



## CLINICO-PATHOLOGICAL STUDY OF TRAUMATIC POSTERIOR FOSSA HEMATOMAS

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### ABSTRACT

Traumatic posterior fossa hematoma is an uncommon complication of head injury. It accounts for approximately 1% of all craniocerebral injuries. Reliance on clinical findings alone is not recommended, as these are nonspecific; it is advisable to conduct a computerized tomography (CT scan) of brain. Management of traumatic posterior fossa hematomas is still controversial. Asymptomatic patients with small hematoma can be managed conservatively by close observation and serial CT scans while large hematoma requires emergency evacuation of hematoma.

**KEYWORDS** : Posterior fossa hematoma

### Introduction

Head injury or traumatic brain injury (TBI) is one of the leading causes of death in INDIA as well as worldwide. Among the patients of TBI posterior fossa or infratentorial hematomas are major causes of mortality. Posterior fossa traumatic lesions are of great importance due to grave prognosis if remained undiagnosed or left untreated. Cranial CT is standard investigation to diagnose such lethal and uncommon condition. Despite researchers' best efforts, the true incident of posterior fossa hematomas remains uncertain. The present study was designed to investigate the incident of posterior fossa hematomas and their age and gender-wise distribution and review of literature.

### Material and Method:

The present study was prospective study conducted at department of neurosurgery, GR Medical College and group of hospitals (GRMC) over a period of 3 year from December 2014 to April 2016. GRMC is a tertiary care super specialty treatment Centre. Being the largest medical institute in the region of Gwalior, it caters the health needs of entire region as well as neighboring states. All patients with traumatic posterior fossa on non-contrast CT were included in this study. Patients with severe co-morbid illness associated fatal injuries like chest and abdominal injury were excluded from study. In addition to NCCT head finding, patient age, sex and Glasgow coma scale were also recorded at the time of admission. Initial NCCT HEAD were looked for -1) location and size of posterior fossa hematomas 2) overlying bone fracture 3. Number of posterior fossa hematomas 4. Presence of hydrocephalus. Initial neurological assessment was done with *Glasgow coma scale range from 3-15*. All admitted patients were managed conservatively or surgically, depending on neurological status, size of posterior fossa hematomas. Outcome of patients were recorded on Glasgow outcome scale.

### Result

Study includes 1830 patients attending trauma center and department of Neurosurgery in above-mentioned period. 39 patients were had posterior fossa hematomas. Incident in our study was 2.1%, Male: female ratio was 1.5:1 (Table 1).

Posterior fossa hematomas were divided according to their location in to extradural hematoma, subdural hematoma, and cerebellar contusions. EDH was found in 48.72%, followed by contusions (30.77%) and SDH 15.38%.

Type of hematoma	Number	%
EDH	19	48.72%
SDH	06	15.38%

Contusions	12	30.77%
Mixed lesions	02	5.23%

Study revealed maximum patients with posterior fossa hematomas usually have GCS between 13-15 followed by 3-8.

**Table 2: Neurological status at the time of admission in posterior fossa hematomas**

GCS	Number	%
3-8	14	36
9-12	7	17
13-15	18	46
Total	39	100

### Discussion

Study revealed incidence of posterior fossa incidence was 2.13 %, higher to other studies reported earlier mentioning incidence less than 1. Reason for higher incidence may be related to high rate of RTA and poor road conditions. Fairly high number of patients had history of fall on back from running vehicle due to pits on road<sup>1</sup>.

Our study revealed male had higher incidence of posterior fossa hematoma compare to females. Results are similar to other study as mentioned by Shin-Ichi OTSUKA et al.<sup>2</sup> The probable reasons for male predominance are that males are more exposed to RTA, heavy work or assault than females. TPEDH is most common type of hematoma in posterior fossa. Incidence of PFEDH accounts for about 4-7 % of total EDH and about 0.3%<sup>1</sup> of total TBI. TPEDH are usually venous<sup>3</sup>, in contrast to supratentorial EDH that are usually arterial in origin. TPEDH arises due to fracture of occipital bone or injury to venous sinuses secondary to rupture of torcula or transverse sinus. According to literature, PFSDH contributes to about 10 % of total PFH lesions. Our study revealed 15.38%, slightly higher than other studies.

Traumatic cerebellar contusions are rare but important cause of mortality and morbidity. Few numbers of case series have been published in literature regarding traumatic cerebellar contusions, reporting incidence less than 1%. Mechanism responsible for these lesions remains unclear. Takeuchi et al. categorized the types of injuries causing these contusions as mentioned 1. Coup injury, where the occiput was the site of impact. 2 Countercoup injuries and acceleration-deceleration injuries.

All the age groups are affected by these injuries but young adults are

more susceptible. Like other hematomas these lesions are totally asymptomatic to be followed by sudden deterioration of neurological status. Symptomatic cases can present with features of raised intracranial pressure and features of cerebellar dysfunction. CT is essential to diagnose these lesions with additional information of associated lesions and mass effect. Volume of hematoma can be measured and used to compare in serial CT scan when patient is managed conservatively. Suboccipital craniectomy and evacuation of hematoma is the preferred surgical approach in these injuries<sup>4</sup>.

TPEDH is most common type of hematoma in posterior fossa. Incidence of PFEDH accounts for about 4-7 % of total EDH and about 0.3%<sup>1</sup> of total TBI. TPEDH are usually venous<sup>2</sup>, in contrast to supratentorial EDH that are usually arterial in origin. TPEDH arises due to fracture of occipital bone or injury to venous sinuses secondary to rupture of torcula or transverse sinus<sup>2</sup>. As TPEDH is venous in origin they expand slowly because of lower pressure imposed by venous extravasation and become symptomatic late in their course. These hematomas often extend in to the supratentorial compartment by stripping the dura over transverse sinus, resulting in significant hemorrhage during surgical evacuation.

Wharton first described TPEDH in 1901, but it was not until 1941 that Coleman and Thompson reported first successfully operated case<sup>3</sup>. Bozbuga et al divided into two two distinctive groups on the basis of CT scan findings. In-group A, There was no mass effect, perimesencephalic cistern were open and fourth ventricle was not compressed or displaced while in group B there is mass effect over fourth ventricle<sup>4</sup>.

TPEDH are usually associated with linear fracture of occipital bone, diastasis fracture of lambdoid suture, or both. Occipital fracture is a good marker to detect the localization of TPEDH<sup>5</sup>. In Literature it has been reported that TPEDH are most commonly encountered in first decade of life. According to Coleman et al., the incidence is higher among children and young adults, because the dura and sinus are easily damaged in event to skull fracture, owing to strong adhesion of dura to inner table of skull in children<sup>1,6</sup>.

There is no characteristic of clinical symptoms of TPEDH. It has been reported that disturbance of consciousness is often present in acute cases, where as symptoms of increased cranial pressure, such as vomiting, headache; cerebellar signs are usually seen in sub acute cases<sup>5</sup>. Since it is difficult to diagnose TPEDH on the basis of clinical signs and symptoms alone, CT is essential element of diagnostic workup. TPEDH is usually associated with supratentorial EDH or hematoma. TPEDH extends in to supratentorial region in 11-64% of total posterior fossa EDH<sup>7</sup>. In literature, supratentorial pathologies associated with TPEDH are reported to be seen in 50%-87.5% of cases. Most commonly frontal and temporal contusions are present due to contre-coup mechanism.

Management of TPEDH is still controversial. Asymptomatic patients with small hematoma can be managed conservatively by close observation and serial CT scans to find size of hematoma, mass effect, development of hydrocephalus and other features. As TPEDH is usually found in young and patient deteriorates very rapidly without giving any warning signs some neurosurgeon prefer surgery as preferred mode of treatment after diagnosis of TPEDH. Indication for surgery varies from surgeon to surgeon but most of neurosurgeon follow this protocol, 1. PFEDH volume more than 10ml in a symptomatic patient. 2, Volume of hematoma > 20cc irrespective of symptoms 3, maximum thickness of hematoma > 15mm 4, Poor visualization of posterior fossa cisterns<sup>8</sup>.

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