Clinicoradiologic Predictors of Outcome of Posterior Fossa Extradural Hematoma: An Institutional Experience

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Abstract

Introduction Posterior fossa extradural hematomas (PFEDH) comprise 4 to 7% of all intracranial extradural hematomas (EDHs).

Material and Methods A prospective study of 25 patients who presented with PFEDH was conducted in PGIMER, Dr. Ram Manohar Lohia (RML) Hospital, New Delhi in department of neurosurgery from January 2011 to July 2012. The patients were analyzed in relation to age, sex, mode of injury, Glasgow coma scale (GCS) at the time of presentation, computed tomography findings of the head, and therapeutic outcome. Duration of follow-up was 6 months.

Results In the authors' study, male-to-female ratio was 22:3. Age range was 6 months to 62 years and mean age was 23.70 years. Mode of trauma was fall from height in 12 patients, road traffic accident (RTA) in 12, and assault in 1. Most patients had acute course (80%) followed by subacute course (20%). GCS was between 8 and 15. Fracture was associated in 21 patients out of 25. Associated intracranial injury was present in 22 patients.

Conclusion In this series, PFEDH is a result of direct impact injury as 88% of patients had overlying fracture. PFEDH should be suspected in patients who have got external injury to the occiput as it is commonly associated with formation of extradural hematoma in the posterior fossa. The neurologic status and outcome were associated with GCS, volume of hematoma, and associated intracranial injury. PFEDH rarely occurs as an isolated injury.

Keywords
- extradural hematoma
- posterior fossa extradural hematoma
- computed tomographic scan
- Glasgow coma scale
- Glasgow outcome scale

Introduction

Extradural hematoma (EDH) constitutes a major source of preventable mortality and occurs in approximately 2% of all patients with head injury.[1] Posterior fossa extradural hematomas (PFEDHs) are much less common than supratentorial EDHs. The incidence of PFEDHs among intracranial EDHs has been reported to be 4 to 7%.[2] Treatment of PFEDH depends on clinical status and radiologic picture and managed either surgically or medically.

The typical findings of headache, lucid interval, hemiparesis, and anisocoria are often not present. Computed tomographic (CT) scan has played an important role in improving outcome by facilitating rapid diagnosis, precise anatomical localization, and recognition of associated injuries. PFEDH can be divided into acute (symptom onset within the first 24 hours of injury), subacute (symptom onset from 2–7 days of injury), and chronic (symptom onset after 7 days of injury).[3]

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Material and Methods

This is a prospective study of 25 patients who presented in emergency department of PGIMER, Dr. Ram Manohar Lohia (RML) Hospital, New Delhi from January 2011 to July 2012. The patients were analyzed in relation to age, sex, mode of injury, Glasgow coma scale (GCS) at the time of presentation, CT findings of the head, and therapeutic outcome. Duration of follow-up was 6 months.

Results

The total number of PFEDH cases was 25. Male-to-female ratio was 22:3. Loss of consciousness (LOC) was the most common presentation seen in 92% of the cases.

The most consistent sign was an external injury to the occiput. Fifteen cases had evidence of local trauma to the back of the head in the form of occipital swelling. Range of GCS was 8 to 15. Lucid interval was present in 10 (40%) cases.

Fracture of the occipital bone was a common feature being detected in 84% (21 out of 25) of the PFEDHs. Volume of hematoma was found to be less than 10 mL in 16 patients, whereas it was greater than 10 mL in 9 patients. Seventeen patients had clot thickness less than 15 mm and eight patients had clot thickness greater than 15 mm. Fourth ventricle compression and hydrocephalus were seen in 6 patients each.

Eight patients were managed by surgical evacuation of PFEDH. One patient initially managed conservatively was taken up for surgery after enlargement of hematoma as was determined by subsequent CT scan. In five cases, source of bleeding was fracture, and in three cases, cause could not be ascertained.

At the end of 6 months of follow-up, all the patients treated surgically or conservatively had good recovery (Glasgow outcome scale [GOS]-5). There was no mortality in our study. Three patients showed irritability (►**Table. 1**–**3**; ►**Fig. 1**).

Discussion

Extradural posttraumatic posterior fossa hematoma is a rare condition estimated to complicate approximately 0.3% of all craniocerebral injuries, and it represents 4 to 12.9% of the entire group of EDHs. Incidence of PFEDH among all EDHs has been reported to be 4 to 7%. Owing to the small volume of the posterior fossa and contained important structures, mortality can be high if the hematoma is missed. EDH generally develops by separation of the periosteal dura 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.[4] Sudden deterioration is a feature that differentiates it from the supratentorial EDHs.[2] PFEDHs, however, do not present like the classic extradural hemorrhages in the supratentorial compartment. The typical findings of headache, lucid interval, hemiparesis, and anisocoria are often not present. This difference has been attributed to the location of the hematoma and also to the source of bleeding. Hydrocephalous may be observed in approximately 30% of cases on CT scan. Presence of swelling/occipital hematoma is an important sign that mandates CT scan and observation. CT scan is usually done for the

Table 1 Age distribution

Age (y)	Number of patients	Percentage
0–18	7	28
19–30	12	48
31–45	4	16
46–60	1	4
> 60	1	4
Total	25	100

Table 2 Clinical presentation of patients

Clinical presentation	Number of patients	Percentage
Transient LOC	23	92
Vomiting	20	80
Occipital/suboccipital swelling	15	60
Nasal bleed	4	16
Altered sensorium	2	8
Ear bleed	2	8

Abbreviation: LOC, loss of consciousness.

Table 3 Mode of injury/GCS/CT scan findings

Total cases	25
Male/female	22/3
Mode of injury	
Fall from height	12
RTA	12
Assault	01
GCS	
14–15	15
9–13	08
≤ 8	02
CT scan findings	
Skull fracture	21
Volume of hematoma	
< 10 cc	16
> 10 cc	09
Clot thickness	
< 15 mm	17
> 15 mm	08
Fourth ventricle compression	06
Hydrocephalus	06

Abbreviations: CT, computed tomography; GCS, Glasgow coma scale; RTA, road traffic accident.

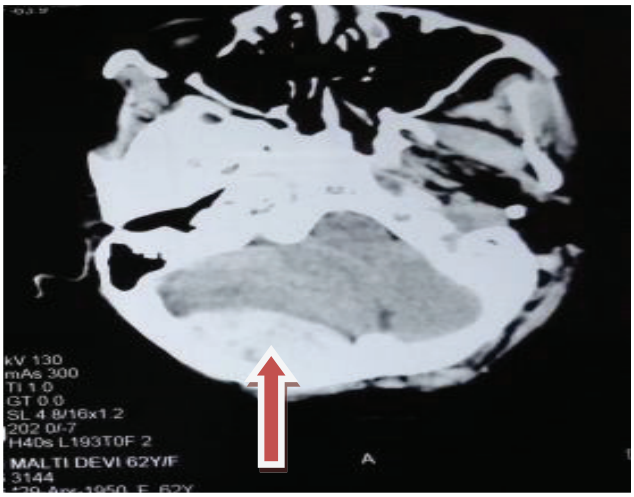

Fig. 1 Red arrow showing posterior fossa extradural hematoma.

diagnosis of PFEDH. PFEDH is more common in men, which can be explained by inherent ruffian and risk-taking behavior in males. Gupta et al also found the same results.[5]

Fall from height and road traffic accidents (RTAs) are the two most common modes of injury. The study by Roka et al[2] found 80% cases of PFEDH by RTAs whereas in a study by Malik et al,[6] 51% were due to fall.

Occipital bone fracture/diastasis fracture of lambdoid suture occurs in 40 to 86%. In our series, fracture was seen in 84% cases, with right-sided fracture in 52% and left-sided fracture in 32%. The possible explanation is presence of large transverse sinus on the right side that is more prone to traumatic bleed. PFEDH is more common in age groups of 20 to 47 years than in childhood. In our series, 48% of patients were in age group of 19 to 30 years.

Swelling of soft tissues of epicranium in the occipital and retromastoid region was observed in 60% patients. Lucid interval was seen in 40% patients in this study, whereas in a study conducted by Mahajan et al,[7] it was in 10% of the cases. The incidence of additional intracranial lesions was 88% in our series

Mortality rate ranges from 12 to 20% in the literature. In our series, there was no mortality as most patients had good preoperative GCS. The reported surgical mortality rate was 5% in series of Bor-Seng-Shu et al[8] and 6.7% in series of Bozbuğa et al.[9]

Decision on the treatment modality was based on clinical and radiologic findings. Surgery is gold standard treatment for patients with symptomatic PFEDH. In our series, eight patients were operated for PFEDH. Surgery in the form of suboccipital craniectomy/craniotomy was done. In a series by Roka et al,[2] 76% patients underwent surgery, whereas in a study by Pozzati et al,[10] 93% of patients underwent surgery.

The rapidity of onset and initial GCS of the patient serve as the main factors that usually determine the prognosis. In our study, at the end of 6 months all patients had good recovery (GOS-5).

In this study, we have found that external injury to the occiput and LOC are important signs and symptoms associated with PFEDH. Most patients with PFEDH have an acute course. Fracture at the site of hematoma is a common finding. Patients with PFEDH should be promptly diagnosed and treated as sudden deterioration leading to death can occur in these patients. We want to emphasize that patients with PFEDH who have a clot thickness of greater than 15 mm and show fourth ventricle compression on noncontrast CT scan of the head must be operated upon, as is the case in this study. EDH volume must be taken into account, and patients with PFEDH volume of greater than 10 mL should be operated upon. PFEDH should be suspected in patients who have got external injury to the occiput as it is commonly associated with formation of EDH in the posterior fossa.

Conclusion

The posterior fossa is less common site for EDHs. It usually occurs in young age group, especially men. Sudden deterioration can occur and can lead to mortality if not recognized and managed timely. CT scan is recommended for making the diagnosis and planning an appropriate treatment. The prognosis depends on initial GCS and the rapidity of onset.

Place of Study

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Conflict of Interest

None.

Statement of Approval from all Authors

Yes.

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