ISSN 1220-8841 (Print)
ISSN 2344-4959 (Online)

ROMANIAN
NEUROSURGERY

Vol. XXXVI | No. 2 June 2022

Posterior fossa extradural hematoma - clinical presentation and outcome. A single centre experience from India

Yadav Kaushal,
Lodha Krishna Govind,
Jaiswal Gaurav,
Gupta Tarun Kumar,
Patel Pratik Bipinbhai,
Kumawat Suresh

DOI: 10.33962/roneuro-2022-033

Romanian Neurosurgery (2022) XXXVI (2): pp. 181-185
DOI: 10.33962/roneuro-2022-033
www.journals.lapub.co.uk/index.php/roneurosurgery

Posterior fossa extradural hematoma - clinical presentation and outcome. A single centre experience from India

Yadav Kaushal, Lodha Krishna Govind, Jaiswal Gaurav, Gupta Tarun Kumar, Patel Pratik Bipinbhai, Kumawat Suresh

Department of Neurosurgery, Maharana Bhupal Government Hospital & Ravindra Nath Tagore (RNT) Medical College, Udaipur, Rajasthan University of Health Sciences, Jaipur (Rajasthan), INDIA

ABSTRACT

Background: Posterior Fossa Extra Dural Hematoma (PFEDH) is a rare entity but certain crucial structures are supposed to be injured. Because of limited space in the posterior fossa, a clinical small volume of hematoma can deteriorate patients. Therefore, timely diagnosis and prompt intervention are required.

Objective: This study is done to analyse factors like demographic profile, mode of injury, clinical features in relation to PFEDH and its management and how they influence the outcome.

Materials & methods: This is a retrospective analysis of patients who presented with PFEDH from July 2016 to July 2021 at RNT Medical College and M.B. group of Hospitals Udaipur, India. Patients were evaluated on the basis of demographic profile, mode of injuries, GCS on admission & discharge, and associated radiological findings.

Result: A total of 25 patients with PFEDH were included in this study. Amongst these, 18 (72%) were males, and10 (40%) were less than 18 years of age. On admission 19 (76%) had GCS 13-15.22 (88%) patients underwent surgery and 3 (12%) were planned for conservative management. At 6-month follow-up, 22 (88%) patients had good outcomes with GOS 3-5 and 1 was lost to follow up while 2 (8%) had poor outcomes with GOS 1-2.

Conclusion: GCS on admission is a good predictor of outcome. The volume of EDH was one of the key factors in deciding the line of management. PFEDH can sometimes be rapidly fatal due to expansion of hematoma and compression of posterior cranial fossa space which leads to brain stem compression therefore time management is the most important factor for a good outcome.

Keywords
posterior fossa,
extradural hematoma,
EDH

Corresponding author:
Yadav Kaushal

Department of Neurosurgery, RNT Medical College,
Udaipur, India

kaushalyadav460@gmail.com

ISSN online 2344-4959
© Romanian Society of Neurosurgery

First published
June 2022 by
London Academic Publishing
www.lapub.co.uk

INTRODUCTION

Extradural hematoma is said to be the most frequently encountered traumatic neurological pathology. But PFEDH has only 4–7% incidence (1.2–15% in various studies for all age groups) of all extradural hematomas.[1,2] EDH comprises the most frequent traumatic space-occupying lesion of the posterior fossa.[12] Posterior fossa is unique

because it contains the brain stem and is smaller in volume than the supratentorial compartment of the cranium.

Though relatively infrequent in occurrence, early identification and immediate appropriate management of Posterior Fossa Extradural Hematoma (PFEDH) is essential for successful neurotrauma management.[4] In PFEDH clinical progress may be silent and slow, but sudden deterioration may occur without significant warning signs. PFEDH can present with quick clinical deterioration because of rapid increasing in size and may cause brain stem compression. Management of PFEDH is either surgical or conservative based on clinical condition and various other factors.

Conservative management has shown good results both in children and in adults in cases of traumatic posterior fossa extra dural hematoma.

Materials and methods

This is a retrospective study from July 2016 to July 2021 at a tertiary care centre, R.N.T. Medical college & M.B. Group of Hospitals, Udaipur, Rajasthan. This study includes 25 cases of traumatic extradural hematoma which were located in posterior fossa.

Patients were categorised on the basis age, sex, mode of injury, GCS on admission, CT findings, volume of PFEDH, type of intervention and post-operative outcome.

Outcome was assessed by GOS at discharge and at 6 months follow-up.

Results

This study includes 25 cases of traumatic posterior fossa extradural hematoma taken over a period of 60 months from July 2016 to July 2021. The mean age of patients was 26.6 (5-48 years).18 (72%) were males amongst these .10 (40%) patients were below 18 years. RTA was found to be the most common mode of injury amongst these patients 18 (72%). Rest were either fall from height or assault. Majority of these patients had GCS 13-15, 19 (76%) when presented to emergency department. 21 (84%) patients were brought within 1 hour of trauma. Headache, vomiting and altered sensorium were few common symptoms found in most of these patients. All patients underwent non contrast CT brain and PFEDH was found in all. PFEDH was unilateral in 23 cases (92%). Occipital bone fracture was found in 17(68%) patients f/b supratentorial extension in 3 (12%) patients, acute subdural hematoma in 1 (4%) patient, frontal contusion in 2 (8%), hydrocephalus and IVH was also present in 1 (4%) patient.Volume of PFEDH was >15 cc in 22(92%) patients and <15 cc in 3 (12%) patients.

Amongst these patients 22 (88%) underwent surgery and 3 (12%) were planned for conservative management. Decesion was based on volume of PFEDH and GSC at admission and associated injuries. Incision and craniotomy were made as per the site and size of EDH.

All operated patients were subjected to early NCCT brain postoperatively.

On discharge 23 (92%) patients had GCS 13-15 and 2 (8%) had GCS of 9-12. Patients who were admitted within 1 hour of trauma had better outcome at discharge, signifying the importance of very early intervention before deterioration. At 6 month follow up 22 (88%) had good outcome with GOS 5, 1(4%) was lost to follow up and 2 (8%) eventually had poor outcome with GOS 2.

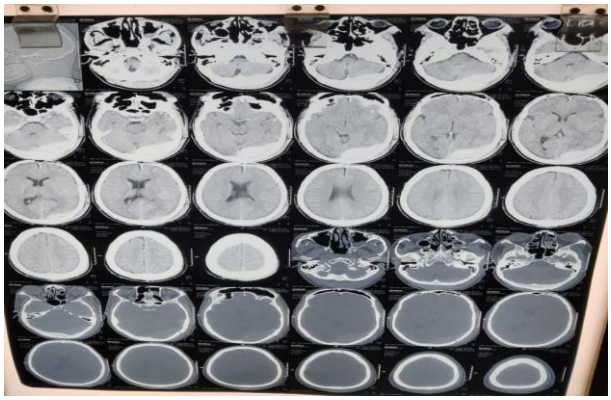

Figure 1. NCCT head showing extradural hematoma in posterior fossa on left side.

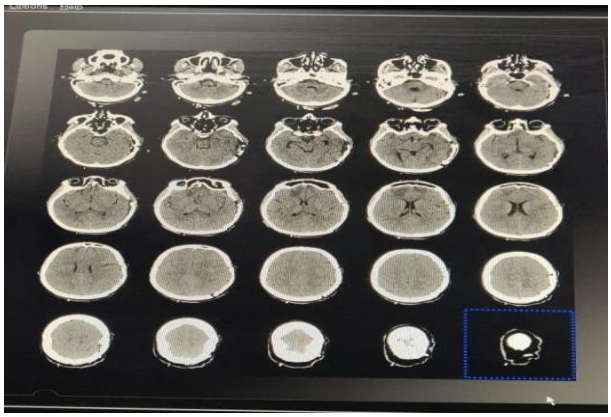

Figure 2. Post-operative NCCT head after evacuation of extradural hematoma.

Discussion

Post-traumatic posterior fossa extradural hematoma is a rare entity. Incidence is 0.3% of all craniocerebral injuries, and 4-12% of all extradural hematomas.[7]

Posterior cranial fossa lodges some important vital structures of brain, like brain stem. If PFEDH is large, it can cause rapid fall in consciousness level and brain stem dysfunction.

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] For PFEDH, it takes longer to develop clinical picture and it is of vital importance to use imaging methods for early diagnosis. An acute extradural hematoma is seen as a biconvex hyperdense mass located between the duramater and the bone on NCCT. An acute extradural hematoma is demonstrated as a localized extra-axial collection of blood between dura and inner table of skull bones on magnetic resonance imaging. Imaging of dura as a line with very low signal intensity between the hematoma and brain parenchyma is pathognomonic for extradural hematoma. MR imaging modality is more sensitive in detection of parenchymal conditions or dural venous sinus thrombosis possibly associated with PFEDH.[13,14]

Still Imaging of choice and the most commonly used method is NCCT because of a short acquisition time, allowing demonstration of occipital fractures that are associated with great majority of PFEDHs. It also defines the size and mass effects of the hematoma and also provide visualization of possible supratentorial conditions that are reported to be associated with half of the cases in the literature[15,5] and MR imaging study is difficult in unstable trauma patients. Among all the clinico-radiological parameters, volume of PFEDH is the most important factor in deciding the line of management, as also suggested by Prasad et al.[6]

Occipital subgaleal haematoma and Battle's sign can be a clue to the diagnosis of PFEDH. Fracture of the occipital bone is an important sign and it necessitates close observation along with repeat CT scan later to diagnose these haematomas. Change in GCS or severe headache with vomiting and new onset cerebellar signs are associated features that can help to have an idea of diagnosis. Hydrocephalus may be observed in as high as 30% of cases on the CT scan.

All the patients who required surgery in this study had volume of PFEDH more than 15cc. This is similar to the observation of Bozbuga et al.[8] Patients with PFEDH should be operated based on radiological indications without waiting for clinical deterioration, in order to get a good outcome. Paediatric patients with PFEDH require surgery more often than adults because of smaller posterior fossa volume and elderly require surgery less often, as atrophic brain can accommodate more volume.[10]

Admission GCS score is the single most important predictor of outcome, with GCS more than 8 having strong association with good outcome (GOS 5). GCS at admission is found directly proportional to GCS at discharge, better the GCS i.e. >8 better the outcome seen. Our study is also in line with this fact and is consistent with that reported by Balik et al, Jang et al and Prusty et al.[11,16] PFEDH needs more urgent management, before irreversible brainstem herniation occurs. This requires vigilant paramedical and medical care right from the site of accident, early shifting to neurosurgical care, high index of suspicion in cases of occipital trauma and prompt management.

Conservative management can also be an option if the patient is asymptomatic and has good GCS. The patient should be kept under close monitoring in neurosurgical intensive care unit (ICU). There are some case reports in the literature about these haematomas which resolved spontaneously without any intervention.[3]

3(12%) cases in our study were managed conservatively out of which 1(4%) did not report back at follow up of 6 month. In our study, PFEDH was more common among male than female patients Similarly Prashant et al also showed in their study that more males suffered from head trauma as compared to females because of more exposure of males to traffic and outdoor activities than females.[9] RTA being the most common mode of injury in our study was in line with the studies Bavil MS et al[3]and Igun GO et al.[9]

Patients with associated intracranial findings, with mass effect over brainstem had lesser GCS score on admission, increased EDH volume had increased hospital morbidity compared to other patients. Occipital bone fracture was found in 68% patients which was in line with that reported by Karasu et al.

Conclusions

PFEDHs are rare. Early diagnosis and emergent evacuation lead to good outcome and also reduces morbidity. Occipital bone fractures and associated injuries in form of supratentorial or infratentorial subdural hematoma, intraparenchymal hematoma or intraventricular haemorrhage can also be present. Clinical progression of disease is silent and slow, but the deterioration is sudden and quick. It can lead to serious complications if not promptly diagnosed and treated.

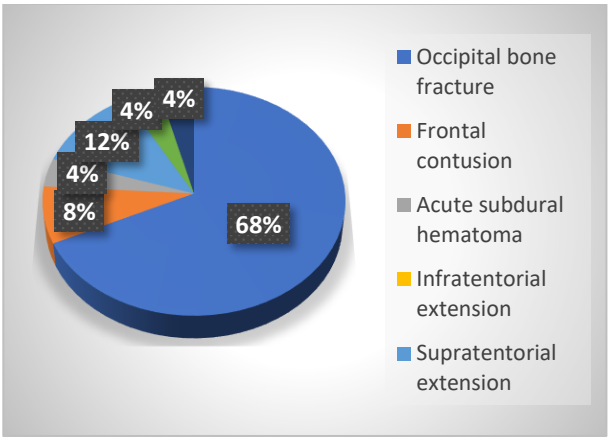

Figure 3. Distribution of radiological findings

Table 1. Demographic data

Gender	Number of cases	Percentage
Male	18	72%
Female	7	28%
Age		
<18	10	40%
>18	15	60%

Table 2. Mode of injury

RTA	18	72%
Fall	6	24%
Assault	1	4%

Table 3. Radiological findings

Occipital bone fracture	17	68%
Frontal contusion	2	8%
Acute subdural hematoma	1	4%
Infratentorial extension	0	0
Supratentorial extension	3	12%
Hydrocephalus	1	4%
Intra ventricular hemorrhage	1	4%

Table 4. GCS

At admission		
13-15	19	76%
9-12	4	16%
<8	2	8%
At discharge		
13-15	23	92%
9-12	2	8%
<8	0	0

Table 5. Volume of PFEDH

<15	3	12%
>15	22	88%

Table 6. Management

Conservative	3	12%
Surgery	22	88%

Table 7. Outcome based on GOS

Outcome based on GOS	At discharge	At 6 month
GOS 5	21(84%)	22 (88%)
GOS 4	2(8%)	1 (4%)
GOS 3	1 (4%)	0
GOS 2	1 (4%)	1 (4%)
GOS 1	0	0

Conflicts of interest
The authors declare no conflict of interest.

Informed consent
Informed consent was obtained from all individual participants included in the study.

References

1. Ammirati M, Tomita T. Posterior fossa epidural hematoma during childhood.
2. Asanin B. Traumatic epidural hematomas in posterior cranial fossa. Acta Clin Croat 2009;48:27 30.
3. Bavil MS. Autopsy Findings in Patients with Severe Head Injury. Res J Med Sci 2008;2(4):190.
4. Berker M, Cataltepe O, Ozcan OE. Traumatic epidural haematoma of the posterior fossa in childhood: 16 new cases and a review of the literature. Br J Neurosurg 2003;17:226 9.
5. Bozbuğa, M., İzgi, N., Polat, G., & Gürel, I. (1999). Posterior fossa epidural hematomas: observations on a series of 73 cases. Neurosurgical review, 22(1), 34-40.1.
6. Ersahin, Y., & Mutluer, S. (1993). Posterior fossa extradural hematomas in children. Pediatric neurosurgery, 19(1), 31-33, doi:10.1159/000120697.
7. Garza-Mercado R. Extradural hematoma of the posterior cranial fossa. Report of seven cases with survival. J Neurosurg. 1983;59(4):664-72.
8. Balik, V., Lehto, H., Hoza, D., Sulla, I., & Hernesniemi, J. (2010). Posterior fossa extradural haematomas. Central European Neurosurgery-Zentralblatt Neurochirurgie, 71(04), 167-172, doi:10.1055/s-0030-1249046.
9. Igun GO. Predictive Indices In Traumatic Intracranial Haematomas. East Afr Med J 2000;77(1):9.
10. Jang, J. W., Lee, J. K., Seo, B. R., & Kim, S. H. (2011). Traumatic epidural haematoma of the posterior cranial fossa. British journal of neurosurgery, 25(1), 55- 61, doi:10.3109/02688697.2010.520759 11. Prusty, G. K., & Mohanty, A. (1995). Posterior fossa extradural haematoma. Journal of the Indian Medical Association, 93(7), 255-8.
11. Kang SH, Chung YG, Lee HK. Rapid disappearance of acute posterior fossaepidural hematoma. Neurol Med Chir (Tokyo). 2005;45(9):462-3.
12. Koc RK, Pasaoglu A, Menkii A, Oktem S, Meral M. Extradural hematoma of the posterior cranial fossa. Neurosurg Rev 1998;21:52-7.
13. Osborn AG. Craniocerebral Trauma, Diagnostic Neuroradiology. St. Louis: Mosby; 1994. p. 204 5.
14. Pozzati E, Tognetti F, Cavallo M, Acciarri N. Extradural hematomas of the posterior cranial fossa. Observations on a series of 32 consecutive cases treated after the introduction of computed tomography scanning. Surg Neurol 1989;32:300 3.
15. Prasad GL, Gupta DK, Sharma BS, Mahapatra AK. Traumatic pediatric posterior fossa extradural hematomas: A tertiary-care trauma center experience from India. Pediatr Neurosurg 2015;50:250-6.
16. Prashant G, Atul K, Amit D, Kumkum G, Madhu B, Gouri G, et al. CT Scan Findings and Outcomes of Head Injury Patients: A Cross-Sectional Study. J Pak Med Stud 2011;1(3):78–82.
17. Samudrala S, Cooper PR. Traumatic intracranial hematomas. In: Wilkins RH, Rengachary SS, editors. Neurosurgery. 2nd ed. New York: McGraw Hill; 1996. p. 2797 807.