RISK FACTORS FOR PROGRESSION OF TRAUMATIC INTRACRANIAL HAEMORRAGE

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INTRODUCTION

The World Health Organisation (WHO) considers Traumatic Brain Injury (TBI) to be a worldwide menace that cuts across all the continents. It is a major public health problem due to its high incidence and socioeconomic burden to the society. In Egypt, injuries burden is significant as it was the fifth leading cause of death in 2004. Also, it's considered as a hidden epidemic due to under-reporting. Progressive intracranial haemorrhage is a common occurrence in patients with intracranial haemorrage (ICH). It increases the probability of secondary injury to the brain. Previous studies have shown that the final size of the haematoma has a greater impact to the patient outcome as compared to the initial size of the ICH. The prognosis is worse with patients with progressive intracranial haemorrhage (PIH).

AIM OF THE WORK

The aim of this study was to determine the incidence of PIH in patients with TBI and the potential risk factors that cause PIH.

PATIENTS AND METHODS

The study consisted of 91 patients admitted to the emergency department of Alexandria University with ICH from July 2022 to December 2022. It included 63 males and 28 females.

Three head CT scans were done to the patients within a period of 24 hours. The 1st CT was taken at admission 2nd taken at 4-8hrs and 3rd at 24 hrs after admission. The volume of the haematoma was calculated using the Tada formula, V= a x b x c x ½. History and physical exam was done and past medical history including medication history was taken. Coagulation profile and a complete blood count was done including liver function tests (LFTs). Patients were followed up with CT scans and GCS assessment.

RESULTS

Table 1: Comparison between PIH at 4-8 hrs and at 24 hrs with laboratory tests

Laboratory	PIH (4-8 hrs.) No. (%)	Test of sig.	P	PIH (24hrs.) (n=7) No. (%)	Test of sig.	P
PLT	(n=28)			(n=7)		
Normal®	19 (67.9%)	c^2= 5.081	MCp= 0.063	3 (42.9%)	c^2= 3.799	MCp= 0.135
Decrease	9 (32.1%)			4 (57.1%)		
Increase	0 (0.0%)			0 (0.0%)		
Min. – Max.	112.0 – 378.0	U= 509.500*	<0.001*	110.0 – 198.0	U= 109.500*	0.045*
Mean ± SD.	185.39 ± 57.42			148.57 ± 32.76		
Median (IQR)	184(144.0–216.5)			131.0 (130.0–170.50)		
PTT	(n=28)			(n=7)		
Normal®	19 (66.6%)	c^2= 14.143*	FEp= 0.001*	7 (100%)	c^2= 0.314	FEp= 1.000
Increase	9 (33.3%)			0 (0%)		
Min. – Max.	25.40 – 41.30	U= 337.500	0.025*	27.40 – 31.80	U= 54.000	0.231
Mean ± SD.	35.31 ± 6.01			28.93 ± 2.48		
Median (IQR)	38.70 (28.20–40.20)			27.60 (27.50–29.70)		
PT	(n=28)			(n=7)		
Normal®	12 (42.9%)	c^2= 17.088*	<0.001*	4 (57.1%)	c^2= 0.647	FEp= 0.417
Increase	16 (57.1%)			3 (42.9%)		
Min. – Max.	11.30 – 34.50	U= 389.0*	<0.001*	13.10 – 14.80	U= 187.0	0.136
Mean ± SD.	15.04 ± 4.36			13.83 ± 0.61		
Median (IQR)	14.10 (13.20–15.20)			13.80 (13.40–14.15)		
INR	(n=28)			(n=7)		
Normal®	15 (53.6%)	c^2= 13.645*	<0.001*	6 (85.7%)	c^2= 0.178	FEp= 1.000
Increase	13 (46.4%)			1 (14.3%)		
Min. – Max.	0.99 – 3.95	U= 341.0*	<0.001*	1.0 – 1.45	U= 202.500	0.211
Mean ± SD.	1.41 ± 0.60			1.19 ± 0.14		
Median (IQR)	1.23 (1.14–1.47)			1.20 (1.15–1.20)		
AST	(n=28)			(n=7)		
Normal®	12 (42.8%)	c^2= 0.782	0.376	7 (100%)	c^2= 3.251	FEp= 0.124
Increase	16 (57.2%)			0 (0%)		
Min. – Max.	21.0 – 110.0	U= 146.0	0.442	19.0 – 43.0	U= 48.0	0.368
Mean ± SD.	51.37 ± 26.42			35.0 ± 11.31		
Median (IQR)	47.0 (35.0–55.50)			39.0 (27.0–43.0)		
ALT	(n=28)			(n=7)		
Normal®	22 (78.6%)	c^2= 2.393	FEp= 0.150	7 (100.0%)	c^2= 1.597	FEp= 0.556
Increase	6 (21.4%)			0 (0.0%)		
Min. – Max.	15.0 – 201.0	U= 53.0*	0.05 *	19.0 – 45.0	U= 36.500	0.138
Mean ± SD.	43.32 ± 46.52			26.50 ± 12.48		
Median (IQR)	24.0 (19.50–35.0)			21.0 (19.0–34.0)		

Table 2: Comparison between PIH 4-8 hrs and 24hrs with demographic and clinical data

Demographic and clinical data	PIH 4-8hrs (n=28) No.	%	Test of sig.	P	PIH (24hrs.) (n=7) No.	%	Test of sig.	P
Age (years)								
0 – 40®	13	44.9	c^2= 13.485*	<0.001*	2	28.6	C^2=4.713*	FEp=0.048*
41 – >60	15	56.5			5	71.4		
Min. – Max.	0.83 – 80.0				15.0 – 72.0			
Mean ± SD.	40.28 ± 22.06			0.008*	47.86 ± 23.41		U= 179.500	0.088
Median (IQR)	44.0 (22.0–54.50)				55.0 (34.0–62.50)			
Past medical history								
HTN	7	25.0	c^2=11.246*	0.003*	4	57.1	c^2=10.158*	0.006*
DM	4	14.3	c^2=0.493	FEp=0.479	0	0.0	c^2=0.731	FEp=1.000
DVT	1	3.6	c^2=0.034	FEp=1.000	0	0.0	c^2=0.259	FEp=1.000
HD	2	7.1	c^2=2.159	FEp=0.199	2	28.6	c^2=5.948	0.034*
Liver disease	4	11.4	c^2=0.011	FEp=1.000	0	0.0	c^2=0.936	FEp=1.000
Medication								
Waf	3	10.7	0.361	FEp=0.672	0	0.0	c^2=0.535	FEp=1.000
HTNives (non compliant)	5	17.9	6.067*	0.020*	4	57.1	c^2=11.375*	0.004*
GLY	3	10.7	0.361	FEp=0.672	0	0.0	c^2=0.535	FEp=1.000
Asprin	2	7.1	2.159	FEp=0.199	2	28.6	c^2=5.948	0.034*
Lesions at admission								
EDH	6	21.4	1.140	0.286	1	14.3	c^2=0.262	FEp=1.000
SAH	7	25	7.566*	0.006*	1	14.3	c^2=0.262	FEp=1.000
TICH	8	28.5	0.216	0.642	3	57.1	c^2=0.059	FEp=1.000
IVH	0	0.0	0.632	FEp=1.000	0	0.0	c^2=0.084	FEp=1.000
SDH	2	7.1	2.476	0.116	1	14.3	c^2=0.330	FEp=1.000
Combined	5	17.9	8.566*	0.004*	2	28.6	c^2=0.342	FEp=1.000

CONCLUSION

- The incidence of PIH is high and is under reported especially if the 1st CT is done after 4 hours.
- The age range of 40-60 years is a vulnerable age to have PIH as they have comorbidities but are also the 2nd highest group involved in RTA.
- A previous history of hypertension and non-compliant to medication, patients with heart disease on aspirin are a risk factor to PIH.
- SAH has a high risk of progression causing PIH.
- Deranged coagulation profile should be viewed as a risk factor to PIH.
- Patients with combined site of injury and lesions are at higher risk of developing PIH.