



POSTERIOR CRANIAL FOSSA EDH MANAGEMENT - AN INSTITUTIONAL STUDY

Neurosurgery

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ABSTRACT

Introduction: Acute traumatic extradural hematoma (EDH) is a life threatening condition and requires early diagnosis and prompt intervention. It is most frequently caused by traumatic head injury. In this study we analyse the management of consecutive patients with posterior fossa EDH managed at our institute. **Materials And Methods:** This is a prospective study of all consecutive patients with posterior fossa EDH admitted and managed in Rajendra Institute of Medical Sciences, Ranchi between January 2023 to December 2023. All patients were analysed and age, sex, cause of injury, time of presentation, Glasgow Coma Score (GCS), treatment and clinical outcomes were determined. **Results:** A total of 15 patients were enrolled in this study. Of these patients, 13 were male and 2 females, with a mean age of 36.8 years. Most common mode of injury was road traffic accident (n = 10, 66.67%), rest were either fall (n = 3, 20%) or assault (n = 2, 13.33%). GCS at the time of admission was 13-15 in 6 (40%) cases, GCS 9-12 in 6 (40%), GCS 3-9 in 3 (20%), and favourable outcome was 86.67% and there was no mortality in our study. **Conclusion:** Early diagnosis and appropriate treatment are the cornerstone in the management and it results in the high-quality survival (Glasgow Outcome Score 4 or 5) of posterior fossa EDH patients. Low GCS should not be a deterrent in the decision for prompt surgical intervention.

KEYWORDS

Posterior Fossa EDH, RTA, GCS, Glasgow Outcome Scale

INTRODUCTION

Epidural hematomas of the posterior fossa (EDHPF) are rare lesions associated with trauma to the posterior skull base. They have been reported to occur in 5.7–9.9 % of traumatic epidural hematomas^{1,2}. The advent of Computed Tomography (CT) has facilitated the diagnosis of EDHPF. It has also contributed to a substantial drop in mortality associated with these lesions, with 40 % mortality in the pre-CT era to 15.6% immediately after the introduction of CT imaging³. Generally, larger contemporary published series have treated the majority of these lesions surgically^{2,4,7}. Conservative management has mostly been reserved for only smaller-size EDHPF^{2,4,6,8}. These lesions are believed to have a venous origin typically from a tear in the venous sinus or the site of overlying skull fracture^{1,9,12}. Due to their bleeding site being typically venous, our approach to small lesions by default has been conservative.

MATERIALS AND METHODS:

This is a Prospective study of 15 patients with posterior fossa EDH admitted at Department of Neurosurgery, Rajendra Institute of Medical Sciences, Ranchi between January 2023 and December 2023. Clinical examination was performed in all cases. GCS score at admission was calculated. Radiological assessment was performed using CT scan of brain immediately as soon as the patient presented to Trauma Centre Emergency, RIMS, Ranchi.

The patients were managed according to the clinical feature at the time of admission. Conservative treatment was given to neurologically intact patient with evidence of posterior fossa EDH on NCCT without mass effect (hydrocephalus, decline in GCS ≥ 2 , distortion of fourth ventricle). Those with indication for operation were managed using standard suboccipital craniectomy and removal of EDH. The Glasgow outcome Scale was used at the time of discharge to assess neurologic outcomes. Patients whose score was 1 or 2 were classified as having a poor outcome, and those with a score between 3 and 5 were classified as having a good outcome.

RESULTS:

A total of 15 patients were enrolled in this study. Of these patients, 13 were male and 2 female, with an mean age of 36.8 years. Most common mode of injury was road traffic accident (n = 10, 66.67%), rest were either fall (n = 3, 20%) or assault (n = 2, 13.33%). GCS at the time of admission was 13-15 in 6 (40%) cases, GCS 9-12 in 6 (40%), GCS 3-9 in 3 (20%).

All patients underwent non contrast CT (NCCT) brain with 5 mm axial

cuts of the posterior fossa, and PF-EDH was present in all cases. Among the associated CT findings, occipital bone fracture was the most frequent, present in 7 (46.67%) cases followed by acute subdural hematoma (SDH) in 5 (33.33%) cases and frontal contusion in 3 (20%) patients. Hydrocephalus due to compression or obliteration of the fourth ventricle was seen in 5 (33.33 %) cases. There was no requirement of ventriculoperitoneal shunt in any of the patients. Of the total 15 cases, 11 (73.33%) were operated and 4 (26.67%) were treated conservatively. Incision and craniotomy were made as per the site and size of EDH. All operated patients underwent standard midline suboccipital craniectomy. Operated patients were subjected to early NCCT brain in the postoperative period that is within 24 hours while conservatively treated patients were followed on regular CT scans.

All patients were discharged, of which, to discharge, 10 (66.67%) had favourable outcome at discharge. Glasgow outcome score (GOS) was used to measure the outcome. Outcome was favourable in 9 of the 11 cases operated (81.8%), while all conservatively treated patients had favourable outcomes. So out of 15 patients, 13 (86.67%) had favourable outcomes on Glasgow coma scale.

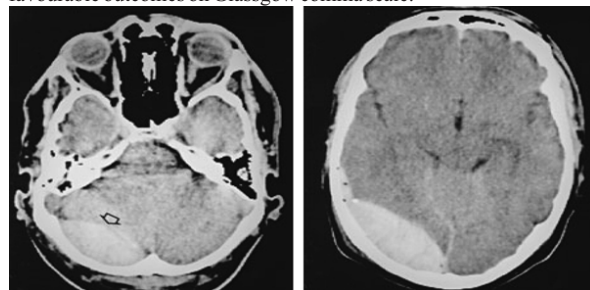


Table Showing The Different Variables

AGE	Mean age- 36.8 years
GENDER	M:F= 13:2
MODE OF INJURY	RTA-66.6% FALL-20% ASSAULT-13.33%
GCS AT ADMISSION	13-15- 40% 9-12 40% 3-9 20%
OTHER FINDINGS	ASDH- 33.33%, CONTUSION- 20%

MANAGEMENT	OPERATED-73.33% CONSERVATIVE-26.67%
OUTCOME	FAVOURABLE- 86.67%

DISCUSSION

Posterior fossa extradural hematoma (PFEDH) is a rare but critical condition often resulting from trauma, particularly in younger populations. Prior to the advent of CT scanning, the mortality associated with PFEDH was high. With better imaging, this mortality was reduced significantly. However, these lesions are still thought by many experts to require prompt surgical treatment by evacuation of the epidural hematoma located in the posterior fossa. In larger modern case-series most of these lesions are typically operated upon. This is generally due to the compact tight space of the posterior fossa harbouring critical brain stem structures. Amongst indications for surgery are thickness or volume of clot, progression of the size of the hematoma, crowding of the basal cisterns, and/or any mass effect on the 4th ventricle with or without associated hydrocephalus.

However, there have been some efforts to apply a conservative approach towards these lesions. 17–20 A non-operative approach has mainly been used for smaller size hematomas, often measuring below 12 mm in thickness, or lesions that do not cause mass effect on the 4th ventricle or basal cisterns. Furthermore, surgery is often applied if any progression of the PFEDH is noted. Even in series more readily applying a conservative approach, a significant portion of patients typically undergo direct clot evacuation. The surgical portion often includes between 30 and 70 % of presented cases.

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 EDHs⁶, 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 fracture⁷. 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-up⁸. Since most of the PFEDHs are of venous origin and expand slowly, it takes longer for the clinical picture to develop in PFEDH and it is of vital importance to use imaging methods for early diagnosis. Currently, NCCT scan is the imaging of choice in brain trauma. An acute extradural hematoma is seen as a biconvex hyperdense mass located between the duramater and the bone on NCCT. Early cranial CT examination should be performed routinely in patients who do not have any neurological findings as well.

Table Showing Comparison Of Case Series Of Posterior Fossa EDH

Authors	No.of Cases	Surgically Operated	Good Recovery %	Mortality
Verma et al	69	66	89.9%	2.9%
Prasad et al	18	16	94.4%	0
Sencer et al	40	29	100%	0
Balik et al	24	24	45.8%	4.2%
Malik et al	61	48	59%	15%
Roka et al	43	33	81.8%	7%
Bozbuga et al	73	59	89%	5.4%
Kabre et al	20	20	95%	0
Our study	15	11	86.67%	0

In this study, we report 15 patients with PFEDHs. 11 of them were operated. There was no mortality and all patients were discharged with 86.67% having favourable outcome. Hence, it can be concluded that PFEDHs are rare events and may be rapidly fatal if neglected, however with timely interventions can result in excellent outcomes, particularly in patients with isolated PFEDHs. Admission GCS is the single most important factor that determined the immediate and long-term outcomes. Patients with additional intracranial findings had relatively poor GCS at admission and categorically much poor outcomes. Nonsurgical management is a viable option in select patients with low

EDH volumes, but with intensive monitoring, and low threshold should be kept for surgical evacuation in such patients.

CONCLUSION

PFEDH frequently affects the male gender and children. For good outcomes, early diagnosis and evacuation are essential. Serial CT brain should be done in all suspected cases for the timely diagnosis to limit the disease-associated mortality. Conservative treatment is a viable option among patients with low EDH volumes, but surgical evacuation is highly recommended for critical cases with high volumes. All suspected cases must undergo early and repeated CT scans. We advise against delaying surgical excision of a hematoma once it has been determined that it needs to be removed in order to lower morbidity and death.

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