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FREQUENCY OF INTRAVENTRICULAR EXTENSION IN INTRACEREBRAL HEMORRHAGE AND ITS OUTCOME AT DAY 30.

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ABSTRACT

Background: Intracerebral hemorrhage (ICH) accounts for 10 to 15% of all strokes, and is found to have a disproportionately high morbidity and mortality.¹ Extension of the hemorrhage into the ventricles (40% occurrence) can happen early or late in the course of events.² **OBJECTIVE:** To determine the frequency of Intraventricular extension in patients with intracerebral hemorrhage and its outcome at day 30 by measuring disability using Modified Rankin Scale. **STUDY DESIGN:** Descriptive case series. **PLACE AND DURATION OF STUDY:** Study was carried out from 1st December 2010 to 31st May, 2011 in the department of Neurology, PIMS, Islamabad, Pakistan. **SUBJECT AND METHODS:** 93 patients of intracerebral hemorrhage were enrolled in the study and the site of bleeding and its intraventricular extension noted on CT scan and outcome was measured by using mRS at discharge and at day 30. **RESULTS:** Total numbers of patients were 93. Mean age was 61.31 ± 16.37 years. Mean duration of hospital stay was 4.06 ± 2.08 days. Mean mRS at Admission was 4.55 ± 0.69 . Intraventricular extension of the intracerebral hemorrhage was seen in about half of the cases (50.5%). A higher number of patients were seen in mRS 5 in patients with intraventricular extension at admission. At Discharge 17 patients were dead in intraventricular extension group compared to 5 with no intraventricular extension group. The outcome was poor at day 30 as about half of patients (23 out of 47) with intraventricular extension of hemorrhage were dependent. **CONCLUSION:** Intraventricular extension of the intracerebral hemorrhage was seen in about half of the cases and its outcome at day 30 was poor.

KEYWORDS: Intracerebral hemorrhage (ICH), cerebral haemorrhage, Intraventricular hemorrhage (IVH)

INTRODUCTION

Intracerebral hemorrhage (ICH) accounts for 10 to 15% of all strokes, and is found to have a disproportionately high morbidity and mortality.¹ Extension of the hemorrhage into the ventricles (a 40% occurrence) can happen early or late in the sequence of events.² Epidemiological data demonstrate the amount of blood in the ventricles relates directly to the degree of injury and likelihood of survival.² Headache, vomiting and loss of consciousness are the common presentations of Intracerebral Hemorrhage.³ Computed tomography (CT) is the key diagnostic investigation. First, it clearly differentiates hemorrhagic from ischemic stroke. In addition, CT demonstrates the size and location of the hemorrhage and may reveal structural abnormalities such as aneurysms, arteriovenous malformations, and brain tumors that caused the Intracerebral hemorrhage as well as structural complications such as herniation, intraventricular hemorrhage, or hydrocephalus.⁴ The

role of surgical treatment for intracerebral hemorrhage remains controversial and deserves further study.⁵ The outcome of hypertensive intracerebral hemorrhage is dependent on multiple factors like age of the patient, co-morbidity, CT scan findings and Glasgow Coma Scale.⁶ Spontaneous intracerebral hemorrhage is frequently associated with intraventricular hemorrhage (IVH), which is an independent predictor of poor outcome.⁷ Intraventricular hemorrhage, either independent of or as an extension of intracranial bleed is thought to carry a grave prognosis as it can lead to hydrocephalus and thus poor outcome.⁸ The outcome of intracerebral hemorrhage is significantly worse than with ischemic stroke with up to 50% mortality at day 30.⁹ We know that intracerebral hemorrhage with intraventricular extension of blood is thought to have further worse outcome as it leads to hydrocephalus⁸ so we conducted this study to look for its outcome at discharge and at day 30 and to emphasize that early identification can help in early treatment and prevention of morbidity and mortality.

MATERIAL AND METHODS:

Study was carried out from 1st December 2010 to 31st May 2011 on admitted patients of department of Neurology, Pakistan Institute of Medical Sciences (PIMS), Islamabad. Study design was of Descriptive case series. Sample size was calculated using WHO software for sample size collection, where. Confidence level $(1-\alpha) = 95$, Absolute precision $(d) = 0.10$, Using prevalence of 40%², taken from literature review. Sample size (n) : 93 patients of ICH. Intraventricular extension is defined as blood within the ventricular system in association with parenchymal hemorrhage on computed tomography (CT) scan which will show hyperdense area within the ventricular system. Modified Rankin Scale was used to determine the functional status and outcome after intracerebral hemorrhage. Sampling Technique was Non probability consecutive sampling. All patients of both genders above 13 years of age with spontaneous intracerebral haemorrhage diagnosed on CT scan brain. Following were excluded from the study.

- Patients with pure intraventricular hemorrhage
- Patients with head injury.
- Patient with bleeding diathesis or on anticoagulant therapy.
- Patients with other co-morbidities like liver failure, renal failure etc
- Patients with hemorrhage into brain tumor, infarction or venous thrombosis.

The study was approved from hospital ethical committee. All patients underwent a detailed history taking and physical examination and all relevant investigations were performed. The diagnosis of intracerebral hemorrhage was made on CT scan findings. The site of intracerebral hemorrhage and its intraventricular extension was noted. Patients fulfilling the inclusion criteria were enrolled after taking informed written consent from the patients or relatives. The data collected was entered on the specifically designed proforma. All patients received appropriate supportive treatment for intracerebral hemorrhage. Outcome was measured at discharge and at day 30 using modified ranking scale. At day 30 it was done through telephonic inquiry. The data was analyzed using SPSS version 14.0. Descriptive analysis was done for numerical variables and reported as mean; median and standard deviation for continuous variables like age whereas frequencies and percentages was calculated for categorical variables such as gender, duration of hospital stay and modified Rankin scoring at discharge and at day 30.

RESULTS:

A total of 93 patients fulfilled the inclusion criteria and were enrolled in the study. Mean age was 61.31 ± 16.37 years, median was 60 years and mode was 55 years. The age range was 22-125 years, but 68 (73.1%) patients were more than 50 years of age. Out of the 93 patients, 58 (62.4%) were male and 35 (37.6%) were female. Thus intracerebral hemorrhage was more commonly seen in men compared to women 62.4% vs 37.6%. 90 patients out of 93 (96.8%) of the intracerebral hemorrhage patients were dependent at admission as shown in figure 1, while 3 patients were partially dependent (MRS 2).

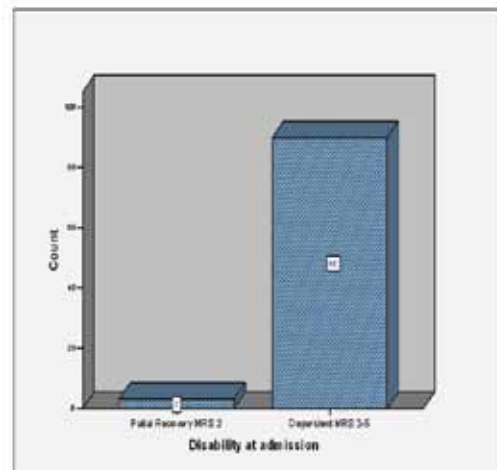


figure 1: Disability at admission.

68 out of 90 dependent patients (73.1%) remained dependent till discharge as shown in figure 2, while 22 out of total 93 patient were dead till discharge.

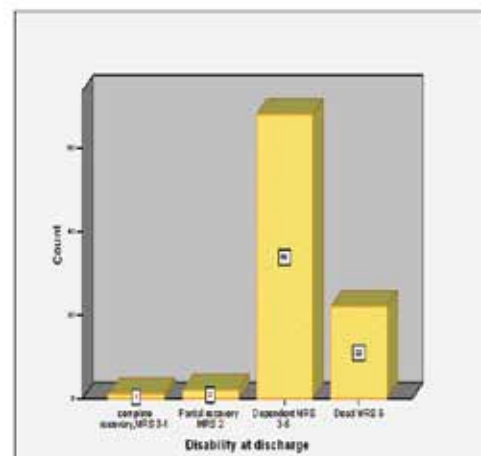


Figure 2: Disability at discharge.

Mean duration of hospital stay was 4.06 ± 2.08 days, range 1-12, median 4 and mode 3. 22 (23.7%) patients expired during the hospital stay; while amongst those who survived, mean mRS at discharge was

4.59±1.06. 66.6% were dependent at the time of discharge. At 30 day follow up the percentage of dead patients was 29%. Maximum number of patients was seen in MRS 4 at day 30 i.e 32 (34.4%) Disability was also calculated as classified according to MRS (annexure 2). 90 patients out of 93 (96.8%) of the intracerebral hemorrhage patients were dependent at admission, while 3 patients were partially dependent (MRS 2).68 out of 90 dependent patients(73.1%) remained dependent till discharge ,while 22 out of total 93 patient were dead till discharge. At day 30 total number of dead patients out of 93 patients were 27.58. (62.4%) patients were still dependent (MRS 3-5) at day 30. Intraventricular extension of the intracerebral hemorrhage was seen in about half of the cases (50.5% vs 49.5%) as shown in figure 3.

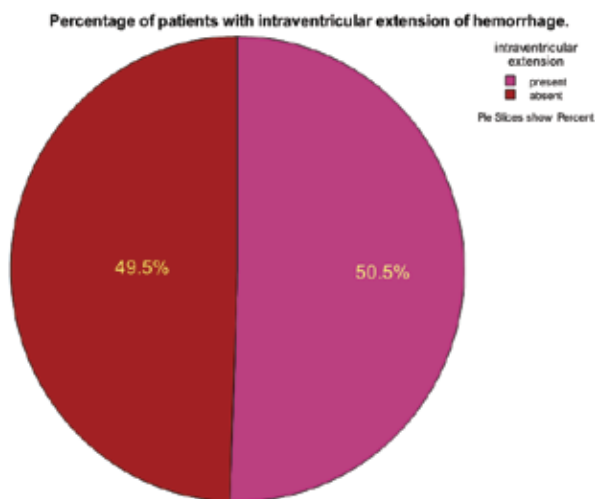


Figure: 3.Percentage of patients with intraventricular extension of hemorrhage

A comparison was also made between intraventricular extensions of the hemorrhage and disability at admission,discharge and at day 30 shown in figure 4,5 and figure 6.

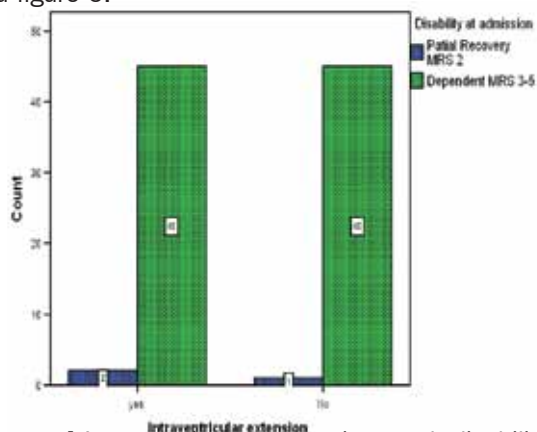


Figure 4.Intraventricular extension and disability at admission

At Discharge the outcome was poor in patients with intraventricular extension subgroup,17 patients were dead in intraventricular extension group compared to just 5 in patients with no intraventricular extension as shown in figure 5.

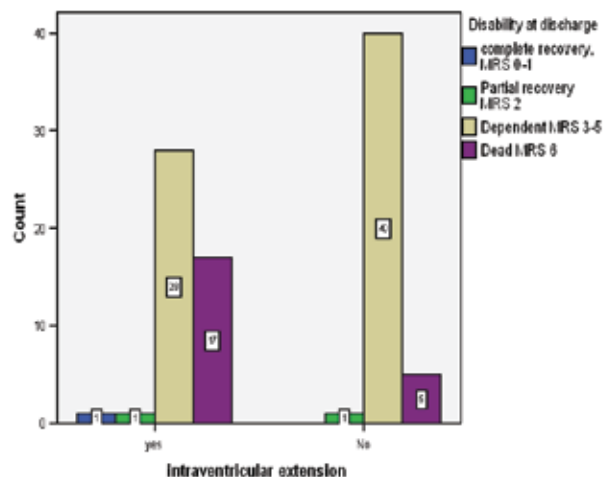


Figure: 5.Intraventricular extension and disability at discharge

Similarly, at day 30 the number of dead patients were 22 in intraventricular extension group compared to 5 in patients with no intraventricular extension as shown in figure 6.

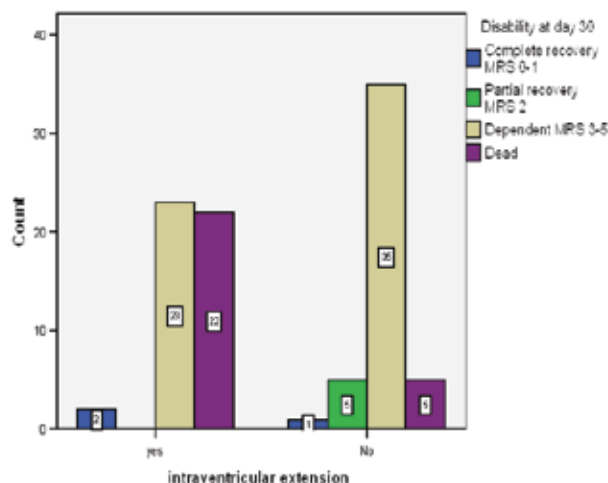


Figure: 6.Intraventricular extension and disability at day 30

The number of dependent patients (in MRS 4 and 5) however, was similar in both groups at day 30 as shown in figure 6.

DISCUSSION

Intracerebral hemorrhage can occur in any age group. The age range of our patients was wide (22- 125). Mean age was 61.31. Most of our patients 68 (73.1%) were more than 50 yrs of age. Thus intracerebral hemorrhage was most commonly seen in elder population in our study. This is in contrast to various studies done in Asia which say that ICH is more commonly seen in younger population in this part of the world. Most studies of Asia e.g one study in India by Mehndiratta and one East Asian study have also shown an increased prevalence of stroke in the young (usually taken as age at onset of less than 45 years).^{10,11} There was a marked male predominance (62.3% vs 37.6%) While reviewing the literature we found another Pakistani study which showed male preponderance as was seen in our study. In that study 62% patients were male and 38% were female.¹² However, in another Pakistani study 38% of the patients were > 60 yrs of age but with equal sex distribution but we had a marked male preponderance.³ The commonest site of bleeding in our study was Basal Ganglion and in that Putamen (39.8%). Same is has been in various reported studies. Another Pakistani study also showed basal ganglion the commonest site of bleeding (55%) followed by thalamus (26%) and followed by lobar cerebral hemorrhage (11%).¹² Intraventricular extension of hemorrhage — Data from a number of studies suggest that extension of blood into the ventricles is an independent predictor of poor outcome in patients with spontaneous ICH.^{7,13,14,15,16} The frequency of intraventricular extension was 50.5% in our study. This percentage is similar to what has been seen in other different studies. Hallevi et al. evaluated 406 patients with ICH, 45 percent of whom had intraventricular extension of hemorrhage.⁷ After controlling for age and ICH volume, they found a poor outcome at discharge (defined as a modified Rankin scale score of 4 to 6 in patients with intraventricular hemorrhage than in those without intraventricular hemorrhage (odds ratio 2.25, 95% CI 1.40-3.64).⁷ We also found poor outcome in intraventricular extension group at discharge (17 deaths vs 5). But the disability later on at day 30 was similar in both groups. Tuhirim et al. studied 129 patients of intracerebral hemorrhage. Of the 129 patients, 47 had intraventricular extension of their hemorrhages. These patients had larger intraparenchymal hemorrhages (36.6 cm³ vs. 15.0 cm³) and lower initial Glasgow Coma Scale scores (mean, 9.6 vs. 13.7). Their 30-day mortality rate was 43% compared with only 9% among those without ventricular extension.¹³ This is in contrast to our

findings. In our study though mortality at discharge was significantly higher in patients with intraventricular extension (17 Patients vs 5) but there was not much difference in mortality between discharge to day 30 in two groups. 5 more patients died between discharge and 30 days in intraventricular extension group whereas none in no intraventricular extension group. Mean duration of hospital stay in our patients was 4.06±2.08 days . The reason of this short stay was high mortality of patients during hospital stay. 22 Patients died during hospital stay. The short duration of hospital stay in my opinion can also be attributed to high turnover of the patients in the tertiary care hospital like ours beyond its resources, so most patients were being discharged while being dependent, in modified Rankin scale 5. Mortality in our patients was high during hospital stay (23.7%).²² patients expired during hospital stay. The overall mortality rate at day 30 was 29%. The 30-day mortality from ICH ranges from 35 to 52 percent in various studies¹⁷⁻²¹; one-half of these deaths occur within the first two days.^{17,22} Furthermore, only a small number of patients function independently after the event. Our 30 day mortality rate of 29% is lower than in previous population studies.¹⁷⁻⁻²¹ The hospital based approach of our study means that some subjects died before hospital admission and must have been missed and some subjects with milder strokes were managed as outpatients as our study was conducted only on inpatients. In a prospective study of 166 patients with spontaneous ICH from a large US metropolitan area, only 12 percent were normal or minimally handicapped at 30 days.²³ In our study only 8.6% patients had complete or partial recovery (MRS 0-2) at day 30. Similarly, morbidity of our patients was very high. 96.8% of our patients were dependent at admission. Disability improved at discharge, 73.1% patients were dependent at discharge. At day 30, 66.7% were still dependent. In a population-based cohort of patients hospitalized after ICH in the Greater Cincinnati/Northern Kentucky area, the ten-year survival was 18%.²¹ The 30-day mortality after spontaneous ICH was 39.7% in a study conducted in Karachi Pakistan. Survival analysis showed a large clustering of deaths within the first 72 hours of hospitalization.²⁴ Same was the case in our study, Out of total deaths during our study, majority i.e 22 occurred during first 72 hours of admission and the percentage of deaths was higher in patients with intraventricular extension of hemorrhage (17 vs 5).

CONCLUSIONS:

Intraventricular extension of the intracerebral

hemorrhage was seen in about half of the cases and was associated with high mortality and morbidity during early days of hemorrhage. Outcome at day 30 was also poor, about half of patients in this group were dependent at day 30. Because of the high proportion of deaths in the early days and high disability at day 30, it is recommended to promptly identify this subgroup and apply specific aggressive therapeutic strategies for this subgroup.

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Author's contribution:

Farheen Niazi: Study concept and design, protocol writing, data collection, data analysis, manuscript writing, manuscript review

Muhammad Irshad: data collection, data analysis, manuscript writing, manuscript review