A study of Hyponatremia in Hospitalized Patients

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خلاصة

يتناول البحث دراسة ميدانية لنسبة انخفاض تركيز الصوديوم في دم المرضى الذين تتجاوز اعمارهم (16 سنة) الراقدين في الردهة الباطنية في مستشفى الديوانية التعليمي ولمدة (160يوماً) من الاول من حزيران ولغاية العاشر من شهر تشرين الثاني عام 2006 ، وقد ظهرت النتائج التالية :

خمسون مريضاً (6%) يعانون من انخفاض تركيز الصوديوم في الدم من اصل (720) مريضاً الذين تم اجراء الفحص عليهم .

خمسون بالمائة من المرضى كانوا ممن يعالجون بالمدررات وستة عشر مريضاً (32%) يعانون من عجز القلب و (20%) من المرضى يعانون من طارئة وعائية دماغية خلال الدراسة كان هناك 41 مريضاً (82%) يعانون من اعراض نسبت الى تركيز الصوديوم في الدم.

Abstract

A study of hyponatremia in adult hospital inpatients over 16 yrs old admitted to the medical department of Al-Diwania teaching Hospital from the 1st of June 2006 to 10th of November 2006, showed that (50) out of (720) patients studied had serum sodium concentration below 135 meq/L.

Twenty five patients (50%) were on diuretics and 16 patients (32%) had heart failure.

The commonest type of hyponatremia was euvolemic hyponatremia (52%)

Forty one pts. (82%) had symptoms attributable to the hyponatremia.

The aim of the study was to determine the incidence, clinical characteristics, and causes of hyponatremia in medical wards of the Al-Diwaniah teaching Hospital.

Introdcution

Disorders of sodium are both the most common and probably the least understood electrolyte disorders in clinical medicine[1] .

Hyponatremia reflect a change in the proportion of sodium and water in plasma rather than a change in sodium content [2] .

Hyponatremia is the number one electrolyte abnormality in hospitalized patients[3] .

A plasma sodium (Na+) concentration less than 135 meq/L usually reflects ahypotonic state[4] .

Aetiology of hyponatremia

Healty adults can drink up to 20 liters/day and the kidneys will respond with a vigorous water diuresis.

However , patients with restricted renal function, including older persons, cannot respond in this way and may become hyponatremic with much smaller volumes.

Most patients regulate their intake of water through the thirst mechanism[2] The most common causes of hyponatremia are shown in Table no 1. [5]

Table (1)

Aetiology of hyponatremia	
Low ECF volume	
* volume depletion (e.g DKA, vomiting, diarrhea and bleeding)	
* Diuretics	* Peritonitis
* Adrenal failure	* Pancreatitis
* Salt-losing renal diseases	
Normal ECF volume	
* Syndrome of inappropriate secrtion of ADH (SIADH)	
* Hypothyroidism	
* Drugs	* Glucocorticoid def.
* positive pressure ventilation	
High ECF volume	
* Cardiac failure	* Liver cirrhosis
* Renal failure	* Nephrotic syndrome

DKA= Diabetic Ketoacidosis

Clinical Features : 4

The signs and symptoms of hyponatremia per se, are related to brain cell swelling caused by an increase in the brain water content, leadings to cerebral oedema. Therefore, the symptoms are

primarily neurological, and hyponatremic disorders should be suspected in patient who has acute mental state disturbance [5] .

Patients may be asymptomatic, or complain of nausea and malaise.

As the plasma Na+ concentration falls, the symptoms progress to include headache, lethargy, confusion, obtundation, seizure and coma[2] .

Hyponatremia was graded as Mild, Moderate, and severe [6] as shown in Table no. 2

Table (2)

Grading	Na values meq/L
Mild	130-135
Moderate	125-129
Severe	<125

The underlying cause can often be ascertained from an accurate history and physical examination, including an assessment of ECF volume status.

The differential diagnosis of hyponatremia, with an expanded ECF volume, and decreased effective circulatory volume includes heart failure, hepatic cirrhosis and nephritic syndrome. All these diseases have characteristic signs and symptoms. Patients with SIADH are usually euvolemic [4] .

PANTIENTS AND METHODS

During the period, from the 1st of June to the 10th of November 2006, 1035 adult (over 16 yrs) patients were admitted to the wards of the medical department. For logistical reasons, serum sodium was done to (720) patients & not to all. Hyponatremia was considered to present when the serum sodium was less than (135) meq/L.

Patients with hyponatremia were assessed clinically using special form with particular reference to the state of hydration, possible symptoms attributable to hyponatremia and the probable cause of the condition.

Normovolemic huponatremia was defined as the absence of clinical evidence of (ECF) volume depletion, absence of oedma and ascites, normal blood pressure, and JVP not raised.

Hypovolemic hyponatremia was defined as the presence of clinical evidence of (ECF) volume depletion (dry tongue & dry inelastic skin) , with hypotension in the supine or erect position or both, absence of ascites and dependent oedema without raised JVP.

Serum sodium was measured by Flame analyzer.

Blood sugar, T.S. protein, blood urea, serum creatinine are also measured.

RESULTS

Out of the (720) patients where serum sodium were measured, 50(6%) patients were hyponatremic.

The patients were aged 16-90 yrs (mean 54) and the age group most affected was (46-60) yrs, as shown in table (3).

Table (3) The distribution of hyponatremia according to the age: see (Fig1)

Age (yrs)	No. of cases	%
16-30	4	8
31-45	5	10
46-60	26	52
60-75	12	24
>76	3	6
Total	50	100

Twenty eight patients (56%) were female, while 22 pts (44%) were male table (4):

Table (4) – Distribution of hyponatremia according to sex

Sex	No. of cass	%
Male	22	44
Female	28	54

Hyponatremia has been graded into mild, moderate and severe based on values shown in table (5):

Table (5) – Grading of hyponatremic patients, see (fig2)

Na+ values (meq/L)	No. of patients	%
Mild (130-135)	14	28
Moderate (125-129)	26	52
Severe < 125	10	20
Total	50	100

The most common cause of Hyponatremia was diuretics treatment which comprise (50%) of cases, the second most common cause was heart failure (32%), the 3rd most common cause was C.V.A. (20%)

Sixteen percent of cases had renal failure, and (14%) had chest infection Table (6) .

Table (6) – The probable cause of hyponatremia (see fig3)

Probable cause	No. of Cases	%
Diuretic therapy	25	50
Heart failure	16	32
C.V.A	10	20
Renal failure	8	16
Chest infection	7	14
Ca. bronchus	3	6
Gastroenterologic disorders	6	12
Endocrine disorders	2	4
Malignancy	4	8
Diabetes	5	10

Twenty three pts (45%) had one cause for hyponatremia, and chest infection was the most common cause among those pts (Table7) .

Twenty pts(40%) had two causes for hyponatremia. And seven pts(14%) had three causes.

Table (7) shows the causes of hyponatremia in pts who had one cause

Probable cause	No. of cases	%
- chest infection	7	34
- C.V.A	5	22
- Ca. Bronchus	3	12
- Malignancy	3	12
- Liver cirrhosis	2	8
- Gastroenteritis	2	8
- Endocrine	1	4
Total	23	100

Fifteen patients (60%) out of 25 case who received diuretic therapy were female, while male comprised 40% of such cases Table (7).

Table (8) shows distribution of diuretic-induced hyponatremia according to the sex (Fig4).

Sex	No. of Cases	%
Male	10	40
Female	15	60
Total	25	100

Symptoms attributable to hyponatremia, such as mental confusion, anorexia, nausea, vomiting, and headache, are non-specific and it is difficult in practice to judge whether hyponatremia or the underlying condition is responsible . Nevertheless, the hyponatremia was considered by treating doctors to be the cause of symptoms in (41) patients (82%). In seven cases, the symptoms were severe and in two were the reason for admission, Table (8a), Table (8b).

Table (9) Symptomatic & asymptomatic hyponatremia Fig(5).

	No. of patients	%
Symptomtic	41	82
Asymptomatic	9	18

Table (9b) Symptoms attributable to hyponatremia

Symptom	No. of cases	%
Nausea	18	36
Vomiting	13	26
Headache	7	14
Irritability	9	18
Confusion	23	46
Seizure	1	2
Coma	3	6
Hiccup	3	6

Euvolemic hyponatremia was the most common comprising (52%) of cases while volume depleted hyponatremia comprised 34% of cases.

Fourteen cases of volume depleted patients was on diuretic therapy, table (10) .

Table (10) – Distribution of hyponatremic pt. according to state of hydration and diuretic thereapy (see also Fig 6)

State of hyponatremia	No. of cases	%	Diuretics
Euvolemic	26	52	6
Volume depleted	17	34	14
Volume overloaded	7	14	5
Total	50	100	25
P-value > 0.05		Not significant	

Discussion

In this study the prevalence of hyponatremia was (6%), in our medical unit and this much higher than usually reported : 1.0% Flear et al[7] , (0.9%) kennedy et al [8], (1.5%) Natkunman et al[9] , and our result are nearly similar to a study done by christopher M[10] , and Robert J. et al [11].

50% of our patients with hyponatremia were associated with diuretic therapy ; This is in a greement with other studies. Areiff et al[12] found that diuretic therapy was responsible for at least half of the cases ; Two-third of cases studied by Kennedy et al [8] were on diuretic therapy. Whlie Crook M. et al[13] , found that chest infection was the most common cause (61% of cases) .

Sixty percent (60%) of hyponatremic patients caused by diuretic therapy were female, and this is in agreement with other studies of Abramow et al [14] (11 of 12) of his patients were female, and Ashraf et al [15] have shown that (71%) of their hyponatremic patients were female. Fishman[16] also found that more than (90%) of hyponatremic patients on diuretics were female.

In our study (82%) of hyponatremia was symptomatic and this is in agreement with other studies of Richard H. et al[17] (80% of their patients were symptomatic) and kennedy P.G. et al [7] (70% of their patients were symptomatic).

Six percent (6%) of our patients had hiccup and this is in agreement with the study of George et al [18] who found that there is a strong and independent associasion between hyponatremia and hiccup.

Chest infection is associated with mild to moderate hyponatremia in our study, while Thomas et al[19] and Kennedy et al [8] found that chest infection cause severe hyponatremia in their study.

Most common type of hyponatremia in our study was euvolemic hyponatremia in (52%) of cases and this is an agreement

with the study of Natkunam A. et al. who found that (70%) of his cases were euvolemic hyponatremia.

Conclusion

Hyponatremia was common electrolyte disturbance in the medical ward.

The commonest cause of Hyponatremia was diuretic therapy Hyponatremia was symptomatic in most of the cases(82%) .

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Name :
Age :
Sex :

S. Na ☐ S. Sugar ☐ T.S. Protein ☐

Clinical features

Nausea ☐ Vomiting ☐ Headache ☐

Irritability ☐ Confusion ☐ Convulsion ☐

Coma ☐ Hiccup ☐ Asymptom ☐

Volume Status

Volume depleted ☐ Volume overload ☐ Euvolumic ☐

Associated Diseases

Diuretics ☐