Original Article

Frequency of Hyponatremia in Patients with Intracerebral Hemorrhage

Balawal Nazeer, Ayesha Saddique, Sultana Nazeer, Salman Ali and Ayesha Murtaza

ABSTRACT

Objectives: To determine the frequency of hyponatremia in patients having intracerebral hemorrhage (ICH) at Nishtar Hospital Multan.

Study Design: Cross sectional study.

Place and Duration of Study: This study was conducted at the Department of Department, NishtarMedical College and Hospital Multan from February 2016 to July 2016.

Materials and Methods: In this study, a total of 72 patients with intracerebral hemorrhage were taken who were admitted at Nishtar Hospital Multan. These patients were diagnosed on bases of clinical diagnosis and CT scan report findings such as "CT scan brain plain showing hyper dense area inside brain parenchyma were defined as Intracerebral Hemorrhage". All these patients were registered in this study, after taking informed consent from their attendants/patients. Patients with clinical and CT scan confirmation of ICH aged more than 30 years of either sex were included in this study.

Results: Out of these 72 patients with ICH, 56 (77.8%) were male patients while 16 (22.2%) were female patients and male to female ratio was 3.5:1. Mean age of these ICH patients was 49.21 ± 12.56 years (age rage; 33 – 86 years). Mean age of the male patients was 48.59 ± 11.99 years while that of female patients 51.38 ± 14.61 years (p = 0.438). Of these 72 study cases, 44 (61.1%) were from urban areas while 28 (38.9%) belonged to the rural areas. Twenty two (30.6%) were poor, 33 (45.8%) were middle income and 17 (23.6%) were rich. Mean body mass index of our study cases was 24.92 ± 3.85 kg/m^2 (range of BMI; 20.5 to 36.75kg/m^2) and 33 (45.8%) were obese. In our study 39 (54.2%) were smokers and all smokers were male patients. Diabetes was present in 33 (45.8%), hypertension in 48 (66.7%), dyslipidemia in 43 (59.7%) and family history in 22 (30.6%). Mean serum sodium level in our study was 137.78 ± 8.77 nmol/L and hyponatremia was noted in 26 (36.1%) patients with intracerbral hemorrhage.

Conclusion: Our study provided the measurement in the cadavers with regards to weight of heart and aortic diameter and the thickness of the wall of aorta. It is also concluded that results obtained show significant difference between male and female hearts with regards to these parameters.

Key Words: Hyponatremia, intracerebral hemorrhage, frequency.

Citation of article:Nazeer B, Saddique A, Nazeer S, Ali S, MurtazaA. Frequency of Hyponatremia in Patients with Intracerebral Hemorrhage.Med Forum 2017;28(5):95-98.

INTRODUCTION

Stroke yet remains major cause of mortality among sufferers all over the world, however most of its burden is borne by underdeveloped nations. Intracerebral hemorrhage (ICH) characterized by the spontandous bleeding in the brain parenchyma, stroke subtype leads to increased morbidity, disabilities and deaths.[1,2] Intracerebral hemorrhage (ICH) is a kind of stroke subtype which has more tendency to early deaths or long term functional disabilities as compared with cerebral infarction or subarachnoid haemorrhage[3].

It may be frequent in approximately 15% of all acute stroke case presentations in emergency care[1] in different parts of the world, however studies have reported it to be more frequent in Asian population [4-7]

Hyponatremia is one of the most commonly occurring serum electrolyte derangement[8–12] among hospitalized patients particularly those having some neurological trauma and leads to significant morbidity, prolonged hospitalizations, more healthcare costs and mortality in such patients[13-14]. In patients with neurological injury it may exacerbate cerebral edema which leads to intracranial hypertension by means of fluid shifting and is a cause of poor prognosis and adverse clinical outcomes. Among patients having brain injuries, hyponatremia (particularly severe hyponatremia) has been reported to increase in-hospital mortality in as many as 50 % patients when compared with those having normal serum sodium levels. This emphasizes towards early diagnosis and timely management of this electrolyte derangement so that adverse outcomes and prolonged hospital stay can be avoided which can further complicate and worsen the patient's condition.[15]

Owing to the high frequency of ICH in our region and fact that hyponatremia causes further complications in such patients having neurological injuries, a study was

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Received: March 11, 2017; Accepted: April 18, 2017

conducted to determine frequency of hyponatremia in patients with ICH. There is no data available on this topic from our population of Southern Punjab.

MATERIALS AND METHODS

In this study, a total of 72 patients with intracerebral hemorrhage were taken who were admitted at Nishtar Hospital Multan. These patients were diagnosed in this cross – sectional study on bases of clinical diagnosis and CT scan report findings such as "CT scan brain plain showing hyper dense area inside brain parenchyma were defined as Intracerebral Hemorrhage". All these patients were registered in this study, after taking informed consent from their attendants/patients. Patients with clinical and CT scan confirmation of ICH aged more than 30 years of either sex were included in this study while Patients having diagnosed coagulopathies & other bleeding disorders, patients having finding on CT scan Brain (plain) consistent with Intracerebral hemorrhage in infratentorial location, tuberculous meningitis, viral/bacterial encephalitis, ischemich stroke, patients having history of head injury or CT brain plain suggestive of space occupying lesion (SOL) were excluded from this study. Venous blood sample was drawn under aseptic conditions and immediately sent to the laboratory for serum sodium level estimation within first 24 hours of hospitalization. Serum sodium level less than 135 nmol/L was defined as hyponatremia. Data management and analysis was done using computer program SPSS version 22. Descriptive statistics was used to tabulate frequencies and percentages for categorical data while numerical data was analyzed for mean and standard deviation. Chi – square test was used to control impact of potential confounders of the study.

RESULTS

Out of these 72 patients with ICH, 56 (77.8%) were male patients while 16 (22.2%) were female patients and male to female ratio was 3.5:1. Mean age of these ICH patients was 49.21 ± 12.56 years (age rage; 33 – 86 years). Mean age of the male patients was 48.59 ± 11.99 years while that of female patients 51.38 ± 14.61 years (p = 0.438).

Of these 72 study cases, 44 (61.1%) were from urban areas while 28 (38.9%) belonged to the rural areas. Twenty two (30.6%) were poor, 33 (45.8%) were middle income and 17 (23.6%) were rich. Mean body mass index of our study cases was 24.92 ± 3.85 kg/m^2 (range of BMI; 20.5 to 36.75kg/m^2) and 33 (45.8%) were obese. In our study 39 (54.2%) were smokers and all smokers were male patients. Diabetes was present in 33 (45.8%), hypertension in 48 (66.7%), dyslipidemia in 43 (59.7%) and family history in 22 (30.6%). Mean serum sodium level in our study was 137.78 ± 8.77 nmol/L and hyponatremia was noted in 26 (36.1%) patients with intracerbral hemorrhage.

Table No. 1: Distribution of hyponatremia in patients with ICH in both genders. (n = 72)

Gender	Hyponatremia		P - value
	Yes (n =26)	No (n = 46)	
Male(n = 56)	24	32	0.025
Female(n = 16)	02	14	
Total	72		

Table No. 2: Stratification of hyponatremia with regards to residential status. (n = 72)

Residential status	Hyponatremia		P - value
	Yes (n =26)	No (n = 46)	
Rural(n = 28)	08	20	0.324
Urban(n = 44)	18	26	
Total	72		

Table No. 3: Distribution of hyponatremia in patients with ICH with regards to obesity. (n = 72)

Obesity	Hyponatremia		P - value
	Yes(n =26)	No (n = 46)	
Yes(n = 33)	19	14	0.001
No (n = 39)	7	32	
Total	72		

Table No. 4: Stratification of hyponatremia with regards to diabetes. (n = 72)

Diabetes	Hyponatremia		P - value
	Yes(n =26)	No (n = 46)	
Yes(n = 33)	17	16	0.014
No (n = 39)	09	30	
Total	72		

Table No. 5: Stratification of hyponatremia with regards to hypertension. (n = 72)

Hypertension	Hyponatremia		P - value
	Yes(n =26)	No (n = 46)	
Yes(n = 48)	20	28	0.200
No (n = 24)	06	18	
Total	72		

DISCUSSION

Intracerebral hemorrhage is often associated adverse outcomes particularly in patients having hyponatremia. Out of these 72 patients with ICH, 56 (77.8%) were male patients while 16 (22.2%) were female patients and male to female ratio was 3.5:1. Similar trends among ICH patients have been reported in different studies. A study conducted by Arshad et al [16] from Bahawalpur has also reported 70 % male patients predominating over female patients which is similar to our study results. Zafar et al[17] from Karachi also reported 62% male gender predominance which is similar to our study results. Rind et al [18] from Jamshoro

also reported 63 % male gender predominance which is similar to our study results. Gray et al [19] reported 75 % male gender predominance which is close to our study results. Mean age of these ICH patients was 49.21 ± 12.56 years (age rage; 33 – 86 years). Mean age of the male patients was 48.59 ± 11.99 years while that of female patients 51.38 ± 14.61 years (p = 0.438). A study conducted by Arshad et al[16] from Bahawalpur has also reported 55 years mean age, which is close to our study results. Anjum et al[20] from Karachi has also reported similar results. Zafar et al[17] from Karachi also reported 56 ±12 years mean in patients with ICH which is close to our study results. Gray et al [19] reported 58.6 ± 10.4 years mean age which is close to our study results.

Obesity is also import modifiable risk factor for stroke and high frequency of obesity was noted in our study. Mean body mass index of our study cases was 24.92 ± 3.85 kg/m^2 (range of BMI; 20.5 to 36.75kg/m^2) and 33 (45.8%) were obese. Kuramatsu et al[21] from Germany reported 24.4 kg/m^2 mean body mass index which is close to our study results.

In our study 39 (54.2%) were smokers and all smokers were male patients. Zafar et al[17] from Karachi reported 28% smoking which is lower than that being reported in our study. Kuramatsu et al[21] from Germany reported 31.8% smoking.

Diabetes was present in 33 (45.8%) in our study cases while Zafar et al[17] from Karachi also reported 30 % diabetes which is in compliance with our study results. Hypertension in 48 (66.7%), dyslipidemia in 43 (59.7%) and family history in 22 (30.6%). Zafar et al [17]from Karachi also reported similar results. Kuramatsu et al[21] from Germany reported hypertension in 72.7 % in patients with ICH which is close to our study results. Gray et al[19] reported 79 % hypertension which is similar to that of our study results.

Mean serum sodium level in our study was 137.78 ± 8.77 nmol/L and hyponatremia was noted in 26 (36.1%) patients with intracerebral hemorrhage. Saleem et al[22] from Srinagar Kashmir has reported 23.2% hyponatremia in patients with intracerebral hemorrhage which is close to our study results. Kuramatsu et al [21] from Germany reported 15.6 % hyponatremia in patients with ICH which is lower than that of our findings. Gray et al [19] reported 25 % hyponatremia which is close to our findings.

CONCLUSION

Hyponatremia leads to significant disease morbidity and mortality in patients with spontaneous intracerebral hemorrhage (ICH) and very high frequency of hyponatremia was noted in our patients. Hyponatremia was significantly associated with male gender, obesity and hypertension in our study. Early diagnosis followed by proper management can help to reduce prolonged hospital stay and adverse outcomes.

Conflict of Interest: The study has no conflict of interest to declare by any author.

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