

## Source of Bleeding in Acute Extra-dural Hematoma

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### ABSTRACT

**Objective:** To know about the source of bleeding in acute extra-dural hematoma (EDH) in patients suffering head injury operated in a tertiary care hospital.

**Materials and Methods:** This study was carried out in the Department of Neurosurgery; Govt. Lady Reading Hospital, Peshawar. We retrospectively analyzed the record of patients operated between the December 2012 and June 2013 (six months). Data was entered from the operation notes including the admission number, age, sex, location of the hematoma and presence or absence of fracture, source of bleeding. Data was analyzed using SPSS version 16.

**Results:** A total of 93 patients were operated and three had re-exploration at our department during the six month period and of these 83 were males and 10 were females (male to female ratio; 10:1), fracture was present in 70 (75.3%) patients and the sole cause of bleeding was in patients 49 (52.7%), middle meningeal artery (MMA) was the cause of bleed in 21 (22.6%), both fracture and MMA was the Source of bleed in 14 (15.1%), generalized ooze in 5 (5.4%) and sinus bleed was encountered in 3 (3.2%) while in one patient the source was unidentified (1.1%).

**Conclusion:** The fracture has been associated with the EDH in almost 75% of cases and has been the sole cause of bleed in more than half cases and along with MMA in every fifth case of EDH.

**Key words:** Middle meningeal artery, extra-dural hematoma, source of bleeding, skull fracture.

### INTRODUCTION

The extra-dural hematoma (EDH) results when there is a blood collection between the calvaria and the dura as a result of trauma which either fractures the bone and the inherent vessel bleeds or there is shredding of vessels over the dura itself resulting in blood collection. It represents about 1 – 3 cases of head trauma and the incidence is even more high representing about 40% cases of severe head trauma.<sup>1,2</sup>

The early management of the extra-dural hematoma is the most important step and has the most gratifying results among severe head trauma. The patient suffering extra-dural hematoma are usually of the working age. CT brain is the investigation of choice in case. Middle meningeal artery has been considered as the cause of bleeding in the majority of the cases and is due to the impact of the skull fracture and

also the shearing forces during trauma in the calvaria as well.<sup>2,3</sup> Fracture accompanies the EDH in more than 75% of the cases and it is one of the major cause of bleed in supra-tentorial hematoma.<sup>4,5</sup> The fracture and the sinus bleed are the sole causes of the posterior fossa hematoma which accounts for less than one percent of all intracranial hematomas.<sup>3,6</sup>

### MATERIALS AND METHOD

We retrospectively analyzed the charts of the patients who were managed surgically at our department during the six month period i.e. December 2012 to June 2013. A total of 96 patients were operated during this six month period and three of them were re-explored who were excluded from the study. Among the patients there were 83 males and 10 were females. Age

distribution was stratified into eight groups and patients were analyzed based on this to know about the age group most affected. The per-operative findings of the patients were recorded on a predesigned proforma which includes the site of hematoma, presence or absence of the skull fracture as well as the post graduate trainee level, timings of the surgery which were further divided into four groups to know about the most busy time in the duty hours of an incumbent neurosurgical resident. The source of bleed as noted from the operation notes was classified as either from the branches of the middle meningeal artery, the fracture site, both MMA and the fracture site, the sinus injury and the generalized ooze from the dura.

**RESULTS**

Among the total 83 were males and 10 were females showing a gender ratio of 10:1. Age distribution was done and patient were distributed into 6 groups according to age. The age group most commonly affected was from 0 – 40 years showing in Table 1. The mean age was 23 ± 11 years.

**Table 1:** *Distribution of age.*

Age Group	Frequency	Percent
0 – 10 years	27	29.1
10 – 20 years	23	24.7
20 – 30 years	17	18.3
30 – 40 years	18	19.4
40 – 50 years	7	7.5
Above 60 years	1	1.1
Total	93	100.0

The most common region affected was the frontal 35 cases (37.6%) followed by parietal, 22 cases (23.4%). Temporal region was affected by hematoma in about 16 (17.2%). The temporoparietal was affected in 11 (11.8%) and fronto parietal was affected in 4 (4.3%) each of the parietooccipital and occipital were affected in 1 (1.1%). Posterior fossa was affected in 3 (3.2%) as shown in Table 2.

Fracture was present in 70 (75.3%) and has been the sole cause of bleeding in 49 (52.3%). MMA was

**Table 2:** *Distribution of the hematoma location wise.*

Location	Frequency	Percent
Frontal	35	37.6
Parietal	22	23.7
Temporal	16	17.2
Occipital	1	1.1
Posterior fossa	3	3.2
Temporoparietal	11	11.8
Frontoparietal	4	4.3
Parietooccipital	1	1.1
Total	93	100.0

the cause of bleeding in 21 (22.1%) and both fracture and MMA was the cause in 14 (15.1%). The sinus bleed was present in 3 (3.2%) generalized ooze in 5 (5.4%) and source was not identified in 1 (1.1%).

**DISCUSSION**

The gender distribution in our series was male to female ratio of 10:1, which coincides with the study by Mushtaq et al.<sup>7</sup> This is due to the cultural norms of our society. The age distribution in our study was 0-40 years reflecting that the school going and the earning age group. This distribution was coinciding with the study by Zamil KH<sup>8</sup> which showed high incidence among the patients with age range 9 – 40 years. Study by Islam MJ et al<sup>9</sup> also showed a good percentage of the respondents with the age range of 26 ± 13 years.

In our series the most common region affected was the frontal 35 cases (37.6%) followed by parietal, 22 cases (23.4%). The study by Islam MJ et al<sup>9</sup> showed that the temporal was least affected, and parietal was the most common. Babu ML<sup>10</sup> however showed results somewhat coinciding with our 110/300 (36%) were in the frontal; temporal region along with temporoparietal in 128/300 (42.66%). The posterior fossa in his series was involved in 6/300 (2%) while in ours it was in 3/93 (3.2%) and the reported incidence in literature is ranging from 4 – 12%.<sup>2</sup>

Fracture in our series was present in 70 (75%) of patients. This is the same as the study by Khan IU<sup>11</sup> which showed a 75% incidence of fractures and by

Riaz UR et al<sup>4</sup> showing 71% of the incidence of fracture in patients with extradural hematoma. A study by Mlay SM<sup>12</sup> showed 72% of fractures with EDH and Zamil KH<sup>8</sup> reported in 68% of cases. Fracture had been the sole cause of bleeding in 49 (52.3%), MMA in 21 (22.1%) and both fracture and MMA in 14 (15.1%), sinus bleed was present in 3 (3.2%) generalised ooze in 5 (5.4%) and source was not identified in 1 (1.1%). Khan IU<sup>11</sup> studied the source of bleeding in acute EDH patients and reported it to be a tear of the middle meningeal artery in 54% of cases, a rupture of the middle meningeal vein in nearly 12% of cases, a tear in the dural sinus in 13.5%, skull fracture and a tear in the diploic veins in 12.5% of cases, with no identifiable source in 8% of the cases.

## CONCLUSION

Fracture is a common association of the extra-dural hematoma and the fracture site in itself contribute to the hematoma in a significant number of patients and has to be considered. The hematoma resulting from fracture site is mostly venous source and gives the patient a golden period which has to be utilized.

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