



OUTCOME PROGNOSTICATION IN TRAUMATIC BRAIN INJURY USING THE MHIPS SCALE –AN OBSERVATIONAL STUDY

Neurosurgery

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ABSTRACT

Head injury sustained due to road traffic accidents and other modes of traumatic brain injury have shown a progressive increase in emergency practice in general and neurosurgical care in particular. Adequate and clinical stratification of patients with regard to outcome and prognosis is of vital concern in reduction of mortality and morbidity in traumatic brain injury patients. The aim of the study is to study the significance of Glasgow Coma Scale and Madras Head Injury Prognostic Scale (MHIPS) as prognostic factors in traumatic brain injury. This analysis was done in a cohort of patients in the age group of 18 to 40 admitted with head injury during the two year period. The main prognostic factors in traumatic main injury were analyzed. The study validates the importance of the basic clinical and radiological examination as quintessential prognostic markers in traumatic brain injury.

KEYWORDS

traumatic brain injury, Madras Head Injury Prognostic Scale (MHIPS), Glasgow Coma Scale (GCS), prognostic outcome in head injury, Glasgow Outcome Score (GOS)

INTRODUCTION

Head injury sustained due to road traffic accidents and other modes of traumatic brain injury have shown a progressive increase in emergency practice in general and neurosurgical care in particular. Adequate and clinical stratification of patients with regard to outcome and prognosis is of vital concern in reduction of mortality and morbidity in traumatic brain injury patients. The aim of the study is to study the significance of Glasgow Coma Scale and Madras Head Injury Prognostic Scale (MHIPS) as prognostic factors in traumatic brain injury. This analysis was done in a cohort of patients in the age group of 18 to 40 admitted with head injury during the two year period. Clinical stratification based on clinical, radiological and laboratory parameters have been well laid out and studied in the IMPACT and the CRASH studies with large cohorts of traumatic brain injury patients.

Ramesh et al developed the Madras Head Injury Prognostic Scale to determine outcome with multivariate parameters such as age of the patient, best motor response of GCS, pupillary light response, oculocephalic response, CT scan findings and systemic injuries.

TABLE 1 MHIPS SCALE

PARAMETER	FINDINGS	POINTS
AGE OF THE PATIENT	LESS THAN 15 YEARS	3
	15 TO 45 YEARS	2
	MORE THAN 45 YEARS	1
BEST MOTOR RESPONSE	5 OR 6	3
	3 OR 4	2
	1 OR 2	1
PUPILLARY LIGHT RESPONSE	NORMAL	3
	IMPAIRED	2
	ABSENT	1
OCULOCEPHALIC RESPONSE	NORMAL	3
	IMPAIRED	2
	ABSENT	1
CT SCAN FINDINGS	NORMAL	3
	PARTIALLY EFFACED BASAL CISTERNS MIDLINE SHIFT LESS THAN 5 MM LESION DENSITY LESS THAN 3 CM	2
	ABSENT BASAL CISTERNS MIDLINE SHIFT ≥ 5 MM LEESION DENSITY ≥ 3 CM	1

TOTAL SCORE =SUM OF ALL THE POINTS FOR ALL PARAMETERS

For analyzing the outcome the patients are grouped under three groups based on total MHIPS, MHIPS 15-18, MHIPS 13-14, MHIPS 6-12 with MHIPS 15-18 having the best outcome, score of 13-14 associated with poor outcome and score of 6-12 being predictor of mortality.

AIM OF THE STUDY

The aim of this study is to analyze the demographic profile of head injury in a cross section of patients and to study the prognostic factors in traumatic brain injury and to analyze the correlation of Madras Head Injury Prognostic Scale (MHIPS) in the prognosis of traumatic brain injury with respect to the outcome in terms of morbidity and mortality.

MATERIALS AND METHODS

The study was done in a cohort of patients in the age group of 18 to 40 years old admitted with traumatic brain injury at Government Rajaji Hospital, Madurai during a two year period. The control cohorts were the patients in the age group 3 to 17 years and another above 41 years treated in the same institution for traumatic brain injury. Patients with polytrauma, alcohol/substance abuse, cerebrovascular accidents, post ictal state patients and patients with spinal cord injuries were excluded from the study. Patients were divided into three groups, Group A being the study group 18 to 40 years old, control group 3 to 17 years old as Group B and older patients above 41 years old being Group C. All patients were managed with standardized treatment protocol. Stratification was done based on age, sex, neurological assessment especially Glasgow Coma Scale on admission and Madras Head Injury Prognostic Scale (MHIPS). The outcome was recorded and analyzed on univariate analysis basis of individual factors with outcome with special emphasis on MHIPS classification.

RESULTS

The results of the study with respect to the demographic profile revealed road traffic accidents to be the main etiology in traumatic brain injury (66.46%) with the mean age of patients in the study group being 29.6 and the male to female ratio of 3.88. The Glasgow Coma Scale stratification was 13.66% in GCS above 13, 29.81% in GCS 9 to 13, 32.91% in GCS 5 to 8 and 23.6% in GCS of below 5 in the study group. The MHIPS stratification showed that 36% of patients belonged to MHIPS 15-18, 23.6% patients belonged to MHIPS 13-14 and 40.4 patients in the MHIPS 6 to 12 in the study group and lower age group MHIPS 15-18 the prevalence was 66.7%, MHIPS 12-13 about 18.5% and MHIPS 6-12 in 14.8% of patients. In the older age group the distribution was of the order of 17.6% in MHIPS 15-18 and 41.2% in MHIPS 12-13 and MHIPS 6-12.

DISCUSSION

The importance of various prognostic factors in traumatic brain injury was analyzed with specific correlation to the Glasgow Coma Scale and Madras Head Injury Prognostic Scale classification. Age specific mortality and favorable outcome is one of the most important prognostic factor in outcome of traumatic brain injury (table 2)

TABLE 2. AGE AND OUTCOME

OUTCOME	GROUP A		GROUP B		GROUP C		TOTAL	
	TOTAL	%	TOTAL	%	TOTAL	%	TOTAL	%
GOOD	79	49.1	37	68.5	33	38.8	149	49.7
POOR & DEATH	82	50.9	17	31.5	52	61.2	151	50.3
TOTAL	161	100	54	100	85	100	300	100

GCS and outcome had a linear correlation with regard to outcome in the study group as shown by the relatively poor outcome in all groups with regard to lower GCS with strong significance and in correlation with previous studies.(Table 3)

TABLE 3 GCS AND OUTCOME

GCS	GROUP A				GROUP B				GROUP C				TOTAL			
	GOOD		POOR/DEATH		GOOD		POOR/DEATH		GOOD		POOR/DEATH		GOOD		POOR/DEATH	
	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%	NO.	%
9 TO 15	51	72.9	19	27.1	31	91.2	3	8.8	21	56.8	16	43.2	103	73.1	38	26.9
3 TO 8	28	30.8	63	69.2	6	30	14	70	12	25	36	75	46	28.9	113	80.1

Patients with MHIPS 15-18 had good outcome in all age groups. In patients admitted with MHIPS 13-14 the Group B had poor outcome and Group C had the increased mortality. Patients with MHIPS 6-12 had increased mortality in all age groups. These results correlate well with previous studies in predicting outcome and clearly show the significance of MHIPS correlates in predicting outcome and mortality.

TABLE 4 MHIPS AND OUTCOME

MHIPS	GROUP A						GROUP B					
	GOOD		POOR		DEATH		GOOD		POOR		DEATH	
	NO	%	NO	%	NO	%	NO.	%	NO	%	NO	%
15-18	58	100	0	0	0	0	36	100	0	0	0	0
13-14	21	55.3	14	36.8	3	7.9	1	10	8	80	1	10
6-12	0	0	8	12.3	57	87.7	0	0	0	0	8	100

MHIPS	GROUP C						TOTAL					
	GOOD		POOR		DEATH		GOOD		POOR		DEATH	
	NO	%	NO	%	NO	%	NO.	%	NO	%	NO	%
15-18	13	86.6	1	6.7	1	6.7	107	98.2	1	0.9	1	0.9
13-14	20	57.1	7	20	8	22.9	42	50.6	29	34.9	12	14.5
6-12	0	0	3	8.6	32	91.4	0	0	11	10.2	97	89.8

The non evacuated lesions with midline shift also had a poor outcome. Early surgical evacuation of especially acute SDH in patients with GCS more than 9 resulted in a more favorable outcome. The overall mortality rate of acute SDH and intracerebral hemorrhage was high across age groups and more so in older ages and in patients with poor GCS. Surgical evacuation of EDH showed better recovery across all age groups.

TABLE 5 TREATMENT AND OUTCOME

TRT.	GROUP A		GROUP B		GROUP C		TOTAL	
	GOOD		POOR/DEATH		GOOD		POOR/DEATH	
	NO.	%	NO.	%	NO.	%	NO.	%

CONSERVATIVE	41	45.6	49	54.4	16	55.2	13	44.8	12	24	38	76	69	40.8	100	59.2
SURGICAL	38	53.5	33	46.5	21	84	4	16	21	60	14	40	80	61.1	51	38.9

CONCLUSION

This study showed strong correlation of age, motor score and pupillary reactivity with improved outcome in all age groups with traumatic brain injury. Mild and moderate TBI according to GCS had better prognosis and this was also confirmed by the linear correlation between decreasing MHIPS scoring and poor outcome and mortality. The study validates the importance of the Madras Head Injury Prognostic Scale (MHIPS) is a quintessential prognostic markers in traumatic brain injury.

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