Article *NIMHANS Journal*

Head Injuries in Children: An Analysis of cases Admitted During Ten Years

Volume: 03 Issue: 01 January 1985 Page: 57-61

Indrajit Roy, Tapas Chatterjee, Rupen Gupta, Manoj Bhattacharya &, R. N. Roy, - *Department of Neurosurgery, Institute of Post Graduate Medical Education & Research, S.S.K.M. Hospital, Calcutta- 700 029, India*

Abstract

An attempt has been made to look into the incidence, causes and mortality in children (upto ten years of age) who were hospitalised with cranial trauma from 1971 to 1980 at the I. P. G. M. E. & R and S. S. K. M. Hospital, Calcutta.

Twenty two per cent of the total number of head injured patients belonged to the age group under study. Falls were the most frequent cause of head injuries. Mortality was highest among children injured in road traffic accidents.

Head injuries in children constitute an important problem for neurosurgeons. The actual magnitude of the problem in our part of the country needs to be assessed for any scientific study on head injury to be undertaken.

Dayananda Rao [1] reported from Hyderabad that 40 percent of the children admitted with head injury were under 12 years of age. Rao, Mohanty & Mukherjee [2] found the largest number of head injuries in the first decade of life. Rowbotham et al [3] reported an incidence of 28 per cent in children in a series of 1400 cases of head injury. In Edinburgh, 20 per cent of Nanghton's [4] severely head injured patients were children below the age of 10 years.

Material & Methods

699 children (upto 10 years of age) admitted to the S.S.K.M. Hospital with head injuries during the years 1971 to 1980 formed the material for this study.

A detailed retrospective analysis was made with reference to incidence, causes and mortality

Observations

(1)Age Incidence

A slightly higher incidence of head injuries (52.91%) was noted in the second half of the first decade as will be evident from Table I.

Table I

Table I

(2)Sex Incidence :

Incidence of head injury was found to be commoner in boys than in girls. There were 454 male patients in our series as against 215 female ones.

Table II

Table II

(3)Aetiology :

The present study showed that fall from a height was the commonest cause of head injuries in children. About 74 per cent of the head injured children had a history of fall from a height. In younger children (below 5 yrs.) the falls were usually from cots, chairs, staircases and from the arms of adults. Older children (5-10 yrs) on the other hand, fell from balconies and terraces while flying kites or playing. Falls from walls and tree-tops were also recorded. Four patients in this group were known epileptics who sustained head injuries during seizures.

Road traffic accident was the second commonest cause of head injuries and children of school going age were the usual victims.

Ten patients admitted with history of "assaults" were all in the older age group, having been hit on the head with stones, bats, etc. during fights with other children.

Among causes listed as "Others", there were cases of fall of heavy objects in the head, or the head striking against walls, doors, cupboards etc.

In three patients, the cause remained unknown as no one who may have observed the accident was available for questioning.

Table III - Aetiology

Table III - Aetiology

Figures in parentheses indicate percentage

(4)Incidence of skull fractures:

Out of the total of 699 patients of this series, 129 children were found to have sustained fractures of the skull. While the majority of 81 patients had linear fractures, there were 20 with open depressed fractures, 25 with closed depressed fractures and 3 with burst fractures of the skull.

Table IV - Incidence of skull fracture in children with head injury

Table IV - Incidence of skull fracture in children with head injury

(5)Skull fracture & level of consciousness :

Not all of children patients with skull fractures in the present series, however, lost consciousness, although there was some alteration of the level of consciousness in about 76 percent of them. Out of the total 699 patients, 230 did not have any history of unconsciousness at all.

Table V - Skull fracture and consciousness level

Table V - Skull fracture and consciousness level

Out of the 230 patients with no history of loss of consciousness, there were 31 patients with fractured skulls. In other words only 13.5 per cent of patients who did not have any alteration of the level of consciousness had sustained skull fractures.

Of course, there is no denying the fact that there may have been a good number of children who had transient loss of consciousness which was not noticeD by the people who brought the child to hospital.

(6)Other injuries associated with head injuries :

Fifty children with head injury had also sustained injuries to other parts of the body. There were 10 children with fractures of the nasal bones, 5 with fractured mandibles and 2 with fractured maxillae out of the 17 patients with faciomaxillary injuries.

12 patients had injuries to the upper limbs of which 6 were colles fractures and 6 clavicular fractures.

14 patients with injuries to lower limbs include 10 cases of fracture femur of which 2 were compound. Two leg bone fractures, one crushed injury of the foot and one lacerated injury of the thigh comprised the remainder.

Out of these fifty children with associated injuries to other parts of the body, 6 children died and the time of death varied between immediately after admission and 15th post-operative / post admission day.

On comparing the mortality figures among patients with head injury only and among patients with head injury associated with injury to other parts of the body we found no appreciable difference in the mortality rates among the two groups, the rates being 12.44 per cent and 12 per cent respectively.

Table VI - Incidence of fractures of skull in relation to loss of consciousness in head injured children - Children with no loss of consciousness

Table VI - Incidence of fractures of skull in relation to loss of consciousness in head injured children - Children with no loss of consciousness

(7)Mortality :

As may have been expected, the level of consciousness at admission had a profound effect on the prognosis. None of the children who were conscious at admission died, while almost 88% of patients admitted in deep coma succumbed.

Table VII - Incidence of other injuries associated with head injuries in children

Table VII - Incidence of other injuries associated with head injuries in children

Table VIII - Mortality in head injured children with associated injuries

Table VIII - Mortality in head injured children with associated injuries

Table IX - Head injured children with and without associated injuries

Table IX - Head injured children with and without associated injuries

Table X - Mortality in children in relation to consciousness levels on admission

Table X - Mortality in children in relation to consciousness levels on admission

Table XI - Mortality figures among children for different causes of head injury

Table XI - Mortality figures among children for different causes of head injury

Since falls were the commonest cause of head injuries in children they naturally accounted for the largest number of deaths as well. 52 children died in this group accounting for 62.7 per cent of the total mortality. Traffic accidents caused 29 deaths, that is, 34.9 per cent of all deaths.

If, however, one looks at the percentage of deaths in each aetiological group, one finds that 20.14 per cent of patients who had been injured in traffic accidents died. This is the highest mortality for any single cause in our series if we ignore the cases under the unknown category as they must actually have belonged to one or the other of the groups.

Discussion

The incidence of head injuries in children below 10 years have varied in different parts of India as noted by Sambasivam [5] (1977). The lowest incidence has been noted at Manipal (2.8%) while Trivandrum (15.83%), Madras (24.4%) and Calcutta (26.78%) have reported much higher rates.

The male preponderance noted in the present series has also been the experience of other workers like Shaw [6], Naughton [4] and Kalyanaraman [7].

Among the causes of head injury reported in the present work, falls have been the commonest followed next by road traffic accidents. Roberts [8], Mc Laurin [9] and Kalyanaraman [7] have also reported similar findings. Shaw [6], however, found traffic accidents to have caused the maximum number (46%) of head injuries followed by falls from a height (24%) playground injuries (13%) assaults (4%) and birth injuries (2%).

The presence of associated injuries did not appear to have significantly affected to mortality rate of head injured children in our series. Dayananda Rao and his co-workers [10] observed that all head injured patients succumbing within 24 hours and associated major injuries. Kalyanaraman [7], however, found multiple associated injuries in only two of the 39 children who died following head injury.

Acknowledgement

We express grateful thanks to the Director, Institute of Post Graduate Medical Education & Research and the Surgeon Superintendent, S.S.K.M. Hospital, Calcutta for permission to use the hospital records & help in publishing this paper.

1.Dayananda Rao B, *Proceedings of Academic Medical Sciences* Page: 2: 122, 1959
2.Rao C J, Moihanty S & Mukerjee K C, Epidemiological aspect of head injuries around Varnasi *Neurology India* Page: 25: 4 260-261, 1977
3.Rowbotham G F, Mc. Iver I N, Dickson J & Bonsfield M E, *British Medical Journal* Page: 1: 726,

1954
4.Naughton J A L, *In "Head Injuries", (Eds) Gillingham F J, Harris P, Hitchcock E & Shaw J F. The eff*
Page: 106-110, 1971
5.Sambasivan M, Survey of the problems of head injuries in India
Neurology India Page: 25 :(2) 51-59, 1977
6.Shaw J F, *In "Head Injuries", (Eds) Gillingham F J, Harris P, Hitchcock E & Shaw J F, Head injuries*
Page: 96-101, 1971
7.Kalyanaraman S, Head Injuries in children
Neurology India Page: 25: (2) 95-107, 1977
8.Robarts F H, *In "Head Injuries", (Eds) Gillingham F J, Harris P, Hitchcock E & Shaw J F, A summari*
Page: 16-17, 1971
9.Mc Laurin R L, *In "Head Injury", Pediatric Neurology, 2nd Edn. Ed. Farmer T W, Medical Dept., Harp*
Page: pp. 303-340, 1975
10.Dayananda Rao B, Subrahmanian M V, Raghava Reddy M V & Naidu V B S, *Neurology India*
Page: 14: 1, 1977