The Changing Trend of Head Injury at Tertiary Referral Hospitals

Khadka NK*, Shrestha R**, Bhandari R***, Bista P****, Jha R*****
*Associate Professor, Department of Neurosurgery, National Academy of Medical Sciences, National Trauma Centre, Kathmandu, Nepal, **Assistant Professor, Department of Neurosurgery, National Academy of Medical Sciences, National Trauma Centre, Kathmandu, Nepal, ***Resident, Department of Neurosurgery, National Academy of Medical Sciences, Bir Hospital, Kathmandu, Nepal, ****Professor, Department of Neurosurgery, National Academy of Medical Sciences, Bir Hospital, Kathmandu, Nepal, ***** Professor, Department of Neurosurgery, National Academy of Medical Sciences, National Trauma Centre, Kathmandu, Nepal

ABSTRACT

INTRODUCTION: Bir Hospital and National Trauma Centre receive many trauma patients including head injuries. Over the time, care and facilities for the management of head injury patients have improved. It is a reasonable practice to evaluate the trend of head injury and their outcomes in recent times.

METHOD: This was a retrospective study to find the frequency and aetiology of head injury and their outcomes at two tertiary level referral hospitals. Data of all patients with head injury attending Emergency Departments of these two hospitals were collected retrospectively for two and a half years. The conscious level was assessed in terms of the Glasgow Coma Scale (GCS) and outcomes were measured in the Glasgow Outcome Score (GOS).

RESULT: A total of 1070 head injury patients were admitted for neurosurgical intervention out of 8526 trauma patients who attended the Emergency Departments of Bir Hospital and National Trauma Center. Rest of the patients were discharged or had mild head injuries associated with major injuries of extremity fractures, maxilla-facial, abdomen, and chest injury. Those patients were admitted by respective departments. The male and female ratio was 2.6:1. Among total admitted head injury patients, most of them (55%) had road traffic accident (RTA), followed by fall from height (36%), physical assault (6%) and other causes of head injury (3%) respectively. Surgeries including the evacuation of intracranial haematomas were required in 325 cases (30%). The majority (91%) of the patients had a favourable outcome at discharge. The number of patients who died during hospital admission was 45; the head injury mortality was 4.2%.

CONCLUSION: The mortality of head injury at Bir Hospital and National Trauma Centre is low in this study and seems to be on a decreasing trend in recent years.

KEY WORDS: Glasgow Coma Scale, Glasgow Outcome Scale, Head Injury, Intracranial Hematoma, Trauma.
The Changing Trend of Head Injury at Tertiary Referral Hospitals

their outcome at two tertiary level referral hospitals National Academy of Medical Sciences (NAMS).

METHOD

This was a retrospective study to find the frequency and aetiology of head injury and their outcome at discharge at two tertiary level referral hospitals under NAMS. Data on all patients with head injury attending National Trauma Centre and Bir Hospital were collected retrospectively for two and a half years (April 2015-September 2017). The mega earthquake 2015 head injury victims were included in this study. Patient inpatient files, Emergency Department (ER) and police records were used to retrieve the data. The conscious level was assessed by the Glasgow Coma Scale (GCS) and the outcome was assessed by the Glasgow Outcome Score (GOS).

Inclusion criteria

All the head injury patients who were admitted in these hospitals under the Neurosurgery care during the study period.

Exclusion criteria

The head-injured patients who were discharged from the ER and those patients attending the Out Patient Department (OPD) and not admitted at any point of time for their head injury.

RESULT

During the study period of two and a half years, there were a total of 8526 trauma patients attending the ER of Bir Hospital and National Trauma Centre. The number of head-injured patients admitted were 1070, out of which 580 (55%) patients had a head injury due to road traffic accident (RTA), 385 (36%) had fall from height, 60 (6%) had physical assault and 35 (3%) had other modes of injury.

Out of the total 1070 admitted patients, 770 (72%) were male and 300 (28%) were female (Figure 2) with male and female ratio of 2.56:1. Non operative (conservative) management was carried in 745 (70%) patients while operative management was carried in 325 (30%) (Figure 4).

The radiological findings on head injury patients showed contusion in most cases (32%) (Figure 5). Most of the cases presented with mild head injury followed by moderate and severe head injuries in descending order based on the GCS (Figure 6). The cranial procedures performed on the patients in descending order were craniotomy (200), the elevation
of compound depressed skull fracture (70), burr hole evacuation of haematoma (40) and cranioplasty (15). The craniotomy group included 30 patients who underwent decompressive craniotomy for their head injuries and they had features of raised intracranial pressure (ICP). The burr hole surgery group (12%) included subacute and chronic subdural haematomas (Figure 7). The following dichotomised outcomes were achieved in 1055 patients at the time of discharge since 15 patients left against medical advice (LAMA) during treatment: favourable outcome in 975 (92.4%) and unfavourable outcome in 80 (7.5%). Among the patients with the unfavourable outcome, there were 45 (4.2%) deaths among the total admitted patients (Figure 8).

Figure 7: Types of surgery

Figure 8: Outcome at discharge

DISCUSSION

Jennett provided the first epidemiological data of head injury. Their study was based on the survey of all Scottish hospitals in 1974 and the annual attendance rate of patients with a head injury was 1780 per 100,000 populations. About 10% of new attendees at ER in Scotland had head injuries and it increased to 15% for those attending after recent trauma. About one attendee in five was admitted.¹

Annually, approximately 2 million Americans suffer a traumatic brain injury (TBI): one injury occurs every 15 seconds.² The situation in India may not be better. The number of population injured per lakh has increased two fold from 1970 to 2011. RTAs accounts for major share in TBI in India. During 1970 to 2011, there is 7.3 times increase in road accident injuries.³
Nepal has no proper data regarding trauma. About two decades ago, Paudel extrapolated his hospital-based study data to get the National Incidence of Trauma and it was 0.79%. Head injury constituted 35% of the total trauma victims. The majority of the pediatric and elderly trauma victims were pedestrians. The mortality rate for trauma victims was 6%.\textsuperscript{4}

Unfortunately, Nepal does not have data on annual incidence rate of head injury.\textsuperscript{5} One of the previous studies done at Bir Hospital found 674 patients with physical assault and 632 patients with RTA had head injuries who attended Bir Hospital ER.\textsuperscript{6} However, the present study showed RTA contributed to 55% of the head injury leading to admission than other causes (Figure 1). Head injury due to physical assault seems to be on the increasing trend from none in the study of Gongol to 6% in the present study.\textsuperscript{7} Fall (36%) was the second on the list in contrast to the first on the list in previous studies at Bir Hospital by Gongol, Khadka (unpublished) and Shrestha (unpublished).\textsuperscript{7,8,9}

This study, as other previous studies, showed male preponderance (Figure 2).\textsuperscript{7,8,9} The present study showed that children below 15 years were only 15%. Gongol showed that children below 15 years constituted 52.2% of the total patients.\textsuperscript{7} This finding was almost reproduced by the study of Shrestha.\textsuperscript{9} However, the present study showed 60% (640) patients were between 15-49 years of age (Figure 3).

Out of the total 1070 admitted patients, 325 (30%) required cranial surgeries (Figure 4). This is in contrast with other previous studies of a head injury at Bir Hospital.\textsuperscript{7,8,9} The number of surgeries in the present series might be due to the low threshold for craniotomy for intracranial haematoma evacuation and the other reasons might be that this study included burr hole evacuation for chronic subdural haematomas and cranioplasties, too (Figure 7).

Based on radiological findings, cerebral contusions (32%) were the commonest pathology among the head-injured patients, followed by extradural hematoma (21%) and acute subdural haematoma (SDH) (20%) respectively (Figure 5). As per GCS, there were 745 (70%) patients with mild head injury, followed by 195 (18%) patients with moderate head injury and 130 (12%) patients with severe head injury respectively (Figure 6).

The following outcome was achieved in the total admitted patients except who went in LAMA at the time of discharge: the favourable outcome in 975 (92%), the unfavourable outcome in 80 (8%). Among the unfavourable outcome group, 45 (4%) patients died (Figure 8). These findings are in contrast with the findings of the previous studies.\textsuperscript{8,9} Contrast to the study of Shrestha, this study has a higher percentage of patients in good recovery and a lower percentage of patients in the vegetative state.\textsuperscript{4} This might be due to the advancement in critical care and proper management of patients with a severe head injury. Moreover, this study analyzed the outcome of only admitted patients at the time of discharge and naturally, those patients who need admission are supposed to sustain more severe forms of head injury. However, the overall mortality in this series is only 4.2% and this is quite low compared to the earlier studies.\textsuperscript{7,8,9} Moreover, they had recruited all the head injuries including the mild head injuries who could be discharged directly from the ER except Gongol study that included only admitted patients.

The mortality of head injury at Bir Hospital has decreased over the last 35 years (Figure 9). The possible reasons for this might be various: to name the few- increased number of personnel in neurosurgical team/department compared to the unit initially run by only a single or a couple of neurosurgeons, more number of anesthesiologists, and other trained personnel including physiotherapists, neuro nurses. After Bir hospital became the university hospital under NAMS, the residents of different faculties from Medicine, surgery/neurosurgery, anesthesia are available round the clock for the management of these patients. Moreover, the monetary incentives (50% allowance) for working full time can be another motivating factor for the employees of these hospitals to work more efficiently and effectively. Lastly, the improved and equipped ICU facilities at both these hospitals can be one of the major factors.

**CONCLUSION**

Head injury due to RTA topped the list of all causes of head injury at Bir Hospital and National Trauma Center. Mortality due to head injury has reduced at these tertiary referral hospitals, probably due to the advancement in critical care and proper management of head injury.
ACKNOWLEDGEMENT

We would like to acknowledge the following persons who directly or indirectly helped us during the study: Neurosurgery residents and neurosurgical nurses at Department of Neurosurgery, Bir Hospital and National Trauma Centre and medical record personnel of both these hospitals.

REFERENCES