

## 소아 두부외상의 임상적 분석\*

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= Abstract =

### A Clinical Analysis of Pediatric Head Injuries

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**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)  
 3)  
 ; 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).

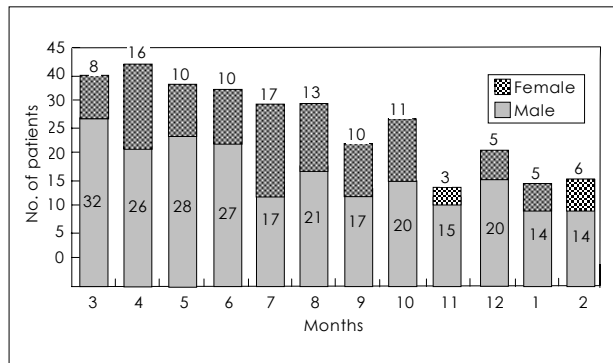


Fig. 1. Monthly distributions of pediatric head injury.

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 313 가

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%)

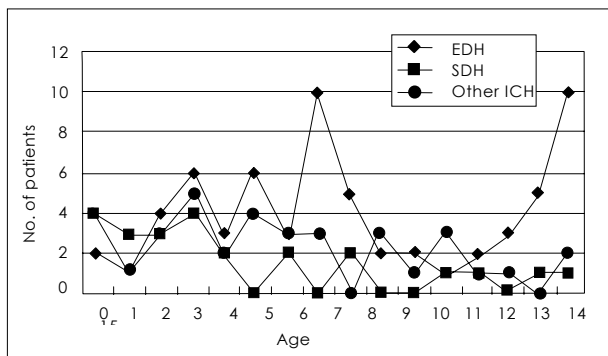


Fig. 2. The correlations between age and hematoma.

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

**Table 4.** The correlations between GOS and GCS

GOS	GCS				Total
	15-13	12-9	8		
I	311	18	5		334
II	1	5	11		17
III	1	0	1		2
IV	0	0	4		4
V	0	0	8		8
Total	313	23	29		365

GOS ; Glasgow outcome score, GCS ; Glasgow coma score I ; Good recovery or mild disability, II ; Moderate disability, III ; Severe disability, IV ; Vegetative, V ; dead

**Table 5.** Outcome of pediatric head injuries according to age

Age	Glasgow Outcome Score					Total
	I	II	III	IV	V	
<8 yr.	223	11	0	2	5	241
8 yr.	111	6	2	2	3	124
Total	334	17	2	4	8	365

7 가 ,  
1 , ,  
가 1 .

### 고 찰

, 가 , 가,  
가 가  
가 가  
가 가

18),  
14),  
40%  
10  
10%

1). Jegger 1/3  
가 ,  
3/4 14).  
1.6%~72%  
8)14)15)21)27)29).

가

가 3 가 4).  
가 2 가 1)4)6)25)27),  
7)8)24) 1)11)21)23)  
6)25)  
16)17)

Ong 24) , 5  
가 가 가  
가 가

6~10  
7)23)27)  
6)25) 3  
9  
14)15) 4~5 가 6)25)

3~8  
가  
가  
가

11.8%~39% 1)6)20)25)27),  
1)6)25),  
54% , 가

1.0~35%  
가 가 3)4)11)21).  
1.0~2.5%, 가 1.5~5.0%  
3)11)18)21)26) 3.5~  
3)4)11)22)23), 10~

10.8%  
20%  
가 6)19)25).  
30.1% 16.7%  
7.6%  
Sanchez 28)  
4  
40.5%, 4.3%  
21.5% 가

4 5 가 5 7 가 8

Raimondi <sup>26)</sup> 65% 가

Luerssen <sup>21)</sup> 25% 가 가 10 가

가 가 가 가

0.027~7.35% <sup>6)12)16)21)25)</sup> 2.7%

1/3~1/7 13~15% <sup>6)25)</sup> 17.5%

<sup>12)13)</sup> 가 <sup>19)21)</sup> 가

Ong <sup>24)</sup> 24 GCS, <sup>2)3)</sup> 가 <sup>2)9)19)</sup> 가 <sup>10)</sup> 가

Luerssen <sup>21)</sup> 가

Berger <sup>3)</sup> 가

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