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General Medicine

HYPONATREMIA AS AN INDEPENDENT PREDICTOR OF IN HOSPITAL MORTALITY IN PATIENTS WITH SPONTANEOUS INTRACEREBRAL HEMORRHAGE

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ABSTRACT **OBJECTIVE:** To investigate the prevalence of hyponatremia, its associations with clinical characteristics, its influence on mortality and functional outcome in patients with spontaneous intracerebral hemorrhage. **MATERIALS AND METHODS:** This is a cross sectional study of 100 cases managed for Spontaneous intracerebral hemorrhage in the medical ward of Government general hospital, Kurnool. All the test done with due permission from the Institutional Ethical Committee and informed consent from the subjects. **RESULTS:** In this study, we found that there is significant association between hyponatremia at admission and in hospital mortality rate among patients presenting with spontaneous intracerebral hemorrhage. There is also significant association between following parameters with hyponatremia and mortality outcome in ICH patients. Blood Pressure, serum Osmolality, Urine Osmolality, Urinary Sodium Excretion. **CONCLUSION:** Hyponatremia is the most common electrolyte abnormality seen among the ICH patients. As seen with other conditions, hyponatremia in ICH patients has deleterious effect on the outcome and prognosis of the patient ICH patients presenting with hyponatremia had greater incidence of in hospital mortality compared to ICH patients presenting with normal serum sodium level.

KEYWORDS : Hyponatremia, intracerebral hemorrhage, mortality, sodium, serum osmolality.

INTRODUCTION:

Stroke is defined as abrupt onset of a neurologic deficit that is attributable to a focal vascular cause.

It is second leading cause of death worldwide with 6.2 million dying from stroke.

Intracerebral hemorrhage accounts for approximately 10% of strokes and over all mortality varies between 25-60% Most common causes for ICH are hypertension and trauma.

Hyponatremia is the most common electrolyte abnormality seen in critically ill neurologic patients.

Hyponatremia is most commonly attributed to Syndrome of Inappropriate Antidiuresis and Cerebral Salt Wasting.

SIADH is volume expanded state, and CSW is a volume depleted state.

Hyponatremia, especially Cerebral Salt Wasting, occurring in the setting of stroke has been shown to worsen the prognosis of stroke, increase morbidity, short and long term mortality, and causes poorer discharge disposition.

Cheryl et. Al conducted a study on 3243 patients from 21 countries, Hyponatremia at presentation is associated with increased mortality in patients with predominantly deep and modest volume intracerebral hemorrhage.

OBJECTIVE:

To investigate the prevalence of hyponatremia, its associations with clinical characteristics, its influence on mortality and functional outcome in patients with spontaneous intracerebral hemorrhage.

MATERIALS AND METHODS:

This is a cross sectional study of 100 cases managed for Spontaneous intracerebral hemorrhage in the medical ward of GGH, Kurnool from January to June 2022.

INCLUSION CRITERIA: All patients above age 18 years & radiologically proven, diagnosed cases of spontaneous intracerebral hemorrhage were included in the study.

EXCLUSION CRITERIA: Patients with ICH secondary to anticoagulation, AV malformation, tumor, trauma and who received hypertonic saline infusion, thrombolysis before reaching our hospital and age less than 18 years and thrombocytopenia less than 50,000 were not included in study.

After explaining about purpose of study to patients and attenders, their written consent was taken. Complete physical examination and necessary blood investigations were done.

RESULTS:

In my study mean age of participants was 64.5 years and its association with hyponatremia is seen. Statistical analysis is done in which p value is 0.043. so age association with hyponatremia is not significant.

In my study population 36% were females and 64% were males, among them 36.1% of females and 46.9% of males were associated with hyponatremia. For association of sex with hyponatremia- Chi square test is done and p value being 0.29 which is not significant.

High systolic BP is seen associated with hyponatremia as mean difference is 10.8 and P value is 0.027, thus SIGNIFICANT.

High diastolic BP is seen associated with hyponatremia as mean difference is 4.6 and p value is 0.03 which is SIGNIFICANT.

For association of serum osmolality with hyponatremia in ICH normal serum osmolality is 67% in whom only 14.9% had hyponatremia and those with low serum osmolality 100% patients had hyponatremia. Statistical analysis was done and p value is <0.001 thus SIGNIFICANT.

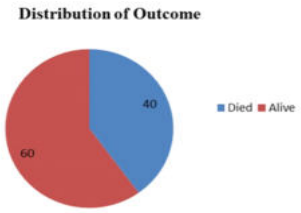
In total of 100 patients those with normal urine osmolality 86.2% had no nyponatremia, patients with incfreased urine osmolality had 100% hyponatremia and patients with decreased urine osmolality had only 22.2% hyponatremia. For association of urine osmolality with hyponatremia in ICH (p value = <0.001), thus SIGNIFICANT.

Association of urinary sodium excretion with hyponatremia, patients with normal urinary sodium concentration had hyponatremia of 13.8% , those with decreased urine sodium excretion had 22.2% hyponatremia and those with increased urinary sodium excretion had 100% hyponatremia. P value is calculated which was <0.001 which is SIGNIFICANT.

Association of CT brain findings (like lobar hemorrhage, infratentorial hemorrhage, intracerebral hemorrhage with midline shift, intracerebral hemorhage with intaventricular extension) with hyponatremia in ICH, was NOT significant.

Association of MRI brain findings with hyponatremia in ICH was NOT significant.

GRAPH 1: DISTRIBUTION OF OUTCOME:



GRAPH 2: DISTRIBUTION OF HYPONATREMIA

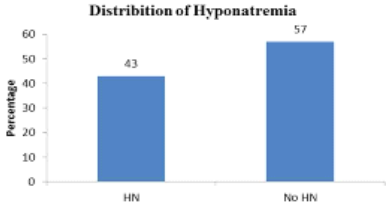


TABLE 1: ASSOCIATION OF OUTCOME WITH HYPONATREMIA.

Hyponatremia	N	Outcome		P value*
		Died	Alive	
HN	43	27 (62.7)	16 (37.3)	<0.001
No HN	57	13 (22.8)	44 (77.2)	

In a total of 100 patients 43% had hyponatremia among which 62.7% died and 37.3% alive. 57% of patients had no hyponatremia and only 22.8% were died and 77.2% were alive. Association of outcome with hyponatremia in ICH SIGNIFICANT as p value is less than 0.001.

Majority of patients (62.7%) who died due to ICH, has associated hyponatremia. 77.2% of patients who recovered did not have associated hyponatremia.

CONCLUSION:

A total of 100 cases were included in study. Majority of patients were in age group 50-80 years.

Male constitute about 64 cases and females about 36 cases. Blood pressure was increased and uncontrolled in majority of patients, and more in hyponatremia patients.

Elevated blood pressure is common acutely after ICH, even in patients without prior history of HTN.

RBS levels, and multiple comorbidities do not have any significant association with hyponatremia and thus outcome.

From the study and statistical analysis, it is found that there is significant association between hyponatremia and mortality rate among patients presenting with spontaneous intracerebral hemorrhage.

There is also significant association between following parameters with hyponatremia and mortality outcome in ICH patients- with Blood pressure, Serum osmolality, Urine osmolality, Urinary sodium excretion.

DISCUSSION:

INTRACEREBRAL HEMORRHAGE [ICH] is the second most common cause of stroke.

It accounts for about 10 to 15% of all strokes. Hypertension being the most common cause for ICH. Most common symptoms being the headache followed by nausea, vomiting, altered sensorium, focal neurological deficit like weakness, numbness, speech disturbances, seizures, loss of consciousness. Strict control of blood pressure with lifestyle modifications, anti hypertensive drugs and health education can prevent or reduce the incidence of ICH.

Persistent and uncontrolled high blood pressure in acute ICH patients will lead to rebleeding in majority of the patients. Hence acute lowering of blood pressure in acute ICH forms part of the treatment for INTRACEREBRAL HEMORRHAGE. Hyponatremia is the most common electrolyte abnormality seen among the ICH patients.

ICH patients presenting with hyponatremia had greater incidence of in hospital mortality compared to ICH patients presenting with normal serum sodium level.

Whatever be the cause of hyponatremia, it should be diagnosed at the earliest and corrected in order to improve the outcome in ICH patients.

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