http://www.banglajol.info/index.php/JNINB

Original Article

DOI: https://doi.org/10.3329/jninb.v10i1.76309

Journal of National Institute of Neurosciences Bangladesh,
January 2024, Vol. 10, No. 1, pp. 8-11

ISSN (Online) 2518-6612
ISSN (Print) 2410-8030

Mode and Associated Injury among the Patients Presented with Acute Subdural Hematoma

Kalim Uddin[1], Md. Moajjam Hossain Talukder[2], Mohammed Ashraful Haque[3], Jalal Uddin Md. Rumi[4], Monirul Islam[5], MA Salam[6], Monzurul Islam[7], SK Sader Hoassain[8]

[1]Assistant Professor, Department of Neurotrauma Surgery, National Institute of Neurosciences and Hospital, Dhaka, Bangladesh; [2]Associate Professor, Department of Clinical Neurosurgery, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh; [3]Associate Professor, Department of Neurosurgery, National Institute of Neurosciences and Hospital, Dhaka, Bangladesh; [4]Associate Professor, Department of Neurosurgery, National Institute of Neurosciences and Hospital, Dhaka, Bangladesh; [5]Associate Professor, Department of Neurosurgery, National Institute of Neurosciences and Hospital, Dhaka, Bangladesh; [6]Associate Professor, Department of Neurotrauma Surgery, National Institute of Neurosciences and Hospital, Dhaka, Bangladesh; [7]Assistant Registrar, Department of Neurotrauma Surgery, National Institute of Neurosciences and Hospital, Dhaka, Bangladesh; [8]Professor and Head, Department of Neurosurgery, National Institute of Neurosciences and Hospital, Dhaka, Bangladesh

Abstract

Background: Different mode of injuries are responsible for the formation of acute subdural hematoma. **Objective:** The purpose of the present study was to mode and associated injury among the patients presented with acute subdural hematoma. **Methodology:** This cross-sectional study was carried out in the Neurosurgery Department of Dhaka Medical College Hospital, Dhaka, Bangladesh from January 2011 to August 2012 for a period of one year and eight months. Patients with acute subdural hematoma who fulfil the inclusion criteria for surgery and got admitted into the Hospital were selected as study population. Acute Subdural hematoma patient of any age, both sexes with GCS 5 to 13, thickness of hematoma more than l0 mm, midline shift more than 5 mm, pupil reacting to light and patient presented within 72 hours of injury were included for this study. At admission, a detailed history of the illness was taken from the patient or attendant, thorough general and neurological examinations were carried out and were recorded. **Results:** A total number of 48 patients presented with acute subdural hematoma who were operated in the Department of Neurosurgery of Dhaka Medical College & Hospital, Dhaka, Bangladesh were included in current study. Majority of the patients were in the age group of 10 to 30 years which was 25(52.1%) cases. In this study, majority of patients 26(54.2%) had history of road traffic accidents. Other causes of injury were fall from height 9(18.75%), physical assault 7(14.58%), industrial accident 2(4.16%). No associated injury was found in 18(37.5%) patients and 15(31.2%) cases were hemorrhagic contusion. In this study 3(6.5%) cases were presented with intra-cerebral hemorrhage (ICH) and 4(8.3%) cases were associated EDH. SAH was found in 3(6.5%) cases. **Conclusion:** In conclusion the most common mode of injury is road traffic accidents which is associated with hemorrhagic contusion. *[Journal of National Institute of Neurosciences Bangladesh, January 2024;10(1):8-11]*

Keywords: Mode; associated injury; acute subdural hematoma

Introduction

Road traffic accident (RTA) is increasing rapidly due to fast urbanization and industrialization of not only Bangladesh but the whole world[1]. RTA is the most common cause of head injury followed by other causes like Industrial accident, fall from height, domestic and sports injuries[2].

Different sorts of trauma occur every day, every moment and most of which involve head injury. Traumatic acute subdural hematoma (ASDH) represents one of the most lethal neurosurgical problems[2]. Young male are the major victims following motor vehicle accident[3]. One of the most serious neurosurgical emergencies usually following trauma, which often require surgical intervention is acute subdural hematoma. If proper treatment is not prompt, acute subdural hematoma can lead to other problems such as intraparanchymal hemorrhages and contusion[4].

Correspondence: Dr. Kalim Uddin, Registrar, Department of Neurotrauma Surgery, National Institute of Neurosciences and Hospital, Sher-E-Bangla Nagar, Agargaon, Dhaka-1207, Bangladesh; Email: drkalim784@gmail.com; Cell No.: +8801712764797;
ORCID: https://orcid.org/0009-0002-1332-3362

Trauma is the 3rd most common cause of death in the United States of America (USA). More than 50.0% death following trauma is due to head injury. Head injury therefore accounts approximately 80000 deaths per year in the United States[5]. The mortality of traumatic acute subdural hematoma is about 50.0% to 90.0% and traditionally thought to be higher in aged patients (60%), 90 to 100% in patients on anticoagulant therapy[6]. But in developing countries outcomes is poor and mortality is very high about 60.0% to 90.0%[7]. The purpose of the present study was to mode and associated injury among the patients presented with acute subdural hematoma.

Methodology

Study Settings and Population: This was a cross-sectional study and this research work was carried out in the Neurosurgery Department of Dhaka Medical College Hospital, Dhaka, Bangladesh. This study was carries out from January 2011 to August 2012 for a period of one year and eight months. Patients with acute subdural hematoma who fulfil the inclusion criteria for surgery and got admitted into the Neurosurgery Department of Dhaka Medical College Hospital, Dhaka, were selected as study population.

Selection Criteria: Acute Subdural hematoma patient of any age, both sex with GCS 5 to 13, thickness of hematoma more than l0 mm, midline shift more than 5 mm, pupil reacting to light and patient presented within 72 hours of injury were included for this study. Brain damage other than lober injury like brain stem, thalamic, hypothalamic, callosal injury, ASDH with associated polytrauma and bilateral dilated, fixed pupil, GCS-less than 5 and more than 13, penetrating head injury with ASDH were excluded from this study.

Study Procedure: A questionnaire was prepared considering variables like age, sex, presenting complaints, clinical findings, associated medical conditions, investigations, which was verified by the guide and then data were collected by the researcher himself. After patient selection aims, objective and procedure of the study were explained to the patient or party with understandable non-technical language. Risks and benefits were also clear to the patient or guardian. Cases were encouraged for voluntary participation and they were allowed for free withdrawal from the study. They were assured that all information's and records were be kept confidentially. Then inform written consent was taken from each patient or guardian. After necessary modification following pre-testing, the structured data sheet was designed and used as data collection instrument. At admission, a detailed history of the illness was taken from the patient or attendant, thorough general and neurological examinations were carried out and were recorded.

Statistical Analysis: The data were collected and edited manually. Then the data was entered into SPSS (Statistical Package for Social Science, version 20) computer software program. The entered data were checked and verified. The same program analyzed the data. For statistical analysis, we used the t-test and Levine's test for equality of variance to determine significant differences between the groups. Differences were considered statistically significant at $p < 0.05$. The data were presented in tabulated form. Statistical calculations were performed by the same software.

Ethical Clearance: Prior to commencement of this study the research protocol was approved by the Ethical Review Committee and Research Review Committee of Dhaka Medical College, Dhaka.

Results

A total number of 48 patients presented with acute subdural hematoma who were operated in the Department of Neurosurgery of Dhaka Medical College & Hospital, Dhaka, Bangladesh were included in current study. Majority of the patients were in the age group of 10 to 30 years which was 25(52.1%) cases followed by 31 to 50 years' age group and more than 50 years which were 19(39.5%) cases and 4(8.3%) cases respectively (Table 1).

Table 1: Age distribution of the study groups (n=48)

Group Age	Frequency	Percent
10 to 30 Years	25	52.1
31 to 50 Years	19	39.6
>50 Years	4	8.3
Total	**48**	**100.0**

In this study, majority of patients 26(54.16%) had history of road traffic accidents. Other causes of injury were fall from height 9(18.75%), physical assault 7(14.58%), industrial accident 2(4.16%) (Table 2).

Table 2: Mode of injury in study population (n=48)

Mode of Injury	Frequency	Percent
RTA	26	54.1
Fall from height	9	18.8
Assault	7	14.6
Industrial accident	2	4.2
Sport injury	1	2.1
Others	3	6.2
Total	**48**	**100.0**

No associated injury was found in 18(37.5%) patients and 15(31.2%) cases were hemorrhagic contusion. In this study 3(6.5%) cases were presented with Intra-cerebral hemorrhage (ICH) and 4(8.3%) cases were associated EDH. Skull fracture was reported in 1(2.1%) case. SAH was found in 3(6.5%) cases. However, others associated injury were 4(8.3%) cases (Table 3).

Table 3: Type of Associated Injury with ASDH in study group (n=48)

Associated Injury	Frequency	Percent
No associated injury	18	37.5
Hemorrhagic contusion	15	31.2
Intra-cerebral hemorrhage	3	6.5
Associated EDH	4	8.3
Skull fracture	1	2.1
SAH	3	6.5
Others	4	8.3
Total	**48**	**100.0**

Discussion

Traumatic acute subdural hematoma is one of the most lethal of all head injuries in which primary brain injury is more critical factor than hematoma[8]. The high mortality of acute subdural hematoma is largely explained by its frequent association with primary brain damage consisting of cerebral contusion, diffuse axonal injury and brain swelling[9]. However, the nature and causes of brain swelling is poorly understood. Brain swelling associated with acute subdural hematoma is caused by secondary insult in addition to primary brain parenchymal damage[10].

In this study, majority of patients 26(54.16%) had history of road traffic accidents. Other causes of injury were fall from height 9(18.75%), physical assault 7(14.58%), industrial accident 2(4.16%). Regarding this series, it would be informed that have deliberately avoided moribund patients (GCS-3/4, bilateral dilated fixed pupils). That may be one of the causes of low mortality in this series than those of other reported series[5,7]. Guilburd and Sviri[11] found following results following multidural fenestration technique for acute subdural hematoma good recovery was seen in 19.0% patients, moderate disability seen in 6.4% patients, 12.1% patients remained severely disable, persistent vegetative state developed 9.7% patients and lastly 51.6% patients died.

No associated injury was found in 18(37.5%) patients and 15(31.2%) cases were hemorrhagic contusion. In this study 3(6.5%) cases were presented with Intra-cerebral hemorrhage (ICH) and 4(8.3%) cases were associated EDH. Skull fracture was reported in 1(2.1%) case. SAH was found in 3(6.5%) cases. However, others associated injury were 4(8.3%) cases. Reducing the operating time and duration of hospital stay it is possible to decrease treatment cost significantly and it seems to us that it is important to consider such factors for the development of greater clinical efficiency in hospitals with current challenge of limited resources and staff constraints especially developing country[12].

Intracranial pressure (ICP) monitoring is one of the most important parts of the management of severe head injury irrespective of acute subdural hematoma[13]. But it is not possible for us to monitor ICP due to unavailability of monitor in this hospital. Another important part of the management of acute subdural hematoma is care of the patients in intensive care unit (ICU)[14]. In this hospital, though limited bed in ICU, it has been provided ICU support for every patient required ICU support. Solvent patients take this facility from other hospital and clinics and return back to DMCH. Serial imaging studies like CT-scan of brain is necessary to confirm that the acute subdural hematoma has removed completely by surgery[15].

Conclusion

In conclusion the most common mode of injury is road traffic accidents followed by fall from height and physical assault. However, hemorrhagic contusion is the most frequently associated injury among the acute subdural hematoma patients. Therefore, proper evaluation of the patients presented with acute subdural hematoma should be carried out for accurate management.

Acknowledgements
None.

Conflict of interest: There is no conflict of interest relevant to this paper to disclose.

Financial Disclosure
This research project was partially funded by Bangladesh Medical Research Council (BMRC).

Contribution to authors: Uddin K, Hoassain SKS conceived and designed the study, analyzed the data, interpreted the results, and wrote up the draft manuscript. Haque A, Rumi JUM, Islam M, Salam MA, Islam M involved in the manuscript review and editing. All authors read and approved the final manuscript.

Data Availability
Any inquiries regarding supporting data availability of this study should be directed to the corresponding author and are available from the corresponding author on reasonable request.

Ethics Approval and Consent to Participate
Ethical approval for the study was obtained from the Institutional Review Board. As this was a prospective study the written informed consent was obtained from all study participants. All methods were performed in accordance with the relevant guidelines and regulations.

How to cite this article: Uddin K, Hoassain SKS, Haque A, Rumi JUM, Islam M, Salam MA, Islam M. Mode and Associated Injury among the Patients Presented with Acute Subdural Hematoma. J Natl Inst Neurosci Bangladesh, 2024;10(1):8-11

ORCID:
Kalim Uddin: https://orcid.org/0009-0002-1332-3362
Md. Moajjam Hossain Talukder: https://orcid.org/0009-0006-2988-5991
Mohammed Ashraful Haque:: https://orcid.org/0009-0005-3240-4768
Jalal Uddin Md. Rumi: https://orcid.org/0000-0003-2364-715X
Monirul Islam: https://orcid.org/0000-0002-3389-1044
MA Salam: https://orcid.org/0009-0006-7340-7524
Monzurul Islam: https://orcid.org/0009-0001-5652-3973
SK Sader Hoassain: https://orcid.org/0009-0007-4176-7346

Article Info
Received on: 7 September 2023
Accepted on: 24 November 2023
Published on: 1 January 2024

References

1. Menon DK, Schwab K, Wright DW, Maas AI. Position statement: definition of traumatic brain injury. Archives Of Physical Medicine And Rehabilitation. 2010;91(11):1637-40
2. Bhat AR, Wani MA, Kirmani AR. Acute sub-dural hematoma with severe traumatic brain edema evacuated by Dural-Stabs-A new brain preserving technique. Biomed Res. 2010;21(2):167-73
3. Bullock MR, Chesnut R, Ghajar J, Gordon D, Hartl R, Newell DW, Servadei F, Walters BC, Wilberger JE. Surgical management of acute subdural hematomas. Neurosurgery. 2006;58(suppl_3):S2-16
4. Wilberger JE, Harris M, Diamond DL. Acute subdural hematoma: morbidity, mortality, and operative timing. Journal of neurosurgery. 1991;74(2):212-8
5. Koç RK, Akdemir H, Öktem IS, Meral M, Menkü A. Acute subdural hematoma: outcome and outcome prediction. Neurosurgical review. 1997;20:239-44
6. Fell DA, Fitzgerald S, Moiel RH, Caram P. Acute subdural hematomas: Review of 144 cases. Journal of Neurosurgery. 1975;42(1):37-42
7. Hatashita S, Koga N, Hosaka Y, Takagi S. Acute subdural hematoma: severity of injury, surgical intervention, and mortality. Neurologia Medico-Chirurgica. 1993;33(1):13-8
8. Jamieson KG, Yelland JD. Surgically treated traumatic subdural hematomas. Journal of Neurosurgery. 1972;37(2):137-49
9. Su TM, Lee TH, Chen WF, Lee TC, Cheng CH. Contralateral acute epidural hematoma after decompressive surgery of acute subdural hematoma: clinical features and outcome. Journal of Trauma and Acute Care Surgery. 2008;65(6):1298-302.
10. Massaro F, Lanotte M, Faccani G, Triolo C. One hundred and twenty-seven cases of acute subdural haematoma operated on. Acta Neurochirurgica. 1996;138(2):185-91
11. Joseph NG, Gil ES. Role of dural fenestrations in acute subdural hematoma. J Neurosurg. 2001;95(3):263-7
12. Ammar A, Rashid AM, Nasser M, Jehani AH, Hadi AA, Anizi AR. Head trauma. Kazadi KN Kalangu, Yoko Kato, Gilbert dechambenoit. Essential Practice of Neurosurgery. Nagoya, Japan, Access Publishing Company. 2009;1:668-9
13. Sawauchi S, Abe T. The Effect of Haematoma, Brain Injury, and Secondary Insult on Brain Swelling in traumatic Acute Subdural Haemorrhage. Acta Neurochirurgica. 2008;150:531-6
14. Narayan, K. R., Kempisty, S. Closed Head Injury. In: Rengachary, S. S. and Ellenbogen, R. G. ed. Principles of Neurosurgery.2“d . Philadelphia: Elsevier Mosby, 2005;785-817
15. Miyake S, Fujita A, Aihara H, Kohmura E. New Technique for Decompressive Duraplasty Using Expanded Polytetrafluoroethylene Dura Substitute—Technical Note—. Neurologia medico-chirurgica. 2006;46(2):104-6