

Impact of Electrolyte Disorders in Hospitalized Rheumatology Patients at the Teaching Hospital of Point G, Bamako, Mali

Pamanta Ibrahim Sory^{1,2*}, Touré Sidi¹, Diallo Seydou F¹, Cissé Maïmouna¹, Maiga Alassane Baneye², Nanakassé Boubacar¹, Kodio Boureima³, Touré Mohomodine Ibrahim⁴, Sangaré Fanta⁵, Diakité Fatoumata⁶, Konaté Moussa⁷, Touré Alkaya⁸, Tolo Nagou⁹, Keita Kaly¹⁰, Dembélé Ibrahim Amadou¹⁰, Cissoko Mamadou¹⁰, Landouré Guida^{2,11} and Cissé Idrissa Ah^{1,2}

¹Service de Rhumatologie, Centre Hospitalier Universitaire « Point G », Bamako, Mali.

²Faculté de Médecine et d'Odontostomatologie, Université des Sciences, des Techniques et des Technologies de Bamako, Bamako, Mali.

³Clinique « Primum Non Nocere », Bamako, Mali.

⁴Service de Médecine, Hôpital Régional de Sikasso, Sikasso, Mali.

⁵Service de Médecine, Centre Hospitalier Universitaire Mère – Enfant Luxemburg, Bamako, Mali.

⁶Service de Médecine, Centre Hospitalier Universitaire « Gabriel Touré »,

⁷Service de Radiologie, Centre Hospitalier Universitaire « Point G », Bamako, Mali.

⁸Service de Néphrologie et d'Hémodialyse, Centre Hospitalier Universitaire « Point G », Bamako, Mali.

⁹Service de Médecine Interne Centre Hospitalier Universitaire « Pr Boubacar Sidi Sall », Kati, Mali.

¹⁰Service de Médecine Interne, Centre Hospitalier Universitaire « Point G », Bamako, Mali.

¹¹Service de Neurologie, Centre Hospitalier Universitaire « Point G », Bamako, Mali.

*Correspondence:

Ibrahim Sory Pamanta, Service de Rhumatologie BP: 333, CHU du Point G, Bamako, Mali.

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ABSTRACT

Introduction: An electrolyte disorder refers to an imbalance between the inputs and outputs of electrolytes present in the body. They are the major causes of several, sometimes life-threatening symptoms. It is crucial to recognize them. A large part is iatrogenic and could therefore be avoided and can be used as an indicator of good quality of care [1]. Despite not being uncommon in the general rheumatology practice, there are no available studies on the prevalence and complications of hydroelectrolyte disorders to date in our department.

Patients and Methods: This was a retrospective and descriptive study over a period of thirteen (13) years, from January 1, 2005 to December 31, 2018. All patients hospitalized during that period and in whom an electrolyte disorder was observed were included.

Results: We enrolled 65 cases with hydroelectrolyte disorders. The most common age group was 60 years and over with a frequency of 58.5% of cases. Females accounted for 61.5%. Hypertension was the most associated condition (43.1%). Clinical signs were polymorphic and dehydration wrinkles were predominant with 52.3% of cases. Hypocalcemia (55.3%) and hyponatremia (47.61%) were the most common electrolyte disorders. Vomiting was the most associated digestive sign (35.3%). Mucocutaneous syndrome was dominated by wrinkles (52.3%), and the most common neurological sign was obtundation (30.7%). Torsade de pointes was the predominant cardiac sign (46.1%). Treatment was based on electrolyte disorder correction protocols. Nevertheless, the evolution was marked by death in 43% of cases.

Conclusion: Electrolyte disorders are common, and their management remains challenging. Hyponatremia and hypocalcemia were the commonest among others. It commonly leads to death in the elderly.

Keywords

Electrolyte disorders, Rheumatology, Bamako, Mali.

Introduction

An electrolyte disorder refers to an imbalance between the inputs and outputs of electrolytes present in the body. Electrolyte disorders can be the etiology of several symptoms that are sometimes life-threatening. Therefore, it is crucial to recognize them as early as possible. A large part is iatrogenic and could then be avoided and used as an indicator of a good quality of care [1]. They can affect all electrolytes, but mostly affect sodium and potassium. They are among admission criteria or occur during hospitalization. In an Austrian series of more than 150,000 patients admitted to intensive care unit, 25% had an abnormality in sodium metabolism [2]. However, in another series of 8,000 patients, 37% developed an abnormality of sodium metabolism during their hospitalization [3]. Electrolyte abnormalities, especially sodium abnormalities, can worsen the prognosis [4]. In Mali, a descriptive and analytical study conducted in the Department of Infectious Diseases at the Teaching Hospital of Point G in HIV/AIDS patients found: hyponatremia (41.2%); hypokalemia (7.8%); hyperkalemia (2.9%) and associated disorders (35.3%) [5]. The same study reports that there is a statistically significant difference between dysnatremia and tuberculosis. Although hydroelectrolyte disorders are common in the rheumatology practice, no study was conducted on the its prevalence and complications in the Department of Rheumatology at the Teaching Hospital of Point G to date. Therefore, we undertook this study with the objective to assess the impact of electrolyte disorders in inpatients in the Department of Rheumatology at the Teaching Hospital of Point G.

Methods

We conducted a retrospective and descriptive study over a period of thirteen (13) years, from January 1, 2005 to December 31, 2018. Our study focused on inpatients in the Department Rheumatology at the Teaching Hospital of Point G. All patients hospitalized between 2005 and 2018 with electrolyte disorder were included in this study. The parameters studied were sociodemographic (age, sex), clinical (reason for admission, first symptoms, clinical signs, medical history, associated conditions), biological, in particular blood and urine electrolytes, therapeutic option and evolution. An individual survey sheet was drawn up to collect the data. Data entry was done in Microsoft Word 2013 and analyzed in SPSS

2.0. The confidentiality of patients was guaranteed, and the data collected on the survey form was confidential with a limited access to caregivers only.

Results

We admitted 1145 patients over the period of the study, and 65 medical records fulfilled our inclusion criteria of electrolyte disorders, i.e. a frequency of 6.72%. This included 40 females and 25 males, with a sex ratio of 0.42. The average age was 59.49 years with extremes of 14 and 85 years. Patients of 60 years and over were more represented (58.5%). Low back pain was the main reason of admission (35.4%), and hypertension the most associated condition (43.1%). Mucocutaneous syndrome was dominated by dehydration wrinkles (52.3%), the neurological one by obtundation (30.7%), and torsade de pointes was at the forefront of cardiac signs, accounting for 46.1% (Table 1).

Table 1: Distribution by symptoms.

| Clinical syndrome | | Number | Percentage |
|------------------------|--------------------------|-----------|-------------|
| Mucocutaneous syndrome | Wrinkles | 34 | 52,3 |
| | Edema | 13 | 20 |
| | Diuresis | 8 | 12,3 |
| | Dry mouth | 8 | 12,3 |
| | Excavation of eyeballs | 6 | 9,2 |
| | Other | 2 | 2,8 |
| Digestive syndrome | Vomiting | 27 | 41,5 |
| | Abdominal pain | 14 | 21,5 |
| | Constipation | 14 | 21,5 |
| | Diarrhea | 12 | 18,4 |
| | Nausea | 11 | 16,9 |
| Neurological syndrome | Obnubilation | 20 | 30,7 |
| | Agitation | 20 | 30,7 |
| | Headache | 17 | 26,1 |
| | Unconsciousness | 7 | 10,7 |
| | Seizures | 6 | 9,2 |
| | Muscle weakness | 28 | 43,1 |
| | Paresthesia | 5 | 7,6 |
| | Paraplegia | 5 | 7,6 |
| | Other | 7 | 10,7 |
| Cardiac syndrome | Torsade de pointe | 30 | 46,1 |
| | Tachycardia | 25 | 38,4 |
| | Palpitation | 5 | 7,6 |
| | Arythmia | 3 | 4,6 |
| | Bradycardia | 1 | 1,5 |

All electrolytes were involved with hypocalcemia and hyponatremia being predominant with 61.3% and 51.67%, respectively. Tables 2 and 3 summarize the results obtained. While vomiting was involved in 41.5% of cases, furosemide and steroid were the most common iatrogenic causes (24.6%), and insufficient hydration was observed mainly in the elderly in 20% of cases. Other associated conditions include spondylodiscitis (16 cases), tumor (11 cases), connective tissue disease (8 cases) and metabolic (4 cases of diabetes and 4 cases of gout). Treatment was based on electrolyte disorder correction protocols (oral route and infusion hydration, correction of electrolytes disorders). Among the clinical features surveillance impaired consciousness persisted in 14/27 patients after 10 days and wrinkles in 8/34 patients after 15 days. The elements of biological monitoring (Table 4) were the assessment of renal function serum electrolyte. The evolution was marked by a referral of 6% of patients to intensive care unit and death occurred in 43% of cases.

Table 2: Distribution according to blood ionogram.

| Blood Ionogram | | Individuals | Percentage |
|-----------------|--------|-------------|------------|
| Natremia (n=60) | Low | 31 | 51.67 |
| | High | 2 | 3.33 |
| | Normal | 27 | 45.00 |
| Calcemia (n=59) | Low | 36 | 61.03 |
| | High | 6 | 10.17 |
| | Normal | 17 | 28.80 |
| Kalemia (n=60) | Low | 28 | 46.67 |
| | High | 2 | 3.33 |
| | Normal | 30 | 50.00 |
| Chloremia (n=8) | Low | 6 | 75.00 |
| | High | 1 | 12.50 |
| | Normal | 1 | 12.50 |

Table 3: Distribution according to urine ionogram performed.

| Ionogramme urinaire | | Number | Percentage |
|---------------------|-----------|--------|------------|
| Natriuria (n=21) | Increased | 6 | 28.57 |
| | Decreased | 4 | 19.05 |
| | Normal | 11 | 52.38 |
| Calciuria (n=15) | Increased | 3 | 20 |
| | Decreased | 6 | 40 |
| | Normal | 6 | 40 |
| Kaliuresis (n=21) | Increased | 0 | 0 |
| | Decreased | 5 | 23.81 |
| | Normal | 16 | 76.19 |

Table 4: Distribution according to changes in biological monitoring criteria.

| Biological Criteria | Admission | | Exit | |
|---|-----------|----|--------|----|
| | | | | |
| Creatinine Admission (n=57) Exit (n=45) | Low | 5 | Low | 2 |
| | Normal | 29 | Normal | 35 |
| | High | 23 | High | 8 |
| Creatinine Clearance Admission (n=42) Exit (n=37) | Low | 19 | Low | 11 |
| | Normal | 39 | Normal | 25 |
| | High | 7 | High | 1 |
| Uricemia Admission (n=44) Exit (n=33) | Low | 6 | Low | 1 |
| | Normal | 24 | Normal | 27 |
| | High | 14 | High | 5 |

| | | | | |
|--|--------|----|--------|----|
| Calcemia Admission (n=59) Exit (n=33) | Low | 36 | Low | 1 |
| | Normal | 17 | Normal | 32 |
| | High | 6 | High | 0 |
| Natremia Admission (n=60) Exit (n=33) | Low | 31 | Low | 5 |
| | Normal | 27 | Normal | 28 |
| | High | 2 | High | 0 |
| Kaliemia Admission (n=60) Exit (n=33) | Low | 28 | Low | 3 |
| | Normal | 30 | Normal | 30 |
| | High | 2 | High | 0 |

Discussion

During the study period, the Department of Rheumatology at the Teaching Hospital of Point G admitted 1145 patients of which 65 presented with electrolyte disorders, i.e. a prevalence of 6.72%. The average age was 59.49 years, and those of 60 years and over were more represented (58.5%). Ould and Miss Tangning reported a predominance in younger patients aged between 41 to 60 and between 20 to 44, respectively [6,7]. Women were predominant, probably due to the higher number of women affected by rheumatologic disorders or the higher prevalence of electrolytes disorders in women in general. Hypertension was the most associated condition, at 43.1%. Although at a lower rate, this result is in line with the study by Ould et al. [6] which identified 86.4% of hypertensive patients. This indicates the high prevalence of hypertension in the general population. In addition, some antihypertensive drugs influence electrolyte metabolism through their side effects. Mucocutaneous syndrome was prevalent and dominated by dehydration wrinkles. This is corroborated by the sodium deficiency seen in our patients at high rate and based on the clinical signs of extracellular dehydration, in particular the "wrinkles" [8]. Besides mucocutaneous syndrome, neuromuscular symptoms dominated by muscle weakness and obtundation and cardiac symptoms, predominantly torsades de pointes, were prevalent. Muscle weakness and obtundation are highly reported and often seen as presenting symptoms of electrolyte disorders including potassium, sodium, calcium and magnesium disturbances. Torsades de pointes vary in duration, and may go unnoticed when they are brief, but they often lead to syncope when they are prolonged [9]. In our study, electrolyte disturbances affected all electrolytes with hyponatremia among the most common. It is the most common hydroelectrolyte disorder in hospitals [10] with an incidence ranging from 15 to 22% [11]. However, hypokalemia found in 43.1% did not lead to T-wave reversal on ECG in any of the tested cases. The plausible explanation is the non-standardization of the testing in our settings. Hypomagnesemia, whether or not associated with hypokalemia [12], with alcoholic malnutrition syndromes [13] or not [14], has been implicated in the genesis of some torsades de pointes. The study identified hypocalcemia in 55.3% and hypercalcemia in 9.2%, which is comparable to the data reported by Ibrahim [15]. Vomiting was involved in 35.3% of cases. Furosemide and steroid therapy were the most common iatrogenic causes (24.6%). Thiazides are the most common cause of severe drug-induced hyponatremia [16]. Hyponatremia occurs preferentially in the elderly treated for hypertension [17-19]. Loop diuretics are less frequently involved, and hyponatremia is less severe [20]. Insufficient hydration was observed mainly in the

elderly in 20% of cases. This decrease in hydration is explained by the reduction of autonomy of aged-people and the urgency of urination or even urinary incontinence that limit fluid intake. Treatment was based on electrolyte disorder correction protocols (oral and infusion, correction of electrolyte disorders). Among the clinical features surveillance, impaired consciousness persisted in 14/27 patients after 10 days and wrinkles in 8/34 patients after 15 days. The elements of biological monitoring were the assessment of renal function and serum electrolyte. The evolution was marked by a transfer of 6% of patients to intensive care unit and death in 43% of cases. The persistence of the signs and the high number of cases of death are explained by the difficulty in monitoring biological markers due to the limited access to electrolyte testing but also challenges faced by the Department of Rheumatology in terms of personnel and infrastructures and referral to an appropriate department.

Conclusion

Electrolyte disorders are not uncommon, and their management remains challenging. Hyponatremia and hypocalcemia are the most common disorders. Death is common, especially in the elderly in our settings due to the limited access to standard care.

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