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A Study Of Prevalance Of Hypokalemia In Elderly Patients With Hip Fractures

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Abstract

Introduction : Elderly patients with osteoporotic fractures are susceptible; e to Hyponatremia , hypokalaemia , hypocalcemia due to co morbidities , increased drug intake , prolonged hospitalisation ,acid base imbalance . These patients are at risk of developing cardiac issues , respiratory issues , polyuria, polydipsia and associated with significant morbidity and mortality.

Objective : To investigate the proportion of hypokalaemia in elderly patients with hip fractures , focusing on difference between male and female patients with extra capsular or intra capsular proximal femoral fractures

Materials and Methods : All records containing clinical and laboratory information about patients admitted to orthopaedic department of S. Nijalingappa Medical College and HSK Hospital and Research Centre , Bagalkot from may 2023 to may 2024 were retrieved from hospital database. They were divided into 4 groups based on gender and type of fracture (extra capsular or intra capsular). Total of 63 patients were extra capsular proximal femoral fractures and 27 were intra capsular fractures

Observation : Out of 90 patients , there were increased number of males(n=41,45%) than females (n=49,54%).In both male and female patients , there were more extra capsular proximal femoral fracture , 30/63 ,47% and 33/63,52% respectively than intra capsular fractures 11/27,40% and 16/27 ,59% respectively Overall , the proportion of Hypokalemia in total population was 11%(10/90). The proportion of hypokalemia was 10%(3/30)for male patients with extra capsular proximal femoral fracture ,18%(2/11) for male patients with intra capsular proximal femoral fracture, 12%(4/33)for female patients with extra capsular proximal femoral fracture and 6%(1/16) for female patients with intra capsular proximal femoral fracture

Conclusion : There was 11% prevalence of hypokalaemia in elderly patients with hip fractures . Serum potassium levels should be routinely assessed in elderly patients with hip fractures to prevent hypokalaemia and its complications .

Introduction:

Nowadays ,we are facing the challenge of an " raging world ," , epidemiological projection for 2050 states that 1.6 billion persons in the world will be aged >65years and over [1], therefore it is important to correct the increase of chronic disease affecting old population and active and healthy aging . Hypokalaemia is common electrolyte imbalance in elderly fractures . Hypokalaemia is defined as potassium level </= 3.5mMol/L[2]. Hypokelemia in older adults is due to reduced dietary intake of potassium , to the presence of co morbidities and use of multiple drugs that effects potassium levels , including diuretics and corticosteroids . Its prevalence was reported to be between 3.4 and 20%in different clinical settings[3].potassium plays role in the regulation of bone turnover , it has been postulated that potassium may influence bone health through its effect on acid - base balance [4,5,6.] Observational studies suggest that diet rich in fruits and vegetables is associated with better bone health as vegetables are rich in potassium their benefit to bone health has been linked to this molecule[7,8].

Measurement of potassium levels could help direct orthogeriatric services to high risk patients and highlight need for urgent medication review and revision of fluids and electrolyte needs. Abnormal plasma concentrations of potassium in the form of hypokalaemia or Hyperkalemia among hospitalised patients are associated with poor outcomes [9.] hypokalemia is one of the most common electrolyte disturbance in hospitalised patients . The prevalence of hypokalemia is 15 - 20%[10,11,12.] hypokalemia and Hyperkalemia can lead to cardiac arrhythmia and hence is cause of mortality in hip fractures.

The purpose of this study is was to investigate the proportion of hypokalaemia in elderly patients with hip fractures ,focusing on difference between male and female patients with extra capsular or intra capsular proximal femoral fractures .

Purpose of the study

The purpose of this study is was to investigate the proportion of hypokalaemia in elderly patients with hip fractures ,focusing on difference between male and female patients with extra capsular or intra capsular proximal femoral fractures.

Materials And Methods :

All records containing clinical and laboratory information about patients admitted to orthopaedic department of BVVS S.Nijalingappa Medical College and HSK Hospital and Research Centre , Bagalkot from may 2023 to may 2024 were retrieved from hospital database.

Inclusion criteria :Patients >50years with hip fractures , intracapsular or extra capsular proximal femoral fractures, patients willing for the surgery **.**

Exclusion criteria : patients <50 years , poly trauma patients , patients not willing for the surgery ,

Total of 90 patients were determined from the hospital base . They were divided into 4 groups ,based on gender and type of fracture (intracapsular or extra capsular).this division was made to evaluate the link between hypokalaemia and different type of hip fractures . The potassium concentrations were retrieved from the records and proportion of hypokalaemia on admission to hospital was determined

Sample size estimation :

The sample size for the present study was calculated based on the average prevalence of hypokalemia among older adults and hip fractures according to existing literature, using the formula,

$$N' = \frac{N * (Z^2 * P * Q)}{[(d^2 (N-1)) + (Z^2 * P * Q)]}$$

where,

N' = Sample size adjusted for a finite population size

N = Known finite sample size in the population= Approximately 180 patients available at the study center for a duration of 1 year (on an average 15 patients per month)

Z = Critical value for a corresponding level of confidence= 1.96 for 95% confidence level

P = Average prevalence of hypokalemia from multiple previous studies= 12% (varied from 4-20%)

q = 100- 12= 88%

d = Acceptable margin of error = 5% Substituting the

above values in the formula, n = 87

Thus, a minimum sample of 87 patients would be required for an error rate of 5% and 95% confidence levels.

Statistical analysis

The data will be analysed using IBM SPSS version 29. Continuous and categorical data will be presented as mean ± SD and percentages respectively. Evaluation of the association between continuous variables will be done using Pearson's correlation. Comparison of prevalence of hypokalemia against categorical variables will be done using chi-square test. A p value of ≤0.05 will be considered significant for all analyses.

Results :

Out of 90 patients , there were increased number of males(n=41,45%) than females (n=49,54%) In both male and female patients , there were more extra capsular proximal femoral fracture , 30/63 ,47% and 33/63,52% respectively than intracapsular fractures 11/27,40% and 16/27 ,59% respectively . Overall , the proportion of Hypokalemia in total population was 11%(10/90). The proportion of hypokalemia was 10%(3/30)for male patients with extra capsular proximal femoral fracture ,18%(2/11) for male patients with intra capsular proximal femoral fracture, 12%(4/33)for female patients with extra capsular proximal femoral fracture and 6%(1/16) for female patients with intra capsular proximal femoral fracture

Table 1: Descriptive Statistics For Continuous Variables In The Study.

Variable	Minimum	Maximum	Mean	Standard deviation
Age in years	54	99	70.69	10.31
Serum potassium	3.00	5.60	4.24	.557

Table 2: Gender Distribution In The Study

Gender	N	%
Male	46	51.1
Female	44	48.9

Graph 1: Gender distribution in the study

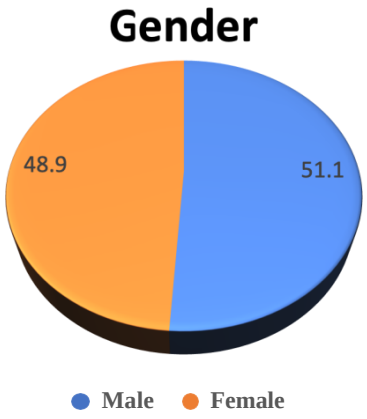


Table 3: Side Distribution In The Study

Side	N	%
LEFT	41	45.6
RIGHT	49	54.4

Graph 2: Side distribution in the study

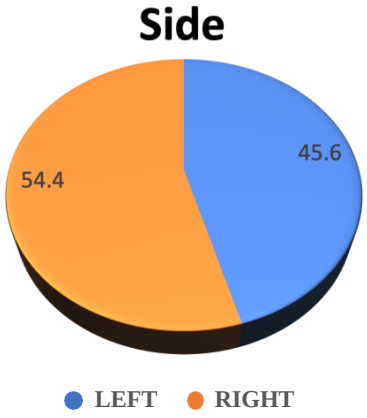


Table 4: Distribution Of Patients Based On Diagnosis

Diagnosis	N	%
Extracapsular	62	68.9
Intracapsular	28	31.1

Graph 3: Distribution Of Patients Based On Diagnosis

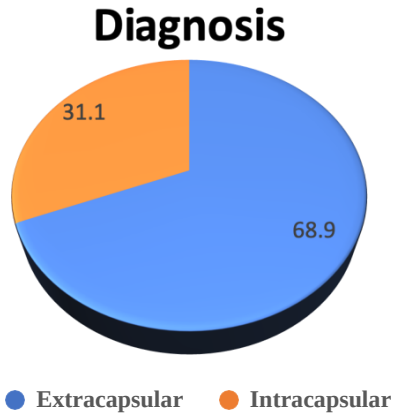


Table 5: Distribution Of Patients Based On Hypokalemia

Hypokalemia	N	%
No	80	88.9
Yes	10	11.1

Graph 4: Distribution Of Patients Based On Hypokalemia

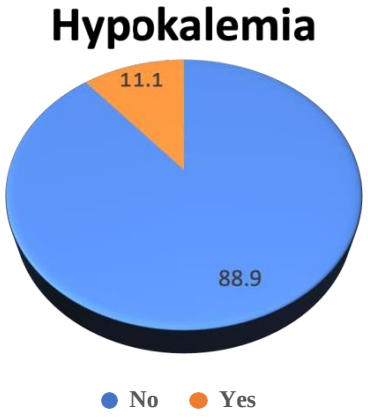
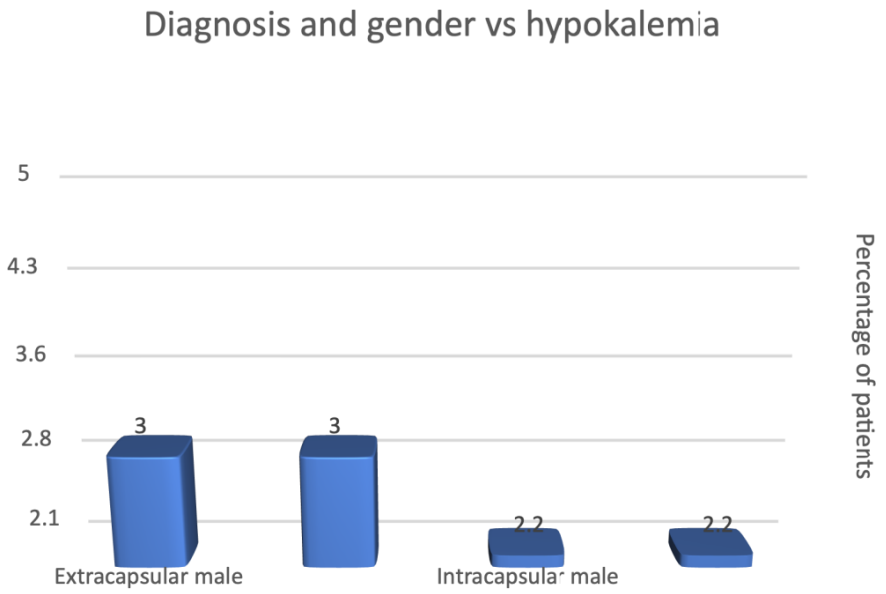


Table 6: Distribution Of Hypokalemia Based On Gender And Diagnosis.

Type	N	%
Extracapsular male	3	3.0
Extracapsular female	3	3.0
Intracapsular male	2	2.2
Intracapsular female	2	2.2

Graph 5: Distribution of hypokalemia based on gender and diagnosis



Discussion :

The relationship between electrolyte imbalance and fracture risk is common with peculiar focus on the relationship between hponatremia , hypokalaemia and fragility fracture[13,14,15,16].Previous studies suggest that potassium supplementation may increase bone health by decreasing bone turnover and increasing bone density[17].Hypokalemic patients were not significantly different with respect to normokalemic ones for analysed variables and do not have increased fracture risk.Laurence et al - lack of data on bone mineral density and bone turnover do not allow to draw definite conclusion on role of sodium and potassium levels on control of bone turnover According to their study although Hyponatremia is associated with increased risk of fracture , we find association of hypokalaemia .

Debbie et al - both hypokalaemia and Hyperkalemia are frequently seen in hospitalised patients and hence hypothesised that both are prevalent and associated with increased with increased mortality in hip fracture patients [17]. Arora et al- found that hypokalaemia and Hyperkalemia are independent predictors of mortality and adverse cardiovascular events.19mild to moderate Hyperkalemia can be related to insulin deficiency and metabolic acidosis and Hyperkalemia is common cause for mortality in hip fracture In the present study ,there was 11% prevalence of hypokalaemia in elderly patients with hip fractures . Serum potassium levels should be routinely assessed in elderly patients with hip fractures to prevent hypokalaemia and its complications **.**

Limitations : the limitations of the present study are

1. The lack of data on the etiology of hypokalaemia in each patient
2. Only diabetic and hypertensive status of individuals were taken into account

3. Detailed history of long standing treatment or chronic drug usage was not present
4. No data on presence or absence of other pre existing conditions

Conclusion : there was 11% prevalence of hypokalaemia in elderly patients with hip fractures . Serum potassium levels should be routinely assessed in elderly patients with hip fractures to prevent hypokalaemia and its complications .

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