Original Article

DEMOGRAPHIC PROFILE, CLINICAL PRESENTATION, MANAGEMENT OPTIONS IN CRANIO-CEREBRAL TRAUMA: An experience of a rural hospital in Central India

Anil M.Bhole[1], Rahul Potode[2], Amit Agrawal[3], S.R. Joharapurkar[4]

ABSTRACT

Objective: Head injury is a common condition that can result in either obvious neurological sequelae or imaging findings. The purpose of this study was to find out the epidemiology, clinical presentation and management options in patients with head injury at a rural centre of central India.

Methodology: In this retrospective study, data of all patients who attended the Department of Surgery, ABMH, Sawangi (Meghe), Wardha for cranio-cerebral trauma were included and a total of 200 patients were reviewed. Epidemiological and clinical details including investigations were noted for all the patients. Management offered to the patients was studied and outcome was analyzed.

Results: This study enrolled 200 patients. Male were more common than female. Young patients were commonly affected. Common presenting features were loss of consciousness and vomiting. Mild head injury was most common. Majority of patients were treated conservatively and indications for surgery were compound depressed fractures and significant intracranial haematomas.

Conclusions: Cranio-cerebral injury patterns in developing countries particularly in rural area are no different from developed countries and knowledge of its causative factors, management and potential complications will help to plan active interventions that may improve outcome. It will also help in developing preventive measures.

KEY WORDS: Cranio-cerebral trauma, Neurological injury, Head injury, Trauma, Injury.

Pak J Med Sci October - December 2007 (Part-I) Vol. 23 No. 5 724-727

1. Dr. Anil M. Bhole,
Professor and Head,
2. Dr. Rahul Potode,
Assistant Professor in Surgery,
3. Dr. Amit Agrawal,
Associate Professor in Neurosurgery,
4. S.R. Joharapurkar
Director, DMDPGME & R,
1-3: Department of Surgery,
1-4: Datta Meghe Institute of Medical Sciences,
Sawangi (Meghe), Wardha – India.

Correspondence

Dr. Amit Agrawal,
Associate Professor (Neurosurgery), Dept. of Surgery,
Datta Meghe Institute of Medical Sciences,
Sawangi (Meghe), Wardha- 442005,
Maharashtra – India.
Email: dramitagrawal@gmail.com

* Received for Publication: April 9, 2007
* Revision Accepted: July 26, 2007

INTRODUCTION

Traumatic brain injury (TBI) is a common and potentially devastating clinical problem substantial financial burden on resources.[1] Head trauma is the cause of death in more than 50% of trauma patients.[2] It accounts for 500000 emergency visits 95,000 hospital admission and 7,000 deaths per year in United States.[3,4] In order to prevent head injuries and effective prevention of head injuries there is a need to identify causes and to implement strategies to reduce their occurrence.[5]

PATIENTS AND METHODS

This study was a retrospective review performed at Acharya Binova Bhave Rural

Hospital, Sawangi (Meghe). This is a hospital situated in rural area of central India. The period of study was from July 2002 to December 2005. A total of 200 consecutive patients who sustained cranio-cerebral injuries were included in this study. Patients' charts were reviewed and epidemiological (age, sex and mode of injury) and clinical details were noted for all the patients in a pre-designed pro-forma. Data was analyzed according to age, sex, cause of injury, mechanism of injury, type and location of the injuries and neurologic injuries. Appropriate views of skull X-Rays were performed in all patients and inpatients with impaired consciousness, neurological signs or clinical signs of a basal skull fracture, an initial CT scan was also performed. Patients were considered to have a skull or facial fracture on the basis of a plain radiograph or a CT scan evaluated by a radiologist. Outcome was analyzed according to the Glasgow outcome scale.[6]

RESULTS

Total 200 patients were admitted with cranio-cerebral trauma and their mean age was 32.64 years (range, 4 years to 76 years). Majority of the patients were young adults (Table-I). There were 173 males and 27 female (ratio of 6.4:1). Most common cause of injury was motor vehicular accidents 164 (82%) followed by fall from height 19 (9.5%) and assault 15 (7.5%). Headache and vomiting were most common clinical features followed by loss of consciences. Closed head injury was the most common neurological injury followed by skull fractures. Associated clinical findings suggestive of basal skull fractures were nasal bleed and/or ear bleed, ecchymosis over mastoid (Battle's sign) (Figure-1) and CSF otorrhoea/rhinorrhoea (Table-II). Seventeen patients (8.5%) had history of post-traumatic seizures. Ninety two patients had mild head injuries, seventy six had moderate and thirty two had severe head injuries. Cerebral contusions were the most common findings on CT scan followed by skull fracture, SDH, EDH and ICH respectively (Table-III). CT scan was normal in 26 cases. Details of associated injuries is shown in (Table-IV). There was no mortality in patients with minor head injuries. Majority of the patients were treated conservatively (81.8%) and only 18.2% cases required surgical intervention. Indications for surgery were intracranial haematomas, compound depressed fractures, closed fractures with significant? Majority of the patients improved (86.7%) in this series. Nine patients left against medical advice either due to financial constraints or poor prognosis. Mortality was mainly seen in patients with severe head injuries.

Fig-1: CT scan of a patient showing Battle's sign

Table-I: Age distribution

Age	*No.*
0-10	7
11-20	19
21-30	52
31-40	66
41-50	36
51-60	8
61-70	9
71-80	3

Table-II: Signs of fracture base skull

Signs	*No.*
Nasal bleeding	64
Ear bleeding	18
Ear and nasal bleed	14
Ecchymosis over mastoid	4
CSF otorrhoea/Rhinorrhoea	9

Table-III: CT scan findings.

Lesion	*No.*
Cerebral contusions	84
Fracture	24
SDH	22
EDH	16
ICH	8
Normal	26

Table-IV: Associated injuries

Associated injuries	*No.*
Rib fracture	20
Long bone fracture	22
Abdominal trauma	5
Maxillofacial fracture	26

DISCUSSION

In this study males were more affected than females. It has been reported that up to two-thirds of head traumas is experienced by males.[7] The most frequent causes are motor vehicle accidents, bicycle accidents, or pedestrian-vehicle accidents. Other causes reported include falls, violence-related injuries.[1,7-9] The incidence of post-traumatic seizures was 8.5% in our study. In a population-based study of TBI in Minnesota, the 30-year cumulative incidence for post-traumatic seizures in patients with non-fatal TBI without prior history of epilepsy or subsequent trauma was 2.1% for patients with mild TBI, 4.2% for patients with moderate TBI, and up to 16.7% for those with severe TBI.[10,11] In our series there was low threshold for CT scan in all groups of patients and indications for CT scan were loss of consciousness, vomiting and headache. In our study incidence of normal CT scan was low.[12,13] Nevertheless, current practice in the UK is that CT scan is reserved for patients considered to be at high risk of intracranial complications, whereas in the USA, CT scan is performed in 75–100% of patients with a normal GCS and loss of consciousness.[14] However, a normal CT scan does not mean that everything is alright as the patient may be suffering from diffuse axonal injury.[15,16] As in the preset series up to 80% of patients suffer with mild cerebral injuries.[4] However severe brain injury is a major predictor of unfavorable outcome in patients with multiple injuries, independent of the presence and severity of extracranial lesions.[17,18] In our series also mortality was mainly seen in severe head injury patients. However predicting outcome in patients with severe head trauma remains a challenging task and generates abundant controversy. Apart from low Glasgow Coma Scale (GCS) several clinical parameters, such as old age, abnormal pupillary reaction, arterial hypotension and hypoxia with subsequent metabolic acidosis, are evaluated prior to and/or at admission and are considered independent predictors of mortality in patients with trau-matic brain injury.[19-23s]

CONCLUSION

Being a retrospective review this study work on the assumption that the history and clinical records accurately represents the events. This study also supports that injury patterns in developing countries particularly in rural area are no different from developed countries and needs to follow similar preventive and counseling measures. There is a need to identify the pattern and exact figures of head injuries to formulate the preventive strategies and to plan the management protocols.

REFERENCES

1. NIH consensus statement, Rehabilitation of persons with traumatic brain injury. 1998;16:1-41.
2. Castillo M, Harris JH. Skull and brain. In: Harris JH, Harris WH, Novelline AR (eds) The radiology of emergency medicine. 3rd ed. Baltimore: Willians and Wilkins, 1993.
3. Chan BS, Walker PJ, Cass DT. Urban trauma: an analysis of 1116 paediatric cases. J Trauma 1989;29:1540-7.
4. Kraus JF. Epidemiological features of brain injury in children: occurrence, children at risk, causes and manner of injury, severity, and outcomes. In: Broman SH, Michel ME, editors. Traumatic Head Injury in Children. New York (NY): Oxford University Press; 1995.
5. Semple PL, Bass DH, Peter JC. Severe head injury in children – a preventable but forgotten epidemic. S Afr Med J 1998;88:440-4.
6. Jennett B, Bond M. Assessment of outcome after severe brain damage. Lancet 1975;1:480-4.
7. Engberg A, Teasdale TW. Traumatic brain injury in children in Denmark: A national 15-year study. Eur J Epidemiol 1998;14:165-73.

8. Covington DS, Wainwright DJ, Teichgraeber JF, Parks DH. Changing patterns in the epidemiology and treatment of zygoma fractures: 10- year review. J Trauma 1994;37:243-8.
9. Afzeliud LE, Rosen C. Facial fractures: A review of 368 cases. Int J Oral Surg 1980;9:25-32.
10. Annegers JF, Grabow JD, Groover RV, Laws ER, Elveback LR, Kurland LT. Seizures after head trauma: a population study. Neurology 1998;3:683-9.
11. Greene KA, Jacobowitz R, Marciano FF, Johnson BA, Spetzler RF, Harrington TR. Impact of traumatic subarachnoid hemorrhage on outcome in non-penetrative head injury. J Trauma 1996;41:964-71.
12. Gorman DF. The utility of post-traumatic skull X-rays. Arch Emerg Med 1987;4:141-50.
13. Boulis ZF, Dick R, Barnes NR. Head injuries in children—aetiology, symptoms, physical findings and x-ray wastage. Br J Radiol 1978;51:851-4.
14. Livingston DH, Lavery RF, Passannante MR, Skurnick JH, Baker S, Fabien TC, et al. Emergency department discharge of patients with a negative cranial computed tomography scan after minimal head injury. Ann Surg 2000;232:126-32.
15. Paterakis K, Karantanas AH, Komnos A, Volikas Z. Outcome of patients with diffuse axonal injury: the significance and prognostic value of MRI in the acute phase. J Trauma 2000;49:1071-5
16. Hume AJ, Graham DI, Jennett B. The structural basis of moderate disability after traumatic brain damage. Journal Neurology, Neurosurgery and Psychiatry 2001;71:521-4.
17. Sarrafzadeh AS, Peltonen EE, Kaisers U, Kuchler I, Lanksch WR, Unterberg AW. Secondary insults in severe head injury: Do multiple patients do worse? Crit Care Med 2001;29:1116-23.
18. Nourjah P. National hospital ambulatory medical care survey: 1997 emergency department summary—advance data from vital and health statistics. Hyattsville, Md: National Center for Health Statistics, 1999;304.
19. Mosenthal AC, Lavery RF, Addis M. Isolated traumatic brain injury: age is an independent predictor of mortality and early outcome. J Trauma 2002;52:907-11.
20. Lannoo E, Van Rietvelde F, Colardyn F. Early predictors of mortality and morbidity after severe closed head injury. J Neurotrauma 2000;17:403-14.
21. Chesnut RM, Marshall LF, Klauber MR. The role of secondary brain injury in determining outcome from severe head injury. J Trauma 1993;34:216-22.
22. Luk SS, Jacobs L, Ciraulo DL, Cortes V, Sable A, Cowell VL. Outcome assessment of physiologic and clinical predictors of survival in patients after traumatic injury with a trauma score less than 5. J Trauma 1999;46:122-8.
23. Struchen MA, Hannay J, Contant CF. The relation between acute physiological variables and outcome on the Glasgow Outcome Scale and Disability Rating Scale following severe traumatic brain injury. J Neurotrauma 2001;18:115-25.