Factors influencing Outcome of Extradural Hematoma in a Tertiary Care Hospital of Dera Ghazi Khan, Pakistan

Liaqat Jalal[1], Atta-ur-Rehman Khan[1], Muhammad Shaukat Farooq[1] and Muhammad Tahir Nouman[2]

1. Dera Ghazi Khan Medical College, Dera Ghazi Khan, Pakistan
2. DHQ Hospital Layyah, Pakistan

*Correspondence: liaqatjalal786@gmail.com

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Significance:
Pakistan is developing country undergoing major economic and demographic transition coupled with increasing urbanization and motorization. Head injury is among the leading causes of mortality in the country. In young adults head injury is the leading cause of mortality Some of the factors that increase the risk of road traffic accidents are unsafe traffic environment, poor road infrastructure and encroachments that restrict safe area for pedestrian's lack of safety engineering measures, traffic mix and an increasing number of motorized vehicles. Identifying factors is very crucial for policy making in this particular matter.

ABSTRACT

Background: The outcome for this neurosurgical problem is still far from set target in many developing countries like Pakistan. Major proportion of cases presenting with EDH in hospital still has poor outcome. This poor outcome of EDH is attributed to many factors including weak health systems of most developing countries. Objective of study was to analyze factors influencing outcome among patients of head injury with an extradural hematoma before surgery admitted in neurosurgery department of Dera Ghazi Khan Medical College, Dera Ghazi Khan.

Materials and Methods: This cross-sectional analytical study was conducted in neurosurgery department of Dera Ghazi Khan Medical College from January 2019 to December 2019 after ethical approval. All the patients with extradural hematoma of either gender admitted in the department during the study duration in which surgery was performed to evacuate extradural hematoma were included in the study. Data was collected by using preformed, pretested questionnaire. A vital signs and Glasgow coma scale record was maintained at thirty minutes interval. Computerized tomography was done in every patient. The EDH volume was calculated by using Peterson and Epperson equation a x b x c x 0.5. Data was entered and analyzed by using SPSS version 22. Chi square test was applied to observe any statistically significant difference between various strata if existed and p value <0.05 was taken as significant.

Results: Total 237 patients with Extradural Hematoma (EDH) were admitted in neurosurgery department during the study period were included in study. More than half 136 (57.4%) patients were more or equal to the age of 18 years. Majority of the patients 218 (91.9%) in the study were male. Major cause of extradural hematoma among patients in this study was road traffic accident 154 (64.9%). The outcome of EDH was found to be significantly (p <0.001) associated with age of patients. More than ninety percent of the patients who were directly admitted to tertiary care hospital has good outcome as compared to 109 (60.2%) patients which were referred and difference in outcome was statistically significant (p<0.001). The volume of EDH is not significantly associated with the outcome (p=0.090). The GSC score of the patients at the time of admission is significantly associated with the outcome (p<0.001). Study findings showed that GCS score of the patients at the time of surgery was also found to be significantly associated with outcome of EDH (p<0.001).

Conclusion: There is a strong association of outcome in extradural hematoma with age, gender and GCS of the patient. In higher GCS the outcome was excellent but in low GCS the outcome was poor.

Introduction

Pakistan is developing country undergoing major economic and demographic transition coupled with increasing urbanization and motorization. Head injury is among the leading causes of mortality in the country. In young adults head injury is the leading cause of mortality. Some of the factors that increase the risk of road traffic accidents are unsafe traffic environment, poor road infrastructure and encroachments that restrict safe area for pedestrian's lack of safety engineering measures, traffic mix and an increasing number of motorized vehicles. Unsafe driving behavior and lack of valid driving licenses or fake driving licenses (1, 2). One of the leading causes of death and disability is head injury. Mortality rate after head injury vary from 10-40% and is an index of alertness and efficiency of health care and hospital setup in a country (3-6).

Risk factors of poor outcome in extradural hematoma(EDH) include old age, intradural lesions, temporal location, increased hematoma volume, rapid clinical progression, pupillary abnormalities, increased intracranial pressure (ICP) and low Glasgow coma scale (GCS) (7). Most significant factors associated with unfavorable outcome of EDH are advanced age, lower GCS, and higher EDH volume. Many reports on extradural hematoma have drawn attention to avoidable factors implicated in preoperative deterioration, such as more time spent in transportation to the hospital and late

diagnosis, but less consideration has been given to the specific factors that influence the outcome of patients who arrive comatose in the operating room. EDH still remains a serious neurological condition (8,9,10).

Extradural hematomas (EDH) accounts for 2.7-4% of traumatic brain injuries (TBI) and majority of the reported cases are in second or third decade of their life (11,12). Extradural hematoma (EDH) life threatening lesion in neurological surgery was killing at least four of five patients previously but in the modern era of computed brain imaging which is affording prompt, precise diagnosis in the trauma patients, EDH has become one of the disease conditions that may truly be called the delight of a neurosurgeon. Outcome from timely neurosurgical intervention is so fairly assured that a target of zero mortality has been set for it (13-16). Unfortunately, the outcome for this neurosurgical problem is still far from set target in many developing countries like Pakistan. Major proportion of cases presenting with EDH in hospital still has poor outcome. This poor outcome of EDH is attributed to many factors including weak health systems of most developing countries (9). This study was designed to investigate the factors influencing the outcome of EDH among patients admitted in neurosurgery department of Dera Ghazi Khan Medical College, Dera Ghazi Khan, Punjab Pakistan.

Materials and Methods

This cross-sectional analytical study was conducted in neurosurgery department of Dera Ghazi Khan Medical College, Dera Ghazi Khan from January 2019 to December 2019 after ethical approval from hospital ethical committee. All the patients with extradural hematoma of either gender admitted in the department during the study duration in which surgery was performed to evacuate extradural hematoma were included in the study while those with post-operative hematoma were excluded from the study.A detailed history and clinical examination was carried out in every patient. Data was collected by using preformed, pretested questionnaire. A special effort was made to obtain the data regarding mode of injury and means of transportation used to reach the Hospital. The classical signs of extradural hematoma like deterioration of conscious level, pupil size difference and hemiparesis were checked. A vital signs and Glasgow coma scale record was maintained at thirty minutes interval. Computerized tomography was done in every patient. The EDH volume was calculated by using Peterson and Epperson equation axbxcx0.5, where a, b and c represents diameter of the hematoma in sagittal, axial and coronal planes respectively. Surgery was performed in all the cases with EDH thickness ≥ 1.5 cm, midline shift of equal or more than 5mm and hematoma volume 25 ml or more in supratentorial and 10ml or more in infratentorial compartment, and in the patients with focal neurological deficits such as limb weakness, unequal pupils, sign of herniation (decerebrate posture) and deterioration of GCS (2 or more points decrease in GCS score from that of admission).Dependent variable of the study was outcome of EDH. The variable was categorized into two groups, good outcome = good recovery and moderate disability, and bad outcome = severe disability, vegetative state and death. The Independent variables wereage, gender, type of admission, blood loss and GCS score before surgery.

Data was entered and analyzed by using SPSS version 22. Variables included in the analysis were age, gender, occupation, site of EDH, associated other intracranial or extra cranial injury and severity of injury by using GCS. Chi square test was applied to observe any statistically significant difference between various strata if existed and p value <0.05 was taken as significant.

Results:

Total 237 patients with Extradural Hematoma (EDH) were admitted in neurosurgery department during the study period. More than half 136 (57.4%) patients were more or equal to the age of 18 years. Majority of the patients 218 (91.9%) were male. Only 56 (23.6%) patients with extradural hematoma were directly admitted to teaching hospital and 76.4% were referred to teaching hospital. Major cause of extradural hematoma among patients was road traffic accident 154 (64.9%) followed by assault 47 (19.8%). At the time of admission 174 (73.4%) patients had GCS between 9-15 and before surgery GCS score of 177 (74.7%) patients was between 9-15.

Outcome of EDH in about half of the patients 48 (47.5%) with less than 18 years age was bad while 107 (78.8%) patients with equal to or more than 18 years age is good. Among male patients 153 (70.2%) had good outcome. The outcome of EDH was good among 51 (91.1%) patients who were directly admitted to tertiary care hospital as compared to 109 (60.2%) in referred cases. The cross tabulation of outcome with causes of EDH showed that 119 (77.3%) patients of road traffic accidents had good outcome followed by 25 (53.3%) assault and 16 (44.4%) other causes. The bad outcome of EDH was observed among 11(22.4%) patients in which volume of extradural hematoma was less than 30 ml. The outcome of EDH was bad among 46 (73.1%) patients in which GCS score at the time of admission was between 3-8 while 141 (81.1%) patients with GCS between 9-15 at the time of admission had good outcome. Similarly 80% patients with GCS score between 3-8 at the time surgery had bad outcome (Table-III).

Table I: Characteristics of the patients with EDH

Variables	Frequency (n)	Percentage (%)
Age		
<18 years	101	42.6%
≥ 18 years	136	57.4%
Gender		
Male	218	91.9%
Female	019	08.1%
Admission		
Direct	056	23.6%
Referral	181	76.4%
Cause of EDH		
Road traffic accident	154	64.9%
Assault	47	19.8%
Others	36	15.3%
Volume of EDH		
< 30 ml	49	20.7%
> 30 ml	188	79.3%
GCS score at the time of admission		
3-8	63	26.6%
9-15	174	73.4%
GCS score before surgery	60	25.3%
3-8	177	74.7%
9-15		

Table II: Location of EDH among patients

Location	Frequency (n)	Percentage (%)
Temporal	98	41.3%
Frontal	51	21.5%
Parietal	42	17.7%
Temporo-parietal	35	14.8%
Occipital	09	03.8%
Posterior Fossa	02	00.9%
Total	237	100%

Discussion

More than half of the patients of EDH with causes other than road traffic accidents and assault had bad outcome. The study findings revealed that volume of EDH is not significantly associated with the outcome (p=0.090) which is comparable with findings of many other studies in which no meaningful relationship between the volume EDH with outcome was noted (17, 18).

The findings of the study showed that GSC score of the patients at the time of admission is significantly associated with the outcome (p<0.001). The similar findings were noted in the study conducted by Ndoumbe A et al. in which GCS score at the time of admission was strongly predictive for good or poor outcome (19). In this study GCS score of the patients at the time of surgery was also found to be significantly associated with outcome of EDH (p<0.001)Which is consistent with the findings of Khan MB et al in which they observed that time since trauma and surgery were directly related to outcomes and that surgical delay beyond 12 hours resulted in statistically significant worse outcomes (20).

Table III: Characteristics of the patients with EDH and their outcome

Variables	Frequency	Outcome		p value
		Good	Bad	
Age				<0.001
<18 years	101	53 (52.5%)	48 (47.5%)	
≥ 18 years	136	107 (78.8%)	29 (21.2%)	
Gender				0.002
Male	218	153 (70.2%)	65 (39.8%)	
Female	019	07 (36.8%)	12 (63.2%)	
Admission				<0.001
Direct	056	51 (91.1%)	05 (08.9%)	
Referral	181	109 (60.2%)	72 (39.8%)	
Cause of EDH				<0.001
Road traffic accident	154	119 (77.3%)	35 (22.7%)	
Assault	047	25 (53.2%)	22 (46.8%)	
Others	036	16 (44.4%)	20 (55.6%)	
Volume of EDH				0.090
< 30 ml	049	38 (77.6%)	11 (22.4%)	
> 30 ml	188	122 (64.9%)	66 (35.1%)	
GCS score at the time of admission				<0.001
3-8	063	17 (26.9%)	46 (73.1%)	
9-15	174	141 (81.1%)	33 (18.9%)	
GCS before surgery				<0.001
3-8	070	14 (20.0%)	56 (80.0%)	
9-15	167	146 (87.4%)	21 (12.6%)	

Conclusion

There is a strong association of outcome in extradural hematoma with age, gender and GCS of the patient. The outcome of extradural hematoma is affected by GCS at the time of admission. In higher GCS the outcome excellent but in low GCS the outcome is poor.

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Disclosure: None

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