



Prevalence of Hyperkalaemia in Chronic Haemodialysis Patients

Mathew Barnd¹, Daniel Yreck¹

¹Public Health Faculty, Ateneo de Zamboanga University, Philippines

*Corresponding Author: Mathew Barnd



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Abstract

Haemodialysis patients are more likely to suffer from hyperkalaemia than the general population. It puts them at danger of a fatal accident. In haemodialysis, it is not part of the standard examinations. The purpose of our study was to find out how common it was among individuals on long-term dialysis. Our research was cross-sectional in nature. Participants had to have been on haemodialysis for at least two months and be willing to participate in the research. Before the start of their first and second weekly dialysis sessions, we did a clinical examination, blood potassium, sodium, and ionized calcium tests, and an electrocardiogram in each of them. 88 patients were chosen for the study. Before the first dialysis session began, 38.7 percent of patients had hyperkalaemia, and 17 percent had it before the second. In three cases, the blood potassium level was determined to be at least 7.5 mEq / l, indicating that the patient was suffering from a condition known as paresis. Hyperkalaemia is associated with a tall T wave on the ECG in two circumstances. Although hyperkalaemia is widespread in our dialysis patients, its clinical and electrocardiographic symptoms are less so.

Introduction

In Cameroon's therapeutic therapy, the only way to replace a chronic renal insufficiency is by the administration of a hemodialyse. Hemodialysis is intermittent in nature, and the composition of the patient's internal environment varies over the interdialytic interval, becoming more harsh during the dialyse (Locatelli, et al., 2005). Hemodialysis is also associated with increased mortality (Murdeswar & Anjum, 2020). There has been an increase in cardiovascular morbidity and death as a result of these alterations (Atsumi et al., 2013).

Concerning people who have been hemodialyzed, cardiac problems are the most common cause of death, accounting for 22 percent of all fatalities in this population. hyperkaliemia and cardiac arrhythmias were the most common causes of mortality in these individuals (Adamson, 2015). Chronic hemodialyzed patients at Yaounde General Hospital have two four-hour dialyse sessions every week, separated by a two-day interdialyse interval and three days between the second session and the first session the following week, according to hospital policy.

The risk of developing hyperkalemia and dying from natural causes is significantly higher in these people. As an extra point of clarification, the Cameroon's regular hemodialysis evaluations do not include a kaliemia dosage (Kabinga, 2019). According to their findings, we discovered that patients at the Yaoundé General Hospital had a greater prevalence of hyperkaliemia, as well as the clinical and electrocardiographic signs that go along with this condition.

Methods

An investigation was carried out as part of the hospital's hemodialysis program, and the results were published. Eligible patients were those who had chosen to participate in the study and had been on chronic hemodialysis for a minimum of three months at the time of enrollment. In this investigation, atrial fibrillation, atrial flutter, atrial tachycardia, sinoatrial blocks, atrioventricular blocks, and plugs were all ruled out as potential complications. As part of our interview process with the selected patients, we recorded their age and gender, dialysis experience, as well as the type of vascular access they used for dialysis.

A search was conducted for signs and symptoms of hyperkalaemia, such as paresthesias, cramps, and paresis, before the patients' first and second weekly dialysis sessions. When no stimulus was provided, a tingling, tingling-like, hot, or cold feeling was experienced. During the cramping process, involuntary, agonizing, and short spasms of the striated muscles occurred. During a physical examination, we tested muscular strength to see whether there were any evidence of paresthesia.

A person with paresis had muscular strength that ranged from 1 to 4 on a scale from 1 to 4. We gave the force a 2 because gravity had been removed from the equation. The force was rated 3 because of lower resistance in the limb that was mobilized against gravity. The force was assigned the value 4 based on the assumption that movement against gravity was possible despite strong opposition to it. Our patients who had arteriovenous fistulas were given a 10ml syringe and 3ml of blood, which was extracted from a vein not far from the fistula. This procedure was repeated several times. Patients who had catheters had to have an additional three milliliters of blood drawn with a second needle, and the initial ten milliliters were returned to them through the catheter, which was then put in a heparinized tube.

The samples were obtained before to each of the two weekly dialysis operations and were sent to the laboratory within 30 minutes of being collected, according to the protocol. The ionometer testing was performed after the serum had been centrifuged at 3000 rpm for three minutes to ensure that only serum would be collected for analysis using an autoanalyzer approach that doses specific ions. This was done to ensure that only serum would be collected for analysis using an autoanalyzer approach that doses specific ions. Patients with hyperkalaemia were diagnosed when their potassium level in the blood was more than 5.5 milligrams per deciliter (mmol/l). Serum potassium concentrations between 3.5 and 5.5 mg/dL were deemed normal. According to the study, normal natremia was defined as having a rate between 135 and 145 mmol/l, while normal serum calcium was defined as having a rate between 44 and 52 mmol/l, respectively.

Results and Discussion

Only five individuals out of the 93 who met our inclusion criteria had a cardiac conduction anomaly, and as a result, they were excluded from the research. Three AVBs of the first degree, one AVB of the second degree (type 1 Mobitz), and one AVB of the third degree were discovered.

Characteristics of the Participants in Terms of their Socioeconomic Status

In this study, the male to female ratio was 2.04, with 67 percent of the participants being male. The average age of the study individuals was 46.36 years, with a standard deviation of 14.36 years. The age distribution of the study population is depicted in Figure 1.

Characteristics of Dialysis

A natural arteriovenous fistula for dialysis was present in more than 95% of the patients enrolled in the study. There was a wide range of time spent on hemodialysis, with an average of 57.9 months for those who were on the treatment.

Serum Potassium Levels are Used to Divide Patients into Groups

The individuals' average blood potassium levels were 5.34 mmol/l and 4.97 mmol/l, respectively, before the two weekly dialysis treatments began. Hyperkalemia was evident in 38.7 percent of patients before to the start of the first dialysis of the week and 17 percent prior to the start of the second dialysis of the week. The distribution of patients is depicted in Table 1 based on their serum potassium concentrations. We identified hyperkalemia in 25 individuals with a level of at least 6 mmol/l.

Table 1. Distribution of participants following their kalemia before the start of their first and second weekly dialysis sessions

Class	Frequency session 1 N (%)	Value P	Frequency session 2 N = (%)	Total case
Hypokalemia	1(1,1)	0,567	2(2,3)	3(1,7)
Normokaliemia	53(60,2)	0,001	71(80,7)	124(70,5)
Hyperkalemia	34(38,7)	0,001	15(17)	49(27,8)
Total	88		88	176

Table 2 illustrates the importance of hyperkalemia before the two dialysis sessions.

Table 2. Severity of hyperkalemia and sessions weekly dialysis

Class (mmol/L)	Frequency Session 1 n(%)	Frequency Session 2 n(%)
5,5 - 6	17(19,3)	7(8)
6 - 7	11(12,5)	6(6,8)
7-8	5(5,7)	2(2,3)
8 and over	1(1,1)	0,0

Calcium and natriuretic acid concentrations in the 25 patients with hyperkalemia higher than or equal to 6 mmol/l

There were 132.01 mmol/l of sodium in the blood of these individuals, and 42.8 mmol/l of calcium in the serum of these patients on average. In Tables 3 and 4, they are illustrated in relation to their sodium and calcium levels, respectively.

Table 3. Distribution of the 25 cases with kalemia ≥ 6 mmol/L following their natremia before the start of their first and second weekly dialysis session

Class	N	%
Hyponatremia	24	96
Norm natremia	1	4
Hypernatremia	0	0
Total	25	100

Table 4. Distribution of the 25 cases with a kalemia ≥ 6 mmol/l, according to their serum calcium before the start of their first and second weekly dialysis session

Class	N	%
Hypocalcemia	18	72
Normokalaemia	7	28
Hypercalcemia	0	0
Total	25	100

Patients undergoing hemodialysis at the General Hospital of Yaoundé are predominantly male

and young (average age 46.16 14.36 years), according to the hospital's statistics (67 percent). Pre-dialysis hyperkalemia affects 38.9 percent of dialysis patients before their first and second dialysis sessions of the week, respectively. This condition is triggered by serum potassium values greater than or equal to 7.5 mmol/l in these animals. The presence of hyperkalemia-related abnormalities on the ECG is relatively rare in these patients (2 cases of ample T wave).

The overconsumption of potassium ions is a problem. According to the findings of a second research, a delayed increase in serum potassium in chronic renal failure may be more relevant than the actual serum potassium level achieved in the patient. A consequence of this would be that compensatory modifications would occur at the same time in order to counterbalance the depolarizing effects of hyperkalemia. Our findings indicated that the second hypothesis was more plausible than the first since none of the participants with hyperkalaemia in our study also had hypercalcaemia.

Features Related To Dialysis

We determined that the average length of hemodialysis treatment was 57.9 months, with a minimum of 13 months. In 2006, Fouda et al. reported that hemodialysis at the same center lasted eight months on average. Between 2006 and 2013, the life expectancy of hemodialysis patients in Yaoundé grew by a significant amount. Since the introduction of bicarbonate dialysates in 2007, the reception capacity of the hemodialysis center at the General Hospital of Yaoundé has expanded, regional dialysis clinics have opened, and the overall quality of dialysis has improved. Elsharif had dialysis for an average of 30.29 25.56 months in Sudan in 2008, but Collado et al. discovered an average of 62.8 7.5 months for hemodialysis in Spain in their study in 2008.

Manifestations of Hyperkalemia

In the first dialysis session, 38.7 percent of patients experienced hyperkalemia, whereas only 17 percent did so in the second, a statistically significant difference between the two sessions. The incidence of hyperkalemia increased with the length of time between dialysis sessions (Putchá & Allon, 2007; El-Sharkawy et al., 2009). These conclusions are supported by the data. At our center, the interdialytic period between the second and third dialysis treatments is three days, despite the fact that just two days separate the first and second dialysis sessions (Karpetas et al., 2017).

It was determined that one hundred and twenty-five cases of hyperkalaemia had occurred, each with a potassium level more than 6 mmol/l. The average values for sodium and calcium were 132.03.96 mg/l and 42.505.12 mg/l, respectively. There were only five patients out of the 25 who were predicted to have clinical signs who actually did. The presence of paresis was associated with serum potassium levels less than 7.5 mmol/l in just three cases reported. There were only 25 cases of hyperkalemia in which electrocardiographic symptoms could be predicted, according to the findings. In total, there were just two instances in which the T wave was extremely significant. The ECG signs of hyperkalemia in hemodialysis patients are quite rare, according to a number of reports. One of two main theories can be offered to explain this phenomenon. Treatment for secondary hyperparathyroidism with vitamin D supplements and dialysate with calcium concentrations up to 3.5 milliequivalents per liter of blood has been reported to increase the risk of developing hypercalcemia.

Conclusion

Patients undergoing hemodialysis are usually found to have elevated levels of potassium in their blood. Despite this, there aren't many clinical or electrocardiographic symptoms of the disease to be found. This particular group of patients continues to be at risk of sudden mortality. This potentially fatal effect can be avoided by routinely checking their serum potassium levels.

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