EXTRA DURAL HEMATOMA SURGICAL OUTCOME USING GLASGOW COMA SCALE IN A TERTIARY CARE HOSPITAL OF KHYBER PAKHTUNKHWA

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ABSTRACT

Objectives: To determine the frequency of various surgical outcomes of acute extra dural hematoma (EDH) in the Department of Neurosurgery, Lady Reading Hospital, Peshawar.

Methodology: This was a case series study conducted in Neurosurgery Department, Lady Reading Hospital (LRH) Peshawar, from 1st January 2009 to 30th September 2009. Total 145 consecutive patients of acute extradural hematoma were admitted and their baseline GCS was recorded. They were operated by consultant neurosurgeon. Post-operative outcome including good recovery, moderate disability, severe disability, persistent vegetative state and death were recorded.

Results: Out of 145 cases, 82% were male and 18% were female. Majority of the cases were less than14 years old. Fall was the cause of EDH in 60% patients, road traffic accident (RTA) in 26% and physical assault was the mode of injury in 14%. Interval between injury and surgery of more than 8 hours was recorded in majority of the cases. Parietal lobe was the commonest site of EDH. Craniotomy was performed in 80% cases and craniectomy in 20% cases. Post-operative GCS of 13-15 was noted in 123 (85%) cases compared to GCS at arrival of 13-15 in 72 (50%) cases. Post-operatively, good recovery was noted in majority of the cases (n=123, 85%) having higher GCS scores (13-15).

Conclusion: Surgical outcome in EDH patient is affected by GCS. Lower GCS have poor outcome. Good recovery was noted in maximum cases.

Key Words: Craniotomy, Epidural hematoma, Traumatic brain injury

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INTRODUCTION

Extradural hematoma (EDH) accounts for 2% of all head injuries[1]. Trauma is the most common cause of EDH[2]. Extradural hematoma is the collection of blood between dura and skull. It is a life-threatening condition, with high risk of mortality and morbidity if untreated. Early diagnosis and evacuation of EDH leads to improved outcome[3-5]. The mean age of presentation is 20-30 years[6]. The initial presentation of EDH is loss of consciousness followed by complete transient recovery (Lucid interval), culminating in neurological deterioration. The lucid interval is not pathognomonic for EDH and may occur in patients who sustain other expanding mass lesions[7]. Extradural hematoma has a male to female ratio of 4 to 1 and remains uncommon among children under 2 years old and beyond 60 years[8]. Computed tomography (CT) scan have increased the diagnosis of EDH. Earlier mortality rate of EDH was 86% which has reduced to 5-12% due to availibilty of CT scans helping in early detection[9]. Early management of EDH decreases mortality and morbidity. Outcome depends on various factors like GCS at presentation, volume of hematoma, time of intervention, age, and location. There were 5 types of EDH patients which we measured in our study i.e. Good recovery, moderate disability, severe disability, vegetative state and death[10,11].

Because of limited local data on surgical outcome of extra dural hematoma on the basis of initial Glasgow coma scale, this study was conducted to find out the outcomes for future management plans.

METHODOLOGY

This was a case series study conducted in Neurosurgery Department, LRH Peshawar from 1st January

2009 to 30th September 2009. Total 145 consecutive patients of acute extradural hematoma were operated and post-operative outcomes including good recovery, moderate disability, severe disability, persistent vegetative state and death were recorded. Surgical outcome was operationally defined as: Good recovery, GCS 13-15= Score 5; Moderate disability, GCS 9-12 =Score 4; Severe disability, GCS 4-8= Score 3; Persistent vegetative state, GCS 3= Score 2 and Death= Score 1.

Patients of any age group and gender having more than 30ml extra dural hematoma on CT scan of the brain were included in the study. Patients with acute extra dural hematoma associated with acute subdural hematoma and sub arachnoid hemorrhage on CT scan and patients of extradural hematoma with multiple injuries were excluded from the study to reduce interference with GCS hence confounders. Descriptive statistics were used to find out demographic distribution, site of hematoma, mode of injury, time lapse between injury and surgery, GCS and final outcome. Data were analyzed by SPSS version 17 and was expressed in tables.

RESULTS

Total 145 patients with EDH were included in this stud out of which 119 (82%) were male and 26 (18%) were female patients. Their age ranged from 2 to 70 years, with overall mean age of 22.55 ±15.87 years. Majority of the patients (41%) were in the age range of less than 14 years, and least (2%) were in the age group of 61-70 years (Table 1). Fall was the major) mode of injury, found in 60% while road traffic accident (RTA) and physical assault were noted in 38 (26%) and 20 (14%) patients respectively. Interval between injury and surgery of greater than 8 hours was recorded in 113 (78%) cases, 4-8 hours in 29 (20%) and less than 4 hours was observed in 3 (2%) cases. Overall mean interval between injury and surgery was 7.8 hours with standard deviation of 1.4 hours. Vomiting was the presenting complaint in majority of cases followed by loss of consciousness and headache.On clinical examination equal size reactive pupils were noted in 101 (70%) cases, while ipsilateral dilated pupils were noted in 44 (30%) cases.

Approximate volume of hematoma on CT scan was from 41-60 ml in 61 (42%) patients. Overall mean volume of hematoma was 42.81 ±14.84 ml. On CT scan, parietal lobe was the commonest site of the hematoma followed by frontal and other sites. (Table 2). Overlying bone fracture was present only in 38 (26%) cases, while in remaining 107 (74%) cases no bone fracture was noted.

Post-operative GCS of 13-15 was noted in 123 (85%) cases compared to GCS at arrival of 13-15 in 72 (50%) cases (Table 3).

Post-operative outcome showed that good recovery was noted in majority of the cases (n=123, 85%) having higher GCS scores (13-15) as shown in Table 4.

DISCUSSION

Head injury is major cause of death and disability and GCS after 24 to 72 hours of injury is a good predictor of outcome[12]. Acute extradural hematoma is one of the known complications of head injuries. If not diagnosed and operated in time it may lead to a high morbidity and mortality[13]. Favorable outcome could be ensured only if the extradural hematoma is evacuated before the onset of brain dysfunction[14]. However a number of factors affect the ultimate outcome. Considering these factors, outcome of the surgical treatment can be modified accordingly.

In one local study conducted by Ayub et al[15], favorable outcome was achieved in 69% patients, in terms of Glasgow coma score of 13-15. In 24% cases there was moderate disability and 10.1% patients remained in vegetative state or died. While in contrast to this, in our study better outcome; good recovery was achieved in 85% cases, moderate disability was observed in 7% cases, severe disability was noted in 3% cases, vegetative state was observed in no case and death occurred in 5% cases. Glasgow coma score of 13-15 was achieved in 82% cases, GCS of 9-12 was achieved in 12% cases and GCS of 3-8 was achieved in 6% cases (Table 3&4). Glasgow coma scale, in a local study conducted by Akbar A 16, was 13-14 (9.72%), 9-12 (49.72%) and less than 8.75 (40.54%). Good recovery occurred in 42.16% cases, moderate disabled was 15.13%, severe disability was 9.72%, vegetative state was 2.70% and death occurred in 30.27% cases[16]. In another local study done by Hamid et al[17] it was seen that the better pre-operative GCS and conscious level were associated with better outcome.

Neurological condition before surgery and interval between trauma and surgery were found to be important factors in deciding the outcome[18,19]. In one study 26 patients with moderate disability were operated at interval of more than 12 hours[15]. The reason was delay in transportation to the hospital. They probably developed complications like asphyxia and ischemic changes in brain due to prolonged compression and herniation[20]. While in our study maximum pre-hospital delay was more than 8 hours and this interval between arrival and operation was noted in 8% and 78% cases respectively. Comparatively majority of patients arrived with mean time of 2.92 hours and they were operated within minimum mean time of 2.36 hours. So due to this reason we achieved better outcome in our study. In a study by Munro and colleagues[21] it was reported

Table 1: Age-wise distribution of patients (n=145)

Age Ranges (Years)	Frequency	Percentage
<14	59	41%
15-20	18	12%
21-30	29	20%
31-40	21	15%
41-50	9	6%
51-60	6	4%
61-70	3	2%
Total	145	100%

Table 2: Size and site of hematoma on CT scan (n=145)

Variable		Frequency	Percentage
Hematoma Size	30-40 ml	58	40%
	41-60 ml	61	42%
	61-90 ml	26	18%
	Total	145	100%
Hematoma Site	Parietal Region	43	30%
	Frontal Region	32	22%
	Frontoparietal Region	12	08%
	Temporoparietal Region	28	19%
	Bifrontal Region	03	02%
	Temporal Region	18	13%
	Occipital Region	02	01%
	Parieto-occipital Region	06	04%
	Fronto-temporo-parietal Region	02	01%
	Total	145	100%

Table 3: Glasgow coma scale (GCS), n=145

Glasgow Coma Scale	At Arrival	Post Operative	P Value
3-8	44 (30%)	07 (05%)	0.01
9-12	29 (20%)	15 (10%)	0.04
13-15	72 (50%)	123 (85%)	0.01

Table 4: Post-operative outcome in patients (n=145)

Outcome	GCS Level	Score	Frequency	Percentage
Good Recovery	13-15	5	123	85%
Moderate Disability	9-12	4	10	07%
Severe Disability	4-8	3	05	03%
Persistent Vegetative State	3	2	0	0%
Death	0	1	07	05%
Total			145	100%

that age influenced neurosurgical transfer before other concomitant factors, such as size of hematoma, the incidence of serious extra cranial injuries and measures of physiological condition on arrival at hospital (including level of consciousness). In our study we have included pediatric age patients but no influence was seen on neurosurgical transfer. Male were in predominance as compared to female. The reason is understandable; males are exposed to external factors and other activities and are more prone to falls, road traffic accidents, assaults and other types of trauma. Females who are usually busy in their homes and schools are less prone to road traffic accidents, falls, assaults and other traumas. Similar results have been reported in a local study done by Hamid et al[17] in which males were 91% as compared to 80% in our study. The majority of head injuries occur as a result of blunt trauma (falls, assault and motor vehicle collisions[22]). In one study, mechanisms of injury were falls (34%), assaults (28%), motor vehicle collisions (14%), pedestrian (11%) and other (12%)[23]. In a local study, the cause of head injuries were road traffic accidents in 42.16%, assaults 34%, fall from height 16% and sports injuries 1.62%[16]. While in our study, fall was the commonest mode of injury in pediatric population followed by road traffic accidents and physical assaults with the frequency of 60%, 26%, and 14% respectively. As in our study we selected pediatric population aged from 1 to 14 years, so this age group is more prone to fall as compared to other mode of injury. Bilateral extradural hematomas have only rarely been reported in the literature. Even rarer are cases where the hematomas develop sequentially, one after removal of the other. Concerning the sporadic reports of such cases, the incidence rate of bilateral epidural hematomas are variable in various studies ranging from 0.5 to 10% of all epidural hematomas. In a study results showed that out of 1025 cases, 46 cases had 'double' EDH. There was bilateral EDH in 39 cases; multiple EDH in 3 cases and ipsilateral double EDH was present in 4 cases. The most common site was frontal (70%). The majority of the patients (80.3%) were in altered sensorium from the time of injury, similar situation was seen in 52.2% of cases with single EDH. The number of patients having a low GCS score was higher when first examined in the double EDH group and the mortality rate was 34.8% as compared to 9% in the single EDH group. Majority of the double EDH cases presented with a low GCS and there was a relatively quick neurological deterioration in these cases[24]. In our study out of 50 cases of epidural hematoma, bilateral hematoma was found in 6% cases, right side was involved in 58% cases and left side of the brain was involved in 36% cases. The mortality following the treatment of acute extradural hematoma varies from 9.6% to 45% in different studies[25-27]. The mortality rate has been reduced considerably after the introduction of CT Scan, timely intervention and good postoperative care[28]. In our study, there was 6% mortality out of 145 cases. It is very low than reported in few studies. This may be due to early arrival of the patients to hospital and early intervention in these patients.

CONCLUSION

Good recovery is observed with GCS more than 12, shorter pre-operative delay and no active bleeding during the procedure (craniotomy).

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CONTRIBUTORS

NH conceived the idea, planned the study, and drafted the manuscript. SA and MU helped acquisition of data and did statistical analysis. FA helped acquisition of data, critically revised the manuscript and supervised the study. All authors contributed significantly to the submitted manuscript.