the posterior fossa and contained important structures mortality can be high if the haematoma is missed. A high index of suspicion is needed for timely intervention to prevent death. PFEDH accounts for even fewer incidences in children (1.3%). Sudden deterioration is a feature that distinguishes it from the supratentorial extradural haematomas. [8]

Some studies have shown that neck stiffness and drowsiness were the commonest clinical signs. [9] CT scan remains the choice of investigation to detect these haematomas. The presence of haematoma more than 10 ml, hydrocephalus and displacement of the IV ventricle are all indications for surgery. These haematomas may be confused with cerebellar

contusion and SAH. The presence of dura between the cerebellar cortex and the haematomas help to separate these haematomas. There have been various classification systems proposed based upon the obliteration of perimesencephalic cisterns and/or displacement of the fourth ventricle or midline shift more than 5 mm, volume more than 10 ml, a thickness of more than 15 mm and the absence of a significant intracranial haematoma elsewhere. [10,11] Surgery remains the gold standard for the treatment of symptomatic PFEDH. This may be in the form of suboccipital craniectomy or craniotomy or both depending on the size of the haematoma.

The aim of the present study was to assess the traumatic posterior fossa extradural hematoma in UP region.

Materials and Methods

The present study was conducted at Department of Neurosurgery, Kashi Neuron Multispeciality Hospital, Ramnagar Varanasi UP, India for one year. We found a total of 596 cases of EDHs, of which only 50 (8.38%) were located in the posterior fossa. The records were retrospectively analyzed for clinical presentation, admission Glasgow Coma Scale (GCS), mode of injury, radiological findings, any other associated intracranial traumatic lesion, type of intervention and postoperative outcome. Postoperative scans, within 2–4 h of surgery were acquired in all cases. Outcomes were assessed on the basis of Glasgow Outcome Score (GOS) at the time of discharge and at 6 months of follow-up. Search was made on pubmed.org with key words "traumatic posterior fossa extradural hematoma" for published literature on PFEDHs and the results were compared.

Results

Table 1: Clinicoradiological features

Features	***N*/(%)**
Mean age (years)	29.7
Range	4-43
Pediatric (<18 years)	20 (40)
Adults	30 (60)
Sex Male	 36 (72)
Female	14 (28)
Mode of injury Road traffic accident	 35 (70)
Fall from height	12 (24)
Assault	3 (6)
Glasgow Coma Scale 15	31 (62)
14-13	9 (18)
12-9	7 (14)
8-3	3 (6)
Associated radiological findings Occipital bone fracture	38 (7)
Frontal contusions	5 (10)
Acute subdural hematoma	6 (12)
Supratentorial	4 (8)
Infratentorial	2 (4)
Supratentorial extension of extradural hematoma	15 (30)
Hydrocephalus	9 (18)
Intraventricular hemorrhage	5 (10)

The mean age of patients was 29.7 years (4–43 years). 20 (40%) of them were below 18 years. 14 (28%) of them were females. Most common mode of injury was road traffic accident (n = 35, 70%), rest were either fall from height (n =12, 24%) or assault (n = 3, 6%). Post-resuscitation admission GCS varied from GCS 15 in 31 (62%) cases, GCS 13–14 in 9 (18%), GCS 9–12 in 7 (14%), and GCS 3–8 in 3 (6%) cases.

Table 2: Outcomes based on Glasgow outcome score

	At 6 months (%)	At 12 months (%)
GOS 5 Good recovery	44 (88)	45 (90)
GOS 4 Moderate disability	1 (2)	0
GOS 3 Severe disability	1 (2)	1 (2)
GOS 2 Vegetative state	3 (6)	3 (6)
GOS 1 Dead	1 (2)	1 (2)

Two patients died. Mean follow-up duration was 68.2 months. At 6 months follow-up, 44 (88%) patients had a good recovery (GOS 5) and at 12 months follow-up, 45 (90%) patients had GOS 5.

Table 3: Outcome based on computed tomography findings

Parameters	Isolated PFEDH	PFEDH with associated brain injury
Total patients	43	7
Associated CT findings		
Occipital bone fracture	35	5
Frontal contusions	-	6
Acute SDH	-	5
Supratentorial		5
Infratentorial		2
Supratentorial extension of EDH	-	6
Hydrocephalus		5
Intraventricular hemorrhage Admission GCS		5
15	30	0
13-14	11	0
9-12	2	5
3-8	0	2
Management		
Surgical evacuation	37	7
Conservative	4	0
Failed conservative	2	0
GCS (at discharge)		
15	40	0
14-13	3	1
12-9	0	1
<8	0	5
GOS 1 (at 6 months)		
5	43	1
4	0	1
3	0	1
2	0	3
1	0	1
GOS 2 (at 12 months)		
5	43	2
4	0	0
3	0	1
2	0	2
1	0	2

In addition, patients with isolated PFEDH (n = 43) had a much better outcome. 30 out of 43 were discharged with GCS 15. At 6 months and 12 months follow-up, all 43 had good recovery (GOS 5).

Discussion

In posterior fossa, traumatic conditions are less frequent, and extradural hematoma is the most frequently encountered traumatic pathology. Traumatic posterior fossa extradural hematomas (PFEDHs) represent a rare clinical entity. It has been reported that PFEDH constitutes only 4–7% (1.2–15% in various studies for all age groups) of all extradural hematomas. [13,14] This rare condition can present with rapid clinical deterioration by quickly increasing in size and causing brain stem compression. Therefore, timely diagnosis of PFEDH is very important for good outcomes. [15]

The mean age of patients was 29.7 years (4–43 years). 20 (40%) of them were below 18 years. 14 (28%) of them were females. Most common mode of injury was road traffic accident (n = 35, 70%), rest were either fall from height (n =12, 24%) or assault (n = 3, 6%). Extradural hematoma generally develops by separation of the periosteal duramater from the calvarium and rupture of the interposed vessels after trauma. The rupture of the vessel causes a rapid increase in the size of the hematoma. However, if the venous structures are involved, late and chronic clinical pictures may develop. Unlike supratentorial EDHs where the source of bleeding is usually the middle meningeal artery in temporoparietal EDHs and the anterior ethmoidal artery in frontal EDHs [16], PFEDHs have a venous origin in 85% of the cases and develop as a result of injury to the transverse or sigmoid sinuses secondary to occipital bone fracture. [17] The classical history of an extradural hematoma as described in the context of temporal EDHs is a short interval of posttraumatic unconsciousness followed by a “lucid interval” that may last for hours, which in turn, is followed by altered sensorium and development of potentially fatal neurological condition secondary to compression of the brainstem. Diagnosing extradural hematoma in the lucid interval is extremely important for good outcomes. However, in cases of PFEDHs, this classical description does not apply. The treatment of epidural hematoma is surgical except for very small hematomas that are followed-up. [18]

On magnetic resonance (MR) imaging, the acute extradural hematoma is seen as a localized extra-axial collection between the dura and the inner table of skull bone. Imaging of the dura as a line with very low signal between the hematoma and the brain parenchyma is pathognomonic for extradural hematoma. While it is not always possible to differentiate small extradural hematomas that have not formed a biconvex shape yet due to small volume, demonstration of dura between the parenchyma, and the hematoma is diagnostic on MR imaging. In addition, MR imaging is more sensitive in the detection of associated parenchymal conditions or dural venous sinus thrombosis possibly associated with PFEDH. [16,19] Post-resuscitation admission GCS varied from GCS 15 in 31 (62%) cases, GCS 13–14 in 9 (18%), GCS 9–12 in 7 (14%), and GCS 3–8 in 3 (6%) cases. Two patients died. Mean follow-up duration was 68.2 months. At 6 months follow-up, 44 (88%) patients had a good recovery (GOS 5) and at 12 months follow-up, 45 (90%) patients had GOS 5. In addition, patients with isolated PFEDH (n = 43) had a much better outcome. 30 out of 43 were discharged with GCS 15. At 6 months and 12 months follow-up, all 43 had good recovery (GOS 5). Cranial CT examination has earned a place as an effective imaging method by having a short acquisition time, allowing demonstration of occipital fractures that are associated with great majority of PFEDHs, defining the size and mass effects of the hematoma and providing visualization of possible supratentorial conditions that are reported to be associated with half of the cases in the literature. [20,21]

Conclusion

PFEDH are rare. They may be rapidly fatal due to the expansion of hematoma and compromise of the posterior cranial fossa space leading to brainstem compression, tonsillar herniation, and/or obstructive hydrocephalus. Early diagnosis and emergent evacuation lead to good outcome. They are usually associated with occipital bone fractures and may also have associated injuries in form of supratentorial or infratentorial subdural hematoma, intraparenchymal hematoma or intraventricular hemorrhage. Associated intracranial injuries should also be managed emergently as per the clinical situation. However despite best possible management these associated injuries lead to worse outcomes depending upon the severity of associated injury.

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