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Faraz Ahmed
Pakistan institute of medical sciences, Islamabad

Mazhar Badshah
Pakistan institute of medical sciences, Islamabad

Sumaira Nabi
Pakistan institute of medical sciences, Islamabad

IN-HOSPITAL OUTCOME IN PATIENTS WITH SPONTANEOUS INTRACEREBRAL HEMORRHAGE (ICH)

Faraz Ahmed[1], Mazhar Badshah[1], Sumaira Nabi[1], Shahzad Ahmed[1], Jahangir Shoro[1]
1Department of Neurology, Pakistan institute of medical sciences, Islamabad

ABSTRACT

INTRODUCTION: Spontaneous intracerebral hemorrhage (ICH) is associated with a high in-hospital mortality and morbidity. One radiological parameter which was found significant in predicting mortality was the presence of hydrocephalus on CT brain (plain). The aim of this study was to determine the frequency of hydrocephalus in patients with spontaneous ICH and to determine the in-hospital outcome in patients of spontaneous ICH with hydrocephalus.**MATERIALS AND METHODS:** This was a descriptive case series carried out in Department of Neurology, Pakistan institute of Medical Sciences, Islamabad from December 30, 2013 to June 29, 2014. All patients who meet the inclusion criteria were selected for the study. Plain CT brain was done at the time of admission. Radiological parameters recorded included the presence of hydrocephalus on CT brain. Every patient was then being observed for outcome within 7 days. **RESULTS:** A total of 96 patients were included in the study. The mean age of patients was 45.1 years with standard deviation of 15.641 years. Out of 96 patients, 52 (54.17%) patients were male and 44 (45.83%) patients were female. 51 (53.12%) patients of intra-cerebral hemorrhage had hydrocephalus. Out of 51 patients of intra-cerebral hemorrhage with hydrocephalus, 33 (64.7%) patients had survived while 18 (35.3%) patients had died.**CONCLUSION:** In our study, significant number of patients of intracerebral hemorrhage had hydrocephalus and it is associated with high mortality and morbidity.

INTRODUCTION

Spontaneous intracerebral hemorrhage (ICH) leads to hemorrhage in the brain parenchyma in the absence of trauma or surgery. It accounts for 8-13% of all strokes and is associated with a high mortality and morbidity. This burden is much higher in countries of the developing world like Pakistan. It is speculated that upto 50% patients expire in the first 30 days. 1,2 The resultant disability is also immense with only 20% cases reported as functionally independent after 6 months of the event. 2 Worldwide various studies have identified certain clinical and radiological factors which help in predicting mortality in patients with spontaneous ICH1-7. One such radiological parameter is the presence of hydrocephalus on CT brain (plain). It is seen in 57% cases of ICH2. The frequency is significantly higher in the ICH patients who expire during hospital stay.Very few local studies have been done on this subject. The aim of this study was to determine the frequency of hydrocephalus in patients of spontaneous ICH and it's in-hospital outcome in our local population to generate local data.

MATERIALS AND METHODS:

This was a prospective, descriptive case series carried out at the department of Neurology Pakistan Institute of Medical Sciences, Islamabad from 30th December 2013 to 29th June, 2014 after taking permission from the hospital ethical committee. A consecutive series of 96 patients diagnosed with spontaneous ICH admitted to the neurology department were enrolled using non-probability consecutive sampling. Sample size was calculated using the WHO sample size calculator. This study was an independent project of the department and was not funded by any pharmaceutical organization. Informed consent was obtained from all patients (and in case of unconscious patients from their next of kin). Patients above the age of 13 years with diagnosis of spontaneous ICH who presented within 24 hours of the event onset were included in the study. Spontaneous ICH was defined as stroke with hemorrhage into the brain parenchyma (hyperdense area) on CT scan brain (plain) done at the time of admission (without history of trauma or surgery). Hydrocephalus for this study was defined by the presence of the following on CT brain: Size of both temporal horns greater than 2 mm, ratio of the largest width of the frontal horns to maximal biparietal diameter (ie, Evans ratio) greater than 30% and ballooning of frontal horns of lateral ventricles and/or the third ventricle. In-hospital outcome was measured at the end of 7 days of hospital stay in terms of survival or mortality. Key exclusion criteria included patients with subdural and epidural hematoma on CT brain,

patients with traumatic ICH, patients on anticoagulant or coagulopathy-related hemorrhage and patients with subarachnoid hemorrhage on CT brain. Patients of ICH fulfilling the criteria underwent detailed history and neurological examination. Demographic features recorded included age and gender. Radiological parameters recorded included the presence of hydrocephalus on CT brain. Every patient was then observed for outcome within 7 days. The data was entered on a standardized performa.Data was analyzed using SPSS version 17. Mean and standard deviation were calculated for quantitative variables. Frequencies and percentages were calculated for qualitative variables. Hydrocephalus and its effect on outcome were compared by using Chi square test. A "P" value of < 0.05 indicated statistical significance.

RESULTS:

A total of 96 patients were included in this study. The mean age of patients was 45.1 years with standard deviation of 15.641 years. Out of 96 patients, 52 (54.17%) patients were male and 44 (45.83%) patients were female. Hydrocephalus was seen in 51 (53.12%) patients out of which 33 were male and 18 were female with a significant p value of 0.027 (Figure I). There was no significant age predilection. Out of 96 patients 72% had hypertension.

Figure 1: Gender distribution of hydrocephalus in spontaneous ICH
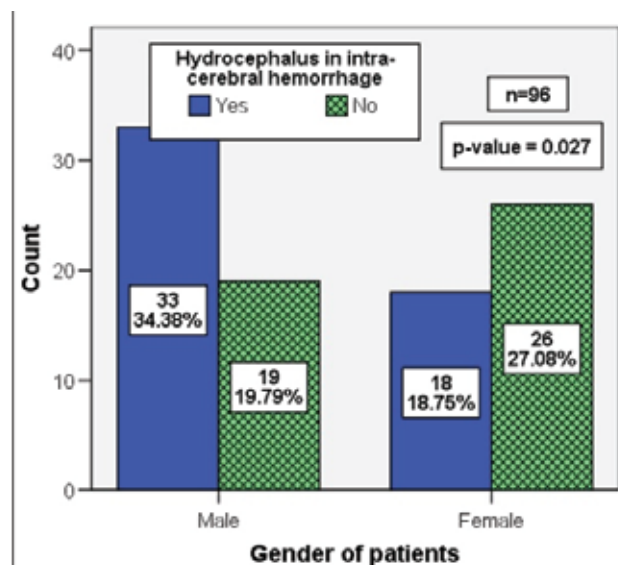
Out of 51 patients of intra-cerebral hemorrhage with hydrocephalus, 33 (64.7%) patients had survived while 18 (35.3%) patients had expired whereas out of 45 patients of intra-cerebral hemorrhage without hydrocephalus, 35 (78.8%) patients had survived while

10 (22.2%) had expired (Figure II and Figure III). The P value was significant at 0.01.

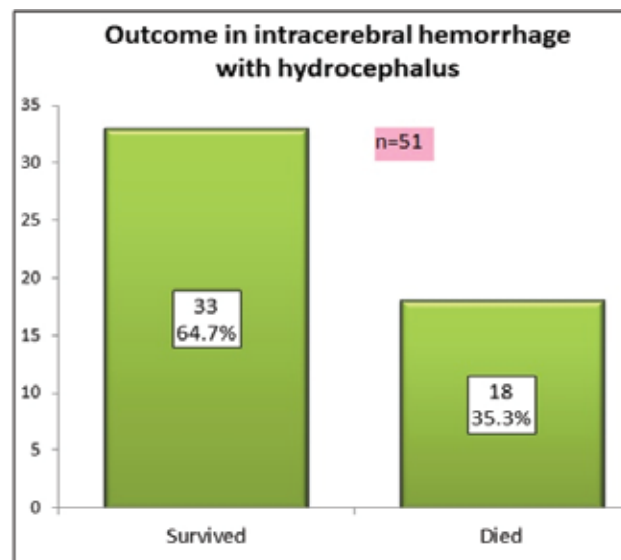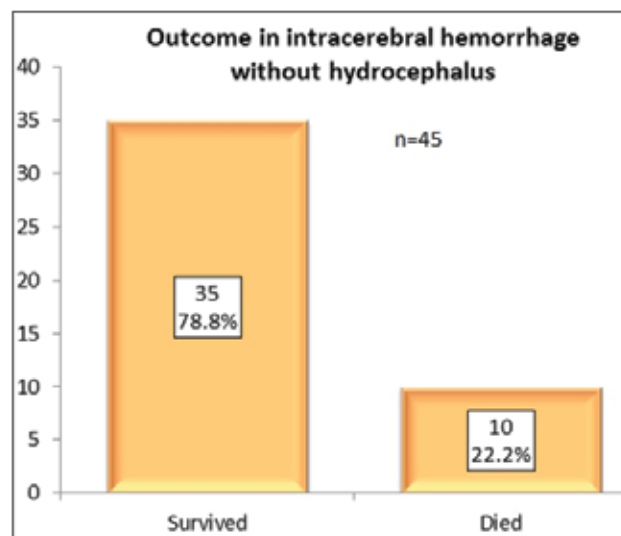**FIGURE 2:** Outcome in spontaneous ICH with hydrocephalus

FIGURE 3: Outcome in spontaneous ICH without hydrocephalus

DISCUSSION

Intracerebral hemorrhage is a catastrophic medical emergency. Much research work is being carried out internationally to salvage patients of ischemic stroke and to reduce the resultant morbidity. Intracerebral hemorrhage still requires more focus in order to improve the outcome. There is no specific medical treatment and the outcome of surgical interventions is controversial. There has been considerable interest in predicting outcome after ICH and several studies have

identified the clinical and radiological parameters associated with poor outcome. It was seen that presence of hydrocephalus on CT brain is associated with considerably higher in-hospital mortality. 2 This study evaluates the impact of hydrocephalus on the in-hospital outcome in patients of spontaneous ICH. Another parallel study was conducted to evaluate more detailed radiological predictors of poor outcome in ICH including hematoma volume and midline shift. In our study, the mean age of patients was 45.1 years with standard deviation of 15.641 years. Out of 96 patients 54.17% patients were male and 45.83% patients were female. The age mean is quite lower than the values reported by western studies where stroke affects people over the age of 55 years. Our study had more patients of young stroke mostly secondary to hypertension. This may be related to genetic and lifestyle factors but needs validation by further studies. Out of 96 patients 72% had hypertension and most had poor compliance and follow up. This may be related to genetic and lifestyle factors but needs validation by further studies. Male preponderance seen in this study is unlike western studies that have documented female predilection. Hydrocephalus was noted in 53.12% patients of intra-cerebral hemorrhage in this study. Diringer MN et al analyzed patients with spontaneous ICH admitted to neurologic and general intensive care units. Outcome was determined with use of hospital disposition (dead, nursing home, rehabilitation, home) and functional outcome. Patients with hydrocephalus versus without hydrocephalus were compared and univariate and multivariate analyses performed to determine whether hydrocephalus was an independent predictor of mortality. Of the 81 patients studied, 40 (almost 50%) had hydrocephalus as seen in our study. Those with hydrocephalus had higher in-hospital mortality (51% versus 2%) as seen in our study. Out of 51 patients of intra-cerebral hemorrhage with hydrocephalus in our study, 33 (64.7%) patients had survived while 18 (35.3%) patients had died. The p value was significant at 0.01. These results of our study were also comparable to the results of other studies. In another study conducted by Bhatia R et al showed that low Glasgow Coma Scale (GCS) score, ventilatory assistance, higher hematoma volume, midline shift, hydrocephalus and intraventricular hemorrhage (IVH) were associated with mortality. 2 Hydrocephalus was seen in 68.6% of the patients who had expired during hospital stay. In a study conducted by Cheung RT et al reviewed the patients admitted to a regional hospital with acute ICH. One factor for high mortality was hydrocephalus. 9Our results correspond to those of studies performed previously. Bhattathiri PS et al analyzed data obtained through the international Surgical Trial in Intracerebral Hemorrhage (STICH), the impact of IVH, with or without the presence of hydrocephalus, on outcome in patients with spontaneous ICH. 10The presence of hydrocephalus and IVH lowered the likelihood of favorable outcome to 11.5% (p = 0.031). Phan TG et al studied 100 consecutive patients with deep cerebral hemorrhage between 1994 and 1998. 11Hydrocephalus was present in 40 of the 100 patients. The 30-day mortality was 29%, and hydrocephalus was present in 76% of those who died. Multivariate analyses showed 2 independent prognostic indicators of 30-day mortality one of which was hydrocephalus (P:=0.005). Literature has many studies predicting the outcome in patients of ICH. 12-15This study has quite a few limitations. We did not evaluate the morbidity of ICH patients using a disability score like MRS or NIHSS. Only one variable that is hydrocephalus was studied for its association with mortality in ICH, other possible clinical and radiological variables were not documented which include hematoma volume, location of bleed, intraventricular extension and midline shift. This was a single center study and the results cannot be generalized. These flaws were then used to draft another study on ICH patients with a more detailed study design and all the above mentioned radiological factors were taken into consideration and analyzed.

CONCLUSION:

In our study, significant number of patients of intracerebral hemorrhage had hydrocephalus and it is associated with high mortality and morbidity. So, intracerebral hemorrhage with hydrocephalus was an independent predictor of poor outcome. Further studies on larger populations will be needed to show whether this can be employed as an early prognostic criterion with respect to poor outcome.

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