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ORIGINAL RESEARCH

Evaluation Of Prognosis Of Traumatic Intra Ventricular Haemorrhage Associated With Severe Blunt Trauma Involving The Head: An Institutional Based Study

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ABSTRACT

Introduction: Intra ventricular haemorrhage (t IVH) from any route or source was thought to be relatively rare entity and invariably fatal before the advent of the newer technologies like computed tomography. The severity of the t IVH is reported to be related with the diffuse axonal injury that is the injury to the neurons in the area of corpus callosum. The aim of the present study was carried out to ascertain the characteristics and prognosis of the t IVH.

Materials and Methodology: There were almost 200 patients screened and only of about 32 patients meet the inclusion criteria. Patients reported with IVH due to other aetiologies were clearly excluded from the study. The diagnosis was reiterated with the help of computed tomography (CT) of the cranium. All persons with blunt traumatic head injury who presented to a participating study centre and received a head CT were included in the study. Patients without blunt trauma (including those with penetrating head trauma) and those undergoing head CT imaging for other reasons were not eligible for inclusion in this study.

Results: Twenty patients died within 1 month; of these, 7 patients died within 48 hours after admission. Of the survivors, at 6 months, 6 had moderate disability and six were normal. Septal haemorrhage was relatively observed in one patient which extended unto the 3rd ventricle and in some 8 cases the blood clot was reportedly located next to the foramen Monroe in close relation. 10 patients had their blood clots located closely to the frontal horn or the body of the lateral ventricle.

Conclusion: The extent of haemorrhage might reflect both the direction of force that has been applied to head and the other associated abnormality. The prognosis remains poor particularly if it had been involved all the four ventricles.

Keywords: Traumatic Intra ventricular Haemorrhage, Head Injury, Blunt Trauma, Glasgow Coma Score.

INTRODUCTION

Traumatic brain injury (TBI) is reported to be one of the major causes that result in morbidity and mortality that are predominantly related with road traffic accidents. The prevalence of traumati**c** intra ventricular haemorrhage (t IVH) in patients reported with TBI ranges from 0.4% - 23%.[1]But the significance of traumatic intraventricular haemorrhage that happens independent of the brain injury remains unclear and confused. There were some studies that reported the poor clinical prognosis is due to the fact that the injury to the neurons that are caused by the shearing force of the impact.[2]

The severity of the t IVH is reported to be related with the diffuse axonal injury that is the injury to the neurons in the area of corpus callosum. Prognosis of t IVH was considered very poor before the advent of CT scanning, probably because the entity was only detected while doing post-mortem or in patient condition has become worst enough to require a neurosurgical intervention. There are few studies conducted since the advent of CT scanning also suggest that t IVH is associated with a poor prognosis, with functional outcomes ranging from 12% to 47%,[3,1] but other studies have reported no difference in recovery rates between patients with and without tIVH.[4,5]

There have been several trials that have suggested that isolated t IVH is associated with a functional outcome[6]moreover this entity is not clearly understood because it is rare.[3,6]Om the other hand, it is not identified with any certainty that what the significance of t IVH is and one do not know what prognosis are associated with only t IVH. Considering the fact that a normal CT scan is compatible with major brain injury (i.e., diffuse axonal injury). Ventricular wall having the differential fragility as an aetiology is suggested, based on variations of the distribution of IVH on CT.[7] The clinical features and CT findings in a group of thirty-two patients with traumatic IVH have been relatively studied in order to evaluate the prognosis in this study group of head injured patients. The sites of ventricular haemorrhage have been evaluated to look for regions that are vulnerable to traumatic haemorrhage. The aim of the present study was carried out to ascertain the characteristics and prognosis of the t IVH.

MATERIALS AND METHODOLOGY

After the obtaining the clearance from the institutional ethical committee, the study was carried out with thirty-two patients who were diagnosed with traumatic IVH. There were almost 200 patients screened and only of about 32 patients meet the inclusion criteria. Patients reported with IVH due to other aetiologies were clearly excluded from the study. The diagnosis was reiterated with the help of computed tomography (CT) of the cranium. All persons with blunt traumatic head injury who presented to a participating study centre and received a head CT were included in the study. Patients without blunt trauma (including those with penetrating head trauma) and those undergoing head CT imaging for other reasons were not eligible for inclusion in this study. Discharge summaries, notes from follow-up appointments, and extra CT reports were collected from six sites participating in the follow-up portion of the study ("prognosis subset"). Mechanism of injury, presenting Glasgow Coma Scale (GCS) score,[8] and neurosurgical status were extracted; the same records were used to calculate the Glasgow Outcome Scale (GOS) score[9] at the time of the final, charted evaluation of each patient.

Data were described using proportions and relative risk (RR) ratios with 95% confidence intervals. Interrater agreement was calculated using raw percentage scores.

RESULTS

Table – 1 depicts the clinical picture and the prognosis of the patients affected with t IVH. Outcome was assessed according to the Glasgow outcome scale. Twenty patients died within 1 month; of these, 7 patients died within 48 hours after admission. Of the survivors, at 6 months, 6 had moderate disability and six were normal.

Septal haemorrhage was relatively observed in one patient which extended unto the 3rd ventricle and in some 8 cases the blood clot was reportedly located next to the foramen Monroe in close relation. 10 patients had their blood clots located closely to the frontal horn or the body of the lateral ventricle.

Table 1: Clinical picture and prognosis of patients with t IVH

Case. No	Age (years)	Cause of injury	Window period (in hours)	GCS score (0/15)	prognosis
1	54	RTA	1	6	Died within 24 hours
2	33	RTA	1	4	Died 4th day
3	21	RTA	1	5	Died 7th day
4	24	RTA	2	6	Died within 24 hours
5	27	RTA	3	8	Died 3rd day
6	32	RTA	4	9	Died 15th day
7	35	Industrial accident	4	11	Normal
8	38	Stunt fail	4	4	Died within 2 hours
9	44	Assault	6	4	Died 4th day
10	46	RTA	7	6	Normal
11	60	RTA	2	8	Moderate with neurological findings
12	33	RTA	60	9	Normal
13	25	RTA	2	4	Died within 3rd day
14	66	RTA	4	4	Moderate with neurological findings
15	59	RTA	5	5	
16	52	RTA	3	8	Died within 24

					hours
17	31	Fall from height	1	7	Moderate with neurological findings
18	29	Assault	55	9	Died within 9th day
19	6	RTA	9	10	normal
20	13	Fall from height	6	12	Normal
21	57	Assault	7	4	Died within 7th day
22	44	Road rage	8	5	Died within 4th day
23	48	Fall	5	6	Moderate with neurological findings
24	39	Industrial accident	3	6	Moderate with neurological findings
25	53	Fall from height	2	7	Died on 18th day
26	61	RTA	72	14	normal
27	32	RTA	9	9	Died in 48 hours
28	26	RTA	8	4	Died on 26th day
29	48	assault	4	6	Died on 15th day
30	43	Fall from height	2	7	Died within 6 hours
31	27	RTA	1	4	Died within 24 hours
32	24	RTA	12	6	Died on 16th day

DISCUSSION

The prevalence of t IVH among the study group of patients with blunt head trauma for whom a head CT was advised was observed to be 1.41%, which is in corroboration with prior results (of between 0.4 to 4%) that was published earlier in the medical literature.[7,10] The changes in prevalence rate is likely to be partly a reflection of criteria that was used for performing a head CT wherein certain earlier studies had utilized CT technology on patients with severe head injury and thereby increasing their prevalence rates between two and three percent.[11,12]

Several large studies (5,000 to 7,075 patients scanned) reported somewhat lower prevalence rates of 0.4% and 0.5%, but they did not delineate their CT selection criteria, if there were any.13 We believe our estimate, derived from a large "real-world" cohort at many different centres, accurately reflects the prevalence of t IVH among patients with head trauma of a sufficient degree to require CT scanning.

French et al in their study observed no case of primary or solitary IVH after screening 1000 cases of head injury,[2] while Cordobes showed 2 cases in his review of 1430 patients.[14] In the present study series, 7 patients (1%) had solitary traumatic IVH. The temporal relationship of the injury to IVH is not clearly known and was confusing to be documented. While IVH in combination with lobar contusions were found to have occurred over 11 to 24 hours after impact, it has also been observed that as early as 30 to 90 minutes after trauma in patients with hematoma involving the deep basal ganglia or without any other intracranial bleeding.[14] In the current study, 14 of the 16 patients were scanned within 12 hours after injury. Particularly, in 6 patients who were scanned as early as 2 hours after injury IVH was seen. Secondary IVH in blunt head trauma could be due to disruption of the ventricular wall by adjacent intracerebral haematoma.[15,16] The proposed mechanisms of primary traumatic IVH might include damage to the subependymal veins secondary to an immediate extravascular negative pressure,[17] shear injury resulting in laceration of ventricular wall[6] and rupture of subependymal vascular malformation.[15]

Fragility present in certain sites in the brain that include foramen of Monroe region, the frontal horn and body of the lateral ventricle, corpus callosum, fornix, and septum pellucidum, to trauma, was prioritised earlier, based on the pathological[18] and radiological studies.[7] The presence of localised haematoma that are adjacent to the foramen of Monroe in 10 patients and in the frontal horn or body of the lateral ventricles in 12 others in our study, corroborates these earlier observations reported in those studies. Haemorrhage in the region of the lateral ventricles, without a fluid level might be due to the subependymal nature of the bleed.[15] Prognosis associated with traumatic IVH in general, is relatively poor. Eighty five percent of patients in our study had died or had residual disability even after 6 months of follow - up. The mortality and morbidity also in the subgroup of traumatic primary IVH is high; up to eighty percent of patients were dead or vegetative in earlier series[7] which compares well with 71% in the present study. It directly reiterates the severity of the traumatic forces and of the primary brain damage but is probably not related only to the intraventricular bleeding. For making an effective clinical decision, an instrument that will identify patients who need a head CT and it is important to assess not just outcomes of t IVH but the associated signs or symptoms that would have detected in each patient as necessary for a head CT. Of the six patients with initially isolated t IVH who fared poorly, all six presented with a GCS <8, making the need for a head CT obvious. Therefore, no patient would be missed if the investigators of a clinical decision instrument relied on an abnormal GCS score and potentially an altered level of alertness, consciousness and seizure to detect these patients for a head CT.

CONCLUSION

The clinical picture that has been identified in this study strongly suggest that t IVH is relatively rare and that prognosis is determined by the associated injuries to brain rather than the t UVH itself. Hence if a physician encounters a rare entity of t IVH, the management should possibly be determined the patient's clinical presentation and their associated injuries. IVH is relatively uncommon after blunt head injury. The extent of haemorrhage might reflect both the direction of force that has been applied to head and the other associated abnormality. The prognosis remains poor particularly if it had been involved all the four ventricles.

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