Outcome Of Traumatic Brain Injury: A Retrospective Audit

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Citation

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Abstract

OBJECTIVE: To assess the outcome of traumatic brain injury patients admitted at our centre.

STUDY DESIGN: A retrospective audit

PLACE AND DURATION OF STUDY: All patients admitted with traumatic brain injury at the Aga Khan University Karachi between January 2009 to June 2009 were included in this audit.

METHODOLOGY: Data was collected from the files of a total of 51 patients admitted with traumatic brain injury on a pre-designed form. The form included the details for GCS at admission, pattern of referral and outcome of admitted patients like GCS at the time of discharge, focal deficit or disability and in hospital death.

RESULTS: 41.1% (n=21) of the cases admitted had moderate or severe TBI and 58.8 % (n=30) had minor brain injuries. The mortality rate of severe TBI in our audit was 46.2 %(n=6) which is similar to that reported from underdeveloped countries but is significantly higher compared to countries following standardized protocols of prehospital and in hospital management (30-33%).

CONCLUSION: We need to introduce standardized protocols for prehospital and inhospital management of TBI and re-assess outcome of traumatic brain injury

INTRODUCTION

Increasing mechanization and violence has led to a significant increase in Traumatic Brain Injury (TBI) all over the world leading to significant morbidity and mortality. The problem is particularly of concern in a third world country like Pakistan where lack of awareness of safety and security and organized trauma care adds to the burden of adverse consequences to the individual and society. The prognosis and functional outcome of TBI depends on the severity of initial brain injury as well as secondary brain injury. However, even minor brain injuries, which are usually reversible, may lead to significant morbidity[ii] . The most widely used clinical measure of severity of brain injury is the Glasgow Coma Score (GCS). Importantly secondary brain injury is preventable, with standardized protocols of pre- and in-hospital management such as those recommended by the Brain Trauma Foundation (1), with significantly improved outcome of moderate to severe brain injury.

Other notable associations of outcome are age, gender and income group of the patient population[iii] . The Pakistani patient population mostly at risk from road traffic accidents and violence consists predominantly of young males from low socio-economic groups. Prevention of death and disability in this patient population has major long term implications for the society. It should therefore be a priority of the health care system to provide standardised protocols of pre-hospital and in-hospital management for TBI. An organized system of pre-hospital trauma care does not exist anywhere in the country. At our centre we offer 24 hour trauma, neurosurgical and intensive care services but to date are not following standardised protocols according to BTF guidelines, which have contributed to significant improvement in outcome of TBI in USA & Europe.

This audit was designed to assess the outcome, at the time of discharge for the patients who admitted in our hospital with traumatic brain injury.

. Bratton SL et al. The guidelines for management of severe head injury. Brain Trauma Foundation; American Association of Neurological Surgeons; Congress of Neurological Surgeons; Joint Section on Neurotrauma and

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METHODOLOGY

A retrospective audit of outcome of patients admitted with traumatic brain injury at the Aga Khan University Hospital from January 2009 to June 2009 was conducted. All cases of mild, moderate or severe brain injury requiring admission were included in the study. Patients with minor brain injury, not requiring admission and patients with minor brain injury but admitted for significant associated injuries were excluded from the study.

We grouped our patients into three categories based on the GCS scores at admission. Patients with a GCS score of 3-8 were classified as severe brain injury (group A), patients with a GCS score of 9-12 were classified as moderate brain injury (group B) and patients with GCS score of 13-15 were classified as minor brain injury (group C).

Data collection was done by means of a designed form which was filled by the principal/co- investigators from patients' files. Information regardingage and gender, GCS at admission, nature of injury, significant injuries other than brain injury, direct admission or referral after initial treatment atanother centre and immediate treatment requiredatour centrewas noted.

The outcome of admitted patients was recorded in terms of GCS at discharge, focal deficit or disability, ventilator dependence, and in hospital death.

A descriptive analysis of all the data was performed by calculating means and standard deviations for continuous variables and proportions for categorical variables. All the data was entered into and analyzed with the Statistical Package for Social Sciences version 17(International Business Machines, Armonk, Newyork)

RESULTS

A total of 51 patients were included in this study. The mean age of the patients was 37.3 ±15.4 years. 88.2 %(n=45) were males while 11.8% (n=6) patients were female. The mean duration of hospital stay was 7.53 ± 6.08 days.41% (n=21) patients had moderate or severe brain injury at admission and 59 %(n=30) had minor brain injury (Fig 1).

39.2% (n=20) of patients were direct admissions while 60.8% (n=31) were received after initial stabilization elsewhere. 96.1% (n=49) of patients had blunt head injury and were mostly road traffic accident victims and 3.9 %(n=2) patients presented with penetrating injuries. 40% (n=20) patients had associated injuries as well. These included pulmonary contusions with rib fractures in 10% (n=5) , abdominal injuries in 2%(n=1), facial injuries in 6%(n=3), clavicular fractures in 4%(n=2), pelvic fractures in 4%(n=2) and limb fractures in 14%(n=7) patients.

61.5 %(n=8) patients in Group A and 37.5% (n=3) in Group B required immediate surgery and postoperative ventilation while46.2%(n=6) inGroup Aand37.5%(n=3)in Group BrequireddirectICU admission. In the minor injury group 26.7 % (n=8) required surgical intervention, 6.6 % (n = 2) required ICU admission and 86.6% (n = 26) were admitted in special care.

Regarding the mortality (Table 1), 46.2% (n=6) with severe brain injury died in hospital. Out of the 6 patients who died, 5 were received after initial stabilization from the other health care centers.Survival rate in severe injury group was 53.84 %(n=7).The mean GCS at discharge for this group was 11.69 ± 5.33.

Of the 8 patientsadmitted withmoderate brain injury,1 patient required ventilator support and had a GCS of 9 at discharge.87.5 % (n=7) of these patients recovered fully and hadGCS of 15/15 at discharge. The mean discharge GCS of this group was 14.25 ± 2.12.

Out of the 30 patients with minor brain injuryonepatient had worsening of GCS at discharge and one patient died because family refused for the surgery. 93.3% (n=28) patients had GCS of 15/15 at discharge.

DISCUSSION

Dedicated trauma care for patients with traumatic brain injury (TBI) needs high priority as it is a leading cause of major morbidity and mortality in young individuals [1] which is a significant setback to family and society. 88% of the patients in our audit were young males. This figure is similar to that from the developing and the developed countries[ii] . Most of the patients in this audit had road traffic accident victims but there is an increasing incidence of firearm injuries due to increasing violence. The incidence of mortality and morbidity in the moderate to severe injury

group in this cohort (46.1% and 27.8% respectively) is similar to other low income regions, but notablyhigh compared to centres where standardized management protocols of pre hospital and in hospital care are being followed, where reported mortality rate is 30-33%[iii] . The majority of patients who died were received after initial stabilization elsewhere. Intensive training of medical personnel and adequate resources are needed for establishing standardized care protocols[iv] .

Significantly one patient with minor brain injury died due to lack of appropriate care based on refusal by family. Awareness and confidence in the health system needs to be created through education and counseling.

The evidence based Brain Trauma Foundation guidelines were first published in 1995, revised twice, most recently in 2007, and endorsed by the American Association of Neurological Surgeons, the World Health Organization Neurotrauma Committee, and the New York State Department of Health[v] . According to an independent analysis if BTF guidelines are used more routinely there would be a 50% decrease in deaths, improved quality of life, savings of $262 million in annual medical costs and $43 million in annual rehabilitation costs[vi] . We need to devise a strategy for funding, training and education for brain trauma management. This is a single centre study with small number of patients over a short period. We need to review mortality and morbidity related to TBI at other major centres in the city which have a significantly higher volume of patients and are much less well equipped than our centre.

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CONCLUSION

Our audit highlights the high mortality rate due to moderate to severe TBI, which can be reduced significantly by implementing evidence based protocols for pre-hospital as well as in-hospital management of brain trauma.

Figure 1

Injury Severity At Admission

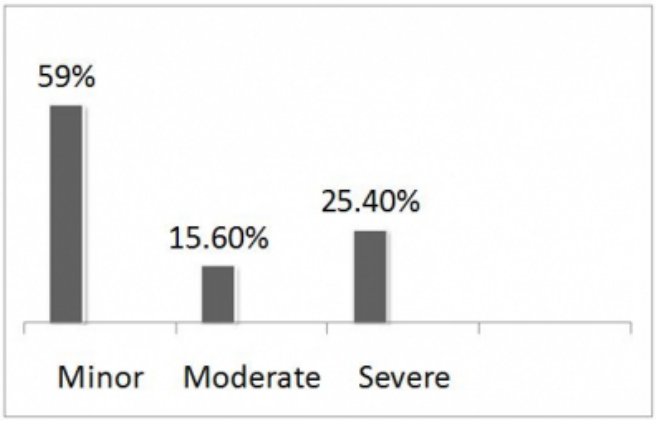

Table 1

Comparison Between the Groups

Parameters	Group A	Group B	Group C
Age*	35	28	41
Male	100% (n = 13)	100% (n = 8)	76.6% (n = 23)
Female	0 % (n =0)	0 % (n=0)	23.3% (n = 7)
Blunt injury	92 % (n = 12)	100 % (n = 8)	96.6 % (n = 29)
Penetrating Injury	7.6 % (n = 1)	0 % (n=0)	3.3 % (n = 1)
Neurological deficits	15.34%(n=2)	12.5% (n=1)	3.3 % (n=1)
GCS 15/15 at discharge	38.5%(n=5)	87.5%(n=7)	93.4 % (n=28)
Mortality	46.2% (n=6)	0 % (n=0)	3.3 % (n=2)

*Mean age rounded to nearest year.

References

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