

## 소아 두부외상의 임상적 분석\*

현동근 · 하영수 · 박종운

= Abstract =

### A Clinical Analysis of Pediatric Head Injuries

Dong Keun Hyun, M.D., Young Soo Ha, M.D., Chong Oon Park, M.D.

Department of Neurosurgery, College of Medicine, Inha University, Sunnam, Korea

**Objectives :** With the advancement of a social life, the pediatric head injuries(PHI) occur greater than ever. Since the PHI differs from adult head injury with regards to mechanism of trauma, prognosis, and mortality, it is important to identify the characteristics of the PHI for its proper treatments and prognosis.

**Methods :** For this study, a series of 365 PHI patients under 15 years of age who were admitted to our hospital, were evaluated from January 1991 to December 1996. The clinical variable studied were age, sex, Glasgow coma score(GCS), causes of trauma, diagnosis, symptoms, associated injuries and Glasgow outcome score(GOS). The characteristics of PHI were evaluated according to presentations of skull fractures, intracranial hemorrhages, associated injuries, GCS at admission and GOS.

**Results :** Mean age of the studied patients was 6.51 years of age. The majority of PHI patients were under the 7 years of age(66.7%). The ratio of male to female was 2.2 : 1. Seasonally, PHI occurred more frequently during March to August(61.6%). The main causes of the injuries were accidental falls and traffic accidents(47.1% and 46.3%). One hundred ninety seven(54%) patients suffered from skull fractures and 110(30.1%) patients were developed intracranial hemorrhages and acute epidural hematomas(17.8%) which were the most common intracranial hemorrhages. There was statistical significance between skull fractures and intracranial hemorrhage ( $p=0.032$ ) and between GCS and GOS( $p=0.001$ ). However, there was no statistical significance between skull fractures and intracranial hemorrhage(epidural hematomas, subdural hematomas, and intracerebral, intraventricular and subarachnoid hemorrhage)( $p=0.061$ , 0.251 and 0.880). Also there were no significance of prognosis between under the seven and over the 8 years of age( $p=0.349$ ).

**Conclusions :** The core management for PHI is prevention from its occurrences. However, when unexpected accident occurs, early diagnosis and treatment for PHI by through examination for associated injuries and other damages even if there is no skull fracture are essential in managing patient's outcome.

**KEY WORDS :** Pediatric head injury · Intracranial hemorrhage · Prognosis · Skull fractures · Associated injury.

서 론

가 . 가  
1/3

3/4가 14)

1)4)16)19)21)26)28)29)

241 (66.8%) 가 , 가 251 (68.8%),  
 가 114 (31.2%) 2.2 : 1 가  
 4 (11.5%) 가  
 (3,4,5 ), (6,7,8 ) 225  
 (61.6%) 가 (9,10,11 ), (12,1,2 ) 140  
 (38.4%) (Fig. 1).

### 연구대상 및 방법

1991 1 1996 12  
 15 365  
 (GCS ;  
 Glasgow coma scale),  
 1)  
 2)  
 ; a) , b) , c)  
 가  
 Glasgow Outcome Scale(GOS)

172 (47.1%) 가  
 169 (46.3%),  
 가 23 (6.3%) 가  
 1 (0.3%) (Table 1).  
 197 (54%)  
 159 가 ,  
 15 , 14  
 9 . 118  
 50 (Table 2).

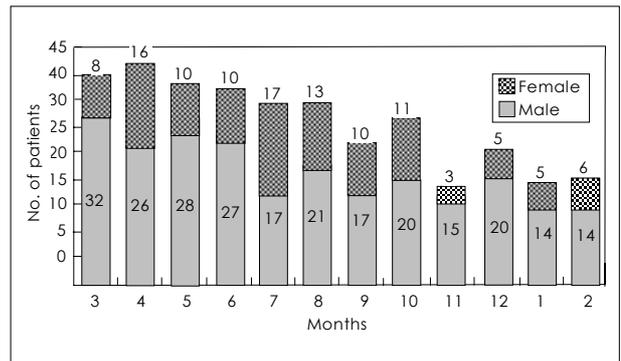


Fig. 1. Monthly distributions of pediatric head injury.

Table 1. The causes of pediatric head injury

Nature of Injuries	No. of patients(%)
Fall	172(47.1%)
Traffic accident	169(46.3%)
Struck by automobile	140(38.3%)
Accidents in automobile	29(18%)
Hit by blunt or sharp objects	23(6.3%)
Battered injuries	1(0.3%)
Total(%)	365(100%)

PC - SAS(ver. 6.12) chi square test  
 Mantel - Haenszel T trend test  
 0.05

### 결 과

6.51 7

Table 2. Association of types skull fractures with various types of hematomas

Types of Fx.	Types of Intracranial hemorrhage						Total
	EDH	SDH	SAH or others	Combined	No ICH		
Linear	30	12	11	5	101	159	
Depressed	8	0	4	1	2	15	
Communitied	7	1	4	1	1	14	
Skull base	0	1	2	0	6	9	
No fracture	20	10	15	5	118	168	
Total	65	24	36	12	228	365	

Fx. ; fracture, EDH ; epidural hematoma, SDH ; subdural hematoma, SAH or others ; subarachnoid hemorrhage or intraventricular hemorrhage or intracerebral hemorrhage, ICH ; intracranial hemorrhage

65 (17.8%)  
 45 , 20  
 (p=0.251).  
 가 16 가 , 11 , 8 ,  
 11 , 가 1 - 가 7 , -  
 4 , - - 가 3 , - 가 3 ,  
 - - 가 1 . 4  
 가 16(25%) 5 49(75%) 가  
 (Fig. 2). GOS I - 58 , II - 5,  
 IV - 1 V - 1 .  
 24 (6.6%)  
 14 10 ,  
 (p=0.661). 가 6 가  
 , 가 2 , - 가 4 ,  
 - - 가 3 , - 가 3 ,  
 - - 가 2 .  
 4 가 16(67%) 5 8(33%)  
 (Fig. 2). GOS - I 19 , 7 가 , 1  
 II - 2 , IV - 1 V 2 .  
 36 48 (13.2%) 가  
 (9.9%) 21 GOS I - 37 , II - 6 , III - 1 , IV - 3 V - 1  
 15 40 (11%)  
 (p=0.880). 4 가 15 12 가 , 가 11  
 (42%) 5 21(58%) 가 10  
 (Fig. 2). GOS - I 24 , II - GCS가 3 8 GOS V , GCS가 13  
 7 , IV - 2 V 3 . 가 110 GCS가 (Table 4. Trend test, p=  
 (30.1%) GCS가 0.001).

197 60 (30.5%)  
 0.032).  
 237 (64.9%)  
 149 (40.8%) .  
 130 (87.2%) 7  
 (4.7%) 12 (8.1%)  
 46 (12.6%) .  
 17 (4.7%) 가 15  
 가 2 GCS 15  
 가 ,  
 9 가 5 ,  
 2 1 .  
 3 , 2  
 1 .  
 74 (20.3%) ,  
 64 (17.5%)  
 31 가  
 17 가 .  
 7 가 , , 1  
 (Table 3).  
 48 (13.2%) 가  
 GOS I - 37 , II - 6 , III - 1 , IV - 3 V - 1  
 40 (11%)  
 12 가 , 가 11  
 가 10  
 GCS가 3 8 GOS V , GCS가 13  
 313 가  
 GCS가 (Table 4. Trend test, p=  
 0.001).  
 7 8  
 (Table 5. Trend test, p=0.349). 10 (2.7%)

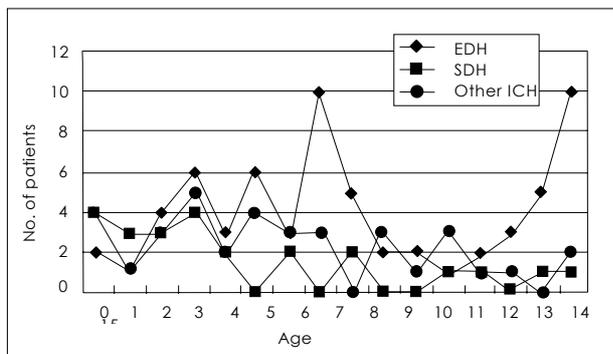


Fig. 2. The correlations between age and hematoma.

Table 3. Associated injuries of pediatric head injury patients

Sites of fracture	No	Visceral injury	No
Long bone	31	Liver	7
Facial bone	17	Lung	2
Clavicle	10	Kidney	1
Teeth	4		
Pelvis	1		
Rib	1		
Total	64		10

Long bone ; Tibiofibular, Humerus, Radioulnar and Femur.  
 No ; Number





- Lone DG : *Head injuries in children under 36 months of age. Demography and outcome. Child's Nerv Syst* 4 : 34-40, 1988
- 12) Irving MH, Irving PM : *Associated injuries in head injured patients. J Trauma* 7 : 500-511, 1967
  - 13) Jamieson KG, Yelland JDN : *Extradural hematoma. report of 167 cases. J Neurosurg* 29 : 13-23, 1968
  - 14) Jegger J, Levine JI, Jane JA, Rimel RW : *Epidemiologic features of head injury in a predominantly rural population. J Trauma* 24 : 40-44, 1984
  - 15) Kalsbeek WD, McLaurin RL, Harris BS 3d, Miller JD : *The national head and spinal cord injury survey(NHSCIS) : Major findings. J Neurosurg* 53 : S19-S31, 1980
  - 16) Kim JK, Park JY, Cho TH, Kwon TH, Lim DJ, Chung YK et al : *Clinical features and prognostic factors of head injury in less than two-year old Children. J Korean Neurosurg Soc* 27 : 625-631, 1998
  - 17) Kim WH, Lee KS, Bae HG, Yun IG, Lee ISL : *A clinical analysis on 1000 consecutive head injuries. J Korean Neurosurg Soc* 18(2) : 290-300, 1989
  - 18) Leblanc R, O'Gorman AM : *Neonatal intravranial hemorrhage. A clinical and serial computerized tomographic study. J Neurosurg* 53 : 642-651, 1980
  - 19) Lee KW, Hwang SK, Sung JK, Hamm IS, Park YM, Kim SL : *Pediatric head injury. J Korean Neurosurg Soc* 28 : 42-47, 1999
  - 20) Lloyd DA, Carty H, Patterson M, Butcher CK, Roe D : *Predictive value of skull radiography for intracranial injury in children with blunt head injury. Lancet* 349 : 821-824, 1997
  - 21) Luerksen TG, Klauber MR, Marshall LF : *Outcome from head injury related to patient's age. A logitudinal prospective study of adult and pediatric head injury. J Neurosurg* 68 : 409-416, 1988
  - 22) Mckissock W : *Subdural hematoma. a review of 380 cases. Lancet* 1 : 1365-1370, 1960
  - 23) Murgio A, Andrade FA, Sanchez Munoz MA, Leung KM : *International Multicenter study of head injury in children. ISHIP group. Child's Nerv Syst* 15 : 318-321, 1999
  - 24) Ong LC, Selladurai BM, Dhillon MK, Atan M, Lye MS : *The prognostic value of the Glasgow coma scale, hypoxia and computerized tomography in outcome prediction of pediatric head injury. Pediatr Neurosurg* 24 : 285-291, 1996
  - 25) Park CO, Chae KB, Lee SD, Jeon HK, Kim Y, Ha YS : *A clinical observation on head injuries in infants and children. J Korean Neurosurg Soc* 21 : 176-185, 1992
  - 26) Raimondi AJ, Hirschauer J : *Head injury in the infant and toddler. Coma scoring and outcome scale. Child's Brain* 11 : 12-35, 1984
  - 27) Reece RM, Sege R : *Childhood head injuries : accidental or inflicted? Arch Pediatr Adolesc Med* 154 : 11-15, 2000
  - 28) Sanchez JI, Paidas CN : *Childhood trauma. Now and in the new millenium. Surg Clin North Am* 79 : 1503-1535, 1999
  - 29) Vane DW, Shackford SR : *Epidemiology of rural traumatic death in children : A population-based study. J Trauma* 38 : 867-870, 1995