International Journal of Research in Medical Sciences
Lokapur A et al. Int J Res Med Sci. 2017 Jun;5(6):2502-2505
www.msjonline.org
pISSN 2320-6071 | eISSN 2320-6012
DOI: http://dx.doi.org/10.18203/2320-6012.ijrms20172436

Original Research Article

Hypokalemia in hospitalized patients in tertiary care teaching hospital Belagavi, Karnataka, India: a retrospective study

Anand Lokapur[1], Raju Badiger[2]*, Manjunath Somannavar[3]

[1]Department of Biochemistry, MVJ Medical College, Hoskote, Bengaluru, Karnataka, India
[2]Department of Medicine, KLE University's Jawaharlal Nehru Medical College, Belagavi, Karnataka, India
[3]Department of Biochemistry, KLE University's Jawaharlal Nehru Medical College, Belagavi, Karnataka, India

Received: 19 March 2017
Accepted: 19 April 2017

***Correspondence:**
Dr. Raju Badiger,
E-mail: intellects19@yahoo.com

ABSTRACT

Background: Hypokalemia is well known condition in which serum potassium levels falls less than the normal level (normal range 3.5 to 5.1mmol/L). It has adverse effect on cardiac rhythm, blood pressure.[1] The objective of the study was to look for causes and associated factors of hypokalemia.
Methods: Patients age, sex, potassium value and primary diagnosis of hypokalemia patients collected from tertiary care teaching hospital retrospectively. Hypokalemia patients are classified based on the severity of hypokalemia, age, sex and primary diagnosis.
Results: Study reveals that both males and females are equally affected by hypokalemia, individuals with age between 40 to 60 are most affected and less than 20 are least affected by hypokalemia.
Conclusions: Hypokalemia is significantly associated with gastrointestinal and genitourinary disorders when compared with other disorders.

Keywords: Diuretics, Hypokalaemia, Potassium

INTRODUCTION

Hypokalemia is a well-known common clinical manifestation due to loss of potassium from the blood, urine and sweat. Common causes for hypokalemia are decreased oral intake, increased loss through urine, gastrointestinal tract, sweat as well as translocation from the cells.[1]

Hypokalemia refers to a condition in which concentration of potassium in blood is lower than the normal level (normal level 3.6 to 5.1mmol/L). Normal recommended intake of potassium in an adult is 40 to 120 meq per day and majority of this is excreted through urine and 98% of it is intracellular in muscles. Hypokalemia occurs in up to 20% of hospitalized patients and is associated with increase in in-hospital mortality rates due to adverse effect on cardiac rhythm, blood pressure and cardiovascular morbidity rate.[2]

The present retrospective study analyzes the causes and associated factors of hypokalemia in patients admitted to tertiary care teaching hospital.

METHODS

During one year period studied, socio demographic profile of patients including name, age, sex as well as serum potassium value and primary diagnosis were collected from the medical record section of hospital. These values were grouped into four classes: 1. Potassium values less than 2 mmol/L is included in the

group "A", 2. Group B contains potassium levels 2 to 2.49mmol/l 3. Group C contains potassium levels 2.5 to 2.9mmol/L and 4. Group D contains potassium levels 3 to 3.49mmol/L and group E contains normal levels of potassium values for control group. Patients with Hyperkalemia that is Potassium values more than 5.1mmol/l were excluded from the control group. After patients were grouped with regards to serum potassium values, each group was analyzed for the co relation with sex ratio, numbers of male and female patients in each group and the percentage was calculated. All the collected data of patients were further analyzed as per age, in which, patients are classified in four groups, first group with age less than 20, second group between the age 20 to 40, third group between the age 40 to 60 and last group contains patients above the age 60 years. Collected data were analyzed for distribution of hypokalemia patients with respect to primary diagnosis. In which Hypokalemia patients are grouped into six classes with regards to primary diagnosis like cancer, gastrointestinal, genito-urinary, respiratory and other disorders. Results were analyzed using appropriate statistical variance for correlation among the groups. χ^2 test applied across the five groups of patients studied comparing groups A, B, C and D individually with normokalemic subjects- results are expressed as "P" values.

RESULTS

The patient's distribution with regards to serum potassium and gender in groups A-E shown in the Table 1. So, there was NO positive correlation associated between the hypokalemia and female sex, no difference between the genders, both males and females are equally affected by hypokalemia.

Table 1 : Distribution of patients based on the serum potassium value and gender.

Set	A		B		C		D		E		Total
Potassium value (mmol/l)	Less than 2.0		2.0- 2.49		2.5- 2.99		3.0-3.49		3.5-5.5		
Numbers	113		405		1222		2878		200		4818
Males	61	2.1%	235	7.9%	740	25%	1780	60.2%	140	4.7%	2956
Females	52	2.8%	170	9.1%	482	25.9%	1098	58.9%	60	3.2%	1862

χ^2 was 11.412, DF was 4 and 'P' is 0.022.

Table 2: Distribution of patients with hypokalemia based on age in years.

Age	Less than 20		20-40		40-60		Above 60	
Set A	16	14%	33	30%	32	28%	32	28%
Set B	46	11%	83	21%	142	35%	134	33%
Set C	115	10%	277	23%	446	36%	383	31%
Set D	265	9%	686	24%	1046	36%	881	31%
Set E	21	10%	40	20%	86	43%	55	27%

χ^2 was 15.321, DF is 12 and P value is 0.224.

Table 3: Distribution of patients based on primary diagnosis.

Primary diagnosis	Total	Groups									
		A (100)		B (200)		C (200)		D (200)		E (200)	
Cancer	23	3	13%	7	30.4%	10	43.4%	3	13%	00	00
Gastrointestinal	117	14	11.9%	38	32.4%	23	19.6%	19	16.2%	23	19..6%
Genito-urinary	115	10	8.6%	26	22.6%	36	31.3%	24	20.8%	19	16.5%
Respiratory	76	11	14.4%	19	25%	14	18.1%	18	23.6%	14	18.1%
Others	515	55	10.6%	99	19.2%	108	20.9%	124	24.1%	129	25%

On analysis of this distribution χ^2 was 11.412, DF was 4 and 'P' is 0.022. Collected data also distributed with respect to patients age, patients are classified in four groups, results are shown in the Table 2, on analysis we found age group between 40 to 60 are most affected by hypokalemia and above 60 are also much affected compared to adults between 20 to 40 years of age.

Less than 20 years of age groups individuals are least affected with 9.6%. There was no positive correlation

among the groups. Statistical analysis shows χ^2 was 15.321, DF is 12 and P value is 0.224.

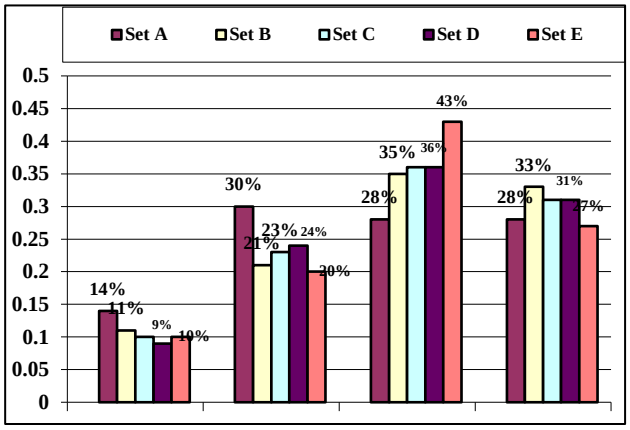

Figure 1: Age wise distribution of hypokalaemia.

To study the association of hypokalemia with other disorders, patients are grouped into 5 classes, complete distribution of patients with regards to primary diagnosis is shown in Table 3 among the analyzed groups gastrointestinal and genitourinary disorders are the significant contributors of hypokalemia. χ^2 test is 35.315 DF is 20 and P value 0.018.

DISCUSSION

In this one year study of hypokalemia in tertiary care teaching hospital of KLE's Dr. Prabhakar Kore' charitable hospital, 4818 patients were noted to have a serum potassium concentration of less than the normal level that is 3.5mmol/l. 2.3% of the patients found to have potassium levels lesser than 2.0 mmol/l. Hypokalemia was most frequently found in females however in the present study, hypokalemia is not significantly associated with females rather it is distributed equally in males as well as females.[2] Hypokalemia is also a common problem in pediatric intensive care unit patients; this has been reported by Singhi S et al.[4] In the present age group between 40 to 60 were most affected and less than 20 years of age group individuals are the least affected.

Hypokalemia has been reported in acute myeloid leukemia (Kassirer and Harrington; Pickering and Catovsky; Ledoux et al Lawson DH et al) this may occur as a consequence of chronic lysozymuria resulting in renal tubular damage and subsequent excessive renal potassium elimination, and partly as a consequence of concurrent treatment with drugs such as cytotoxic agents (Schreiner and Maher). In the present study hypokalemia was found only in 23 cancer patients out of 900 patients.[5-9]

Hypokalemia is accompanied by enhanced renal cystogenesis and may lead to interstitial scarring and renal insufficiency, and hypokalemia is also associated with end stage chronic kidney disease population.[10,11] In the present study, also it is found that Genito-urinary disorders are the significant contributors of hypokalemia, about 13% of patients had genito-urinary disorders

Limitation of this study could not perform the more detailed investigation of the hypokalemia like regarding the mortality, consumption of diuretics, steroids, insulin therapy.

CONCLUSION

After the one year of retrospective study of hypokalemia study conclude mild hypokalemia is common in hospitalized patients, hypokalemia is associated with males and females equally. Hypokalemia is also common in people with age group between 40 to 60. Among the disorders hypokalemia is mainly associated with gastrointestinal and genito-urinary disorders. There was no positive association of hypokalemia with Cancer.

ACKNOWLEDGEMENTS

Authors would like to thank his Head of Department, faculty's members of medicine and Biochemistry, J. N. Medical College, Belagavi, Karnataka, India and special thanks to late Shri. M. D. Mallapur for his statistical support.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Squires RD, Huth EJ. Experimental potassium depletion in normal human subjects. I. Relation of ionic intakes to the renal conservation of potassium. J Clin Invest. 1959;38(7):1134-48.
2. Paice BJ, Paterson KR, Omara OF, Donnelly T, Gray JM. Lawson DH. Record linkage study of hypokalaemia in hospitalized patients. Postgrad Med J. 1986;62(725):187-91.
3. Krakaurer R, Lauritzen M. Diuretic therapy and hypokalemia in geriatric outpatients. Danish medicine bulletin. 1978;25(3):126-9.
4. Singhi S, Marudkar A. Hypokalemia in a pediatric intensive care unit. Indian Pediatr. 1996;33(1): 9-14.
5. Kassirer JP, Harrington JT. Diuretics and potassium metabolism: a reassessment of the need, effectiveness and safety of potassium therapy. Kidney Int. 1977;11(6):505-15.
6. Pickering TG, Catovsky YD. Hypokalemia and raised lysosyme levels in acute myeloid leukemia. Q J Med.1973;42(168):677-82.
7. Ledoux F, Bergerat JP, Vetter JM, Lang JM, Oberling F. Long term Hypokalemia in Acute Myeloid Leukemia. Arch Int Med. 1978;138(8):1287-90.

8. Lawson DH, Murray RM, Parker LJW. Early mortality in the megaloblastic anemias. Q J Med. 1972;41(1):1-4.
9. Schreiner GE, Meher. Toxic Nephropathy. American Journal of Medicine.1965;38(3):409-49.
10. Torres VE, Young WF, Offord KP, Hattery RR. Association of Hypokalemia, Aldosteronism and Renal Cysts. N Engl J Med. 1990;322:345-51.
11. Wang HH, Hung CC, Hwang DY, Kuo MC, Chiu YW, Chang JM, et al. Hypokalemia, Its Contributing Factors and Renal Outcomes in Patients with Chronic Kidney Disease. PLoS ONE. 2013;8(7):e67140.

Cite this article as: Lokapur A, Badiger R, Somannavar M. Hypokalemia in hospitalized patients in tertiary care teaching hospital Belagavi, Karnataka, India: a retrospective study. Int J Res Med Sci 2017;5:2502-5.