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Hydeoelectrolytic Disorders in Programmed Surgery at the Friendship Hospital Sino-guinean of Kipe

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Summary

The goal of this work and to make our contribution to the study of hydro electrolytic disorders in programmed surgery at the friendship hospital of the Sino-Guinean of Kipe Republic of Guinea. Many hydro-electrolytic disorders can complicate the evolution of patients in planned surgery but also in neuroreanimation. Most often, they affect the metabolism of sodium or potassium but can also concern that of calcium or magnesium.

Methodology, we made a study prospective over a period of
3 months going from February 1 to April 31 inclusive. It was carried out in the departments of visceral surgery, trauma of neurosurgery and the laboratory of biomedical analysis.
All patients admitted to planned surgery, having carried out examinations in connection with hydro electrolytic disorders were included in our study. We analyzed the following electrolytes: sodium (135mmol / l-145mmol / l), potassium (3.5mmol / l-5mmol / l), calcium (2.20mmol / l-2.6mmo / l) and magnesium. (0.65mmol/l-0.9mmo/l).

Results We had 125 patients undergoing scheduled surgery. Among them, 25 patients developed hydro electrolytic disorders before and immediately after surgery.

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We noted 17 cases in visceral surgery, 5 cases in neurosurgery, and 3 cases in trauma.
The analysis of different electrolytes in pre and post-operative us possible to achieve the results the following:

Serum chloride low in 1 patient postoperatively, the serum potassium high in 5 patients in preoperative and low in 2 patients in post-operative, the serum calcium elevated in 2 patients in preoperative and low in 4 patients in postoperative, the magnesium levels elevated at 5 pre-operative patients and never disturbed in zero post-operative patients, elevated blood level in 11 pre-operative patients and decreased in 2 post-operative patients.

Conclusion l es electrolyte disturbances are frequent on admission in planned surgery. Their occurrence during hospitalization is most often due to an overcorrection or rarely to an insufficient correction.

Keyword; Hydeoelectrolytic disorders, programmed surgery, friendship hospital, Sino-Guinean, kipe.

Introduction

The hydro-electrolyte balance concerns the relationships between the different electrolytes (sodium, potassium, chlorine, calcium, magnesium , phosphorus ...) and the water contained in the organism [1].
Many hydro-electrolytic disorders can complicate the evolution of patients in planned surgery but also in neuroreanimation [2]. Most often, they affect the metabolism of sodium or potassium but can also concern that of calcium or magnesium.
Their knowledge has a double interest:

- a large part of these disorders are of iatrogenic origin and could therefore be avoided.

- Sometimes their presence is even used as an indicator of the quality of care [2].

In an Austrian series of more than 150,000 patients, upon admission to intensive care, 25% of patients had an abnormality in sodium metabolism [3]. In another series of 8000 patients with normal serum sodium at admission, 37% of patients developed abnormal metabolism soda during hospitalization. [4] Post-surgical electrolyte abnormalities, especially those of sodium, are likely to worsen the prognosis [5]. In neuroreanimation, the most frequent electrolyte abnormality is dysnatremia [6]. Its possible repercussion on the cerebral edema explains why the maintenance of a blood sugar level within the limits of the normal is a major objective of the resuscitation of the brain-injured patient [4].
Digestive disorders, operating procedures, polytrauma, endocrine diseases, disturbances of consciousness are situations where one must fear an abnormality in the ionogram. [3.4].

Electrolyte disorders are easily diagnosed by simple laboratory tests performed very commonly in medical practice. They may be incidental discovery in an asymptomatic patient, or maybe the cause of more or less specific manifestations [1, 2, 4, 5].

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The immediate postoperative period is characterized by the occurrence of sodium hydroxide retention secondary to the consequences of induced surgical stress [3, 6,7].
Changing volume and composition of body fluids may also be influenced e s so iatrogenic period in liquid infusion per- and post-operative immediate [3,8.9,].
In scheduled surgery, these disorders must be corrected before and after surgery. [10].
Research on hydro electrolytic disorders has been the subject of several publications. So recent studies have shown that;

In Belgium at the ND Bruyères University Hospital, in 2017, L uc Radermacher et al. in their studies of the hydro electro disorders lytic in neurointensive have found 3% hyper serum sodium, 32% of hyperkalemia, hyponatremia While was 43% against 32% of hypokalemia. [3.9]
Hyper natremia is a disorder that affects 15% of neuroreanimation patients [3, 4,9.10].
The syndrome of inappropriate secretion of the antidiuretic hormone (SIADH) and the "cerebral Salt wasting" syndrome (CSW) constitute the 2 main causes of hyponatremia in neuroreanimation [4, 11, 12, 13, 14].
At the CHU in Libreville, in July 2014, Laurence Essola et al. in their studies on electrolytic disorders in resuscitation, found on admission, 23 patients (21.7%) associated hyponatremia and hypokalemia. Hypernatremia was found in 9 patients (8.5%). Hypokalemia was found in 5 patients (41.7%). During hospitalization, other electrolyte disturbances were added in 6 of these patients (18.2%): hypocalcemia in 1 patient, hypokalaemia in 2 patients and hypernatremia associated with hyperchloremia in 3 patients.
In Ivory Coast at the University Hospital of Abidjan, in October 2014, N'Guessan and neck on a study comparative of two modes of ion disorder occurred in a reanimation service, have found that the hyponatremia occupied the head ionic disorders the admission with a rate of 34% followed hypo respectively c h lorémies (18%) of hyperkalemia (17%) and with 12% hypokalaemia. In hospital, hyponatremia was always predominant with a rate of 30% followed by hypokalemia (18%), hyperkalemia (16%) and hypocalcemia with a rate of 15%. [1, 14.15]

Methodology

The hospital of the A mitie Sino Guinean has served in part to the realization of this work took place in four departments including three surgical services Neurosurgery, visceral surgery, the trauma and the laboratory of Biomedical Analysis
This stay does a cross-sectional study of descriptive type extended over a three-month period is from 1 st February to 30 April 2019

II.3- Diagnostic criteria for hydro electrolytic disorders:

In our study we identified 4 electrolytes, namely: sodium (135mmol / l-145mmol / l), potassium (3.5mmol / l-5mmol / l), calcium (2.20mmol / l-2.6mmo / l) and magnesium (0.65mmol / l-0.9mmo / l).
In our study, the electrolytes were dosed preoperatively and immediately after surgery.
Hydroelectrolytic disorders were stabilized after the intervention and were not associated with other pathologies

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II.4 - Selection criteria :

T All patients admitted for surgery planned within 3 surgery services of the Friendship Hospital Sino Guinean, who made the examinations requested in connection with hydro electrolyte disturbances in pre and post operative, Have been included in this study :

T he patients admitted in emergency (unplanned surgery) and / or planned who did not carry out the examinations related to hydro electrolytic disorders before and after surgery were not included in our study

II.5 - Study variables

The study variables have been epidemiological, clinical and laboratory.

We respected the administrative procedure, so the confidentiality of the patients was respected.

Results

Table I: Distribution of patients according to the frequency of interventions

Services	Number of interventions	Percentage
Visceral surgery	17	68 %
Neurosurgery	5	20%
Traumatology	3	12%

Table V: Distribution of patients according to the pathologies diagnosed

Diagnostics	**Number of cases**	**Percentage**
Pancreas Tail Cancer	1	4%
Dolichocolon	1	4%
Eventration	1	4%
Closed fracture of the external and internal malleolus	1	4%
Open fracture of the right leg	1	4%
Open fracture of the lower end of the left tibia	1	4%
Crural hernia	1	4%
Unilateral inguinal hernia	1	4%
Inguinal-scrotal hernia	1	4%
Low back pain	1	4%
Pylorus stenosis	1	4%
Hydrocephalus	2	8%
Lésio n traumatic marrow cervi wedge	2	8%
Cholecystitis	3	12%
Umbilical hernia	3	12%
Bilateral Inguinal Hernia	4	16%
Grand total	25	100%

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Table IX: Distribution of patients according to the other signs observed before and after surgery

d. Other signs observed	Total Observed in Preoperative (1)	Total Observed in Post-operative (2)	Total Observed (3) = (1) + (2)	Percentage
Dehydration	0	0	0	0.0%
Hyperhydration	0	0	0	0.0%
Pruritus	2	0	2	3.3%
Thirst	7	0	7	11.7%
Fever	7	2	9	15.0%
Physical asthenia	11	8	19	31.7%
Weightloss	4	19	23	38.3%
Percentage	51.7%	48.3%	100.0%	100.0%

Table XI: Distribution of patients according to the blood tests observed preoperatively

Blood tests	Total Performed in Pre Operative (a) = (1) + (2) + (3)	Normal Pre Operative (1)	Prior high operative ↑ (2)	Low Pre Operative ↓ (3)	Percentage
Chloremia	15	14	0	1	8.9%
Kalemia	17	10	5	2	10.1%
Calcemia	22	16	2	4	13.1%
Magn e sémie	22	17	5	0	13.1%
Natrémie	23	10	11	2	13.7%
Blood sugar	22	15	7	0	13.1%
Proteinemia	0	0	0	0	0.0%
Creatinemia	23	15	8	0	13.7%
Urea	24	16	8	0	14.3%
Grand total	168	113	46	9	100.0%
Percentage	100.0%	67.3 %	27.4%	5.4%	

Most of our patients were operated on under general anesthesia in 68 percent of the cases, while spinal anesthesia was used only in 32 percent of the cases.

Comments

From February 1 to April 30, 2019. 125 Patients were operated on in planned surgery in the Neurosurgery, Trauma and Visceral Surgery departments of the Sino-Guinean Friendship Hospital of Kipé, including :

- 17 visceral surgery patients, i.e. 68%
- 5 patients in neurosurgery or 20%
- And 3 trauma patients, i.e. 12%

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Thus, the frequency compared to the numbers of interventions in planned surgery was 20%.
Among them, 25 patients were identified with hydro electrolytic disorders in two forms either an increase or a decrease in the rate of the parameters of the ionogram which results either in dysnatremia, dyskalemia, dyscalcemia and dysmagnesemia.
Hydroelectrolytic disorders have been the subject of several international scientific publications. However, our work is the first in this area in the Republic of Guinea.
In our study the most affected age group e t is that between 60 and 74 years 1 1 case is 44 %.
The Average age was 48,016 years with extreme ages of 2 months and 71 years. Essola L et al. In Libreville in his study on hydro electrolytic disorders in intensive care had found an average age of 35 years 19 with extremes of 3 years and 81 years. N'Guessan et al in Abidjan on a comparative study of two modes of occurrence of ionic disorders in an intensive care unit found an average age of 34.89 ± 12.76 years with extremes of 15 years and 90 years. [22. 25. 26. 41]

The sex ratio equal to 1.77 more informa sai t net predominates Minance male. N'Guessan et al in Abidjan, on a comparative study of two modes of occurrence of ionic disorders in an intensive care unit, found a sex ratio equal to 1.03. [22. 23. 24.25. 26. 41]
Almost all pathologies in surgery are concerned. However, serious pathologies such as traumatic lesions of the marrow, cancer of the tail of the pancreas, cholecystitis, pyloric stenosis, hydrocephalus, dolichocolon are always accompanied by hydro electrolytic disorders.
At Ba mako Gamgaly et al. in his study on the hypertrophic nose of the pylorus in the pediatric surgery department of Gabriel Toure hospital found hyponatremia in 4.7 % of the cases; hypochloraemia in 9.3% of cases hypokalaemia in 2.3% [27]
In France G. Audibert et al in his study on hydro-electrolytic disorders of cerebral aggressions; mechanism and treatment believe that Hydro-electrolyte disorders are frequent during cerebral aggressions, in particular dysnatremia and dyskalemia [28]
In our study, 17 patients (68%) were operated on under general anesthesia (GA) and 8 (32%) under spinal anesthesia (AL). In the immediate postoperative period, all patients on GA noted hydro-electrolytic disorders, against only 55% of patients operated on LA.
These disturbances could be explained by the fluid intake that patients in planned surgery receive in per and post-operative especially in severe pathologies under GA. Our results are similar to those found by Essola L in Libreville in his study on hydro electrolytic disorders in resuscitation, i.e. a kalemia 3.3 mmol / l, a Calcemia 2 mmol / l, a Chloremia 95 mmol / l and a natremia 133 mmol. / l [22 .39.40].
In our study, hypernatremia came out on top of ionic disorders on admission in 11 patients with a rate of 48% followed respectively by hyperkalemia in 5 patients, i.e. 29.4%, hypermagnesemia 5 patients, i.e. 22.7%. and hypocalcemia in 4 patients (18.18%).
N'Guessan et al in Abidjan on a comparative study of two modes of occurrence of ionic disorders in an intensive care unit had found that; Hyponatremia led the ionic disorders at admission with a rate of 34%, followed respectively by hypochloremia (18%), hyperkalemia (17%) and hypokalemia with 12 %. [22.25.26. 41]

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In the immediate postoperative period, hypernatremia was always predominant with a rate of 52.4 %, followed by hyperkalemia 29, 4%, hypermagnesemia 22.7% and hypocalcemia 14.3%.

N'Guessan et al in Abidjan, on a comparative study of two modes of occurrence of ionic disorders in an intensive care unit, reported that: In hospital, hyponatremia was always predominant with a rate of 30% followed by hypokalemia (18 %), hyperkalemia (16%) and hypocalcemia with a rate of 15 %. [22. 25. 26. 41]

These variations could be explained by the difference in size of the populations studied, but also by the selection bias of this study. [22. 25. 26. 41] Sodium constitutes the main osmotically active extracellular cation of the human body [27.30.31.32.44]. Under normal conditions, the serum sodium level remains within physiological limits despite the variations in the hydro-sodium intake. This is thanks to an essentially renal regulatory system made up of several hormonal mechanisms. The renin-angiotensin-aldosterone system and the neuro-sympathetic system as well as the presence of the atrial natriuretic hormone and the natriuretic cerebral peptide[33.34.35.38.40.44.52]

Further, an increase can be a sign of adrenal insufficiency (Addison's disease), damage to the interstitial renal tissue (interstitial nephropathy) or even a diet that is too salty.

A decrease can mean kidney failure, digestive losses (diarrhea, vomiting) or even heavy sweating According to guideline Europe ICM 2014 electrolyte disorders can be of several types among others; minor, moderate, deep and serious. In our series we noted that the first two types [35.3 6.43.44.45.54.55]:

In our study, the preoperative cardiac clinical symptomatology was dominated on admission in 81% of our patients and postoperatively in 19 % of our patients.

At admission, the cardiac signs were observed in the following proportions: palpitation was observed in 36% of our patients followed by tachycardia 31% and hypertension 14.3%.

According to the literature, tachycardia represents one of the revealing symptoms of hydro electrolytic disorders of which we had found 13 cases in our series. In postoperative palpitation and tachycardia had considerably regressed.

While that hyper the t ension observed blood on admission was kept in the same proportions postoperatively.

The Principa ux neuropsychiatric signs were observed at admission in patients in the p following roportions: the headache was observed in 27.8 %, the reflex s tendon at 11.11% and confusion at 5.55 % .

After the operation, the percentage of patients complaining of headache increased to 44.44%, signs such as osteotendinous reflexes and mental confusion disappeared completely. However, we observed an immediate post-operative drowsiness with a rate of 5.55% and agitation with a rate of 5.55%.

The abdominal and digestive signs most observed on admission are vomiting found in 19.04%, nausea 9.52%, constipation 19.04% and diarrhea 28.6%.

With the exception of the nausea which was in 14% of the cases, these signs regressed, or even disappeared in our postoperative patients.

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Other signs such as pruritus 3.33%, thirst 11.66% , fever 11.66%, physical asthenia 13.33% and weight loss 31.66% were observed on admission.

Pruritus and thirst were not observed in the immediate postoperative period. Fever was observed in 3.33%, physical asthenia in 13.33% and weight loss in 31.66% of cases.

Blood glucose, blood urea nitrogen, and creatinine were systematic in all our patients and allowed us to highlight the kidney function disturbances with elevations of urea and créatinémi e.

In our study, the overall average hospital stay (MSD) was 26 days.

The postoperative operations were simple in 84% of our patients and complicated with wall suppurations in 16% of our patients.

During our study we did not record cases of death in programmed surgery.

Conclusion

Electrolyte disturbances are frequent upon admission to planned surgery. Their occurrence during hospitalization is most often due to an overcorrection or rarely to an insufficient correction.

Regular monitoring of the blood ionogram to detect dysnatremia, dyskalemia, dysmagnesemia and dyscalcemia is necessary. Their clinical manifestations are diverse and requires a decision in fast charge. In programmed surgery in our context, the appearance of these disorders could be explained by the fluid intake that patients in planned surgery receive per and postoperatively especially in serious pathologies, in particular stomach colon surgeries. and femur.

Conflict of Interest

The authors Declare that there was no conflict of interest

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