

Clinical and Biochemical Spectrum of Patients with Periodic Paralysis with Special Reference to Hypokalemic Periodic Paralysis: A Cross-sectional Study

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Abstract

Background: A condition known as periodic paralysis causes skeletal muscular weakness that is episodic, hyporeflexic, and transient. Exercise, large meals, or fasting are frequently the causes of the recurrent bouts of limb muscle weakness that patients experience. These episodes typically last a few hours to a few days. Hypokalemia, abrupt flaccid paralysis, possibly lethal episodes of muscle weakness, and potentially fatal cardiac arrhythmias are the markers of hypokalemic periodic paralysis (HPP), a kind of metabolic myopathy. Excellent healing, however, might result with early and timely diagnosis of this ailment and treatment commencement. Aim of this study to the clinical and biochemical markers of patients of hypokalemic periodic paralysis and to determine the association of dietary habits (fermented rice) with HPP.

Methods: This descriptive and cross-sectional study was conducted at Department of Medicine, JLNMC, Bhagalpur, Bihar from June 2024 to December 2024 with the total 52 patients of HPP was selected in 21-60 year age group.

Results: The study included 52 patients aged 21-60 years mean (37.98±9.18), male (n=42, 80.7%), taking fermented rice (bassi) in the diet (n=51, 98%), and had no precipitating event. Most of the subjects (n=50, 96.2%) had decreased tone in all 4 limbs, DTR absent (n=33, 63.46%), haemoglobin level <12gm% (n=34, 65.4%), low serum potassium level <3.5meq/l (n=42, 80.7%), and had sinus bradycardia in ECG (n=13, 25%).

Conclusion: Periodic paralysis is a hyporeflexic, episodic, and transient weakening of the skeletal muscles. Most individuals had hypokalemia and regularly ate fermented rice (bassi). Intravenous potassium should be administered to patients with acute flaccid progressive motor paralysis regardless of whether their serum potassium levels are low or normal, since they reacted well and showed no lingering weakness.

Keywords- Hypokalemic Periodic Paralysis (HPP).

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Introduction

Hypokalemic periodic paralysis (hypokalemic PP) is a type of channelopathies that affect the muscular system. The disorder is characterized by transient, episodic, and muscle weakness with hyporeflex.[1]

The weakness attack is associated with hypokalemia with no myotonia recorded in electromyography (EMG) examination.[2]

According to the aetiology, hypokalemic PP can be grouped as primary or secondary.[3] The primary hypokalemic PP is an autosomal dominant trait.[1,4] The secondary hypokalemic PP is

associated with other known conditions that are affecting the derangements of potassium metabolism and causing hypokalemia. [3,5]

Worldwide there is a paucity of reports documenting the clinical profile of hypokalemic periodic paralysis in neurological practice and even no study is available in our area. There is an unmet need for a study regarding the clinical and biochemical profile of the patient with hypokalemic periodic paralysis.

Our study is an attempt to fulfill the lacuna in this area with the aims and objectives to study the

clinical & biochemical profile of patients of hypokalemic periodic paralysis and to determine the association of dietary habits (fermented rice) with hypokalemic periodic paralysis.

Material and Methods

This descriptive and cross-sectional study was conducted at Department of Medicine, JLNMC, Bhagalpur, Bihar from June 2024 to December 2024 with the total 52 patients of HPP was selected in 21-60 year age group. Patients presented in the hospital who diagnosed with Hypokalemic periodic paralysis, aged between 21 to 60 years of both sexes, Willing and capable to give informed consent (n = 52) were included in our study. Patient with the bladder or bowel involvement, alteration in level of consciousness, hypokalemia due to any other cause (Renal, adrenal, thyroid dysfunction; renal tubular acidosis; diuretic and laxative abuse), Other causes of Acute flaccid paralysis (Gullian barre syndrome, GBS), Porphyria, and Poliomyelitis were excluded from our study. Informed consent was obtained and following it data were collected in a predetermined proforma. A

detailed history including any previous episodes of weakness, thyroid disease, drug intake, diarrhea, vomiting, hypertension, and renal disease was noted.

Detailed systemic examination and complete neurological examination including assessment of muscle tone, muscle power, and deep tendon reflexes were done. All patients were subjected to the hematological (complete blood count), biochemical studies (Blood Urea, Serum Creatinine, Serum Sodium, and Serum Potassium by ILAB650 machine), ECG and radiological studies.

The patient's socio-demographic detail, clinical profile and the biochemical profile was analysed using descriptive statistics. The descriptive statistics were expressed as frequency (N, %) and mean $\pm$ standard deviation.

Result

The present study included 52 patients with Hypokalemic Periodic Paralysis, aged between 21-60 years.

Table 1: Demographic Profile of the study subjects

Demographic factors	No. of cases (n=52)	Percentage (n%)
Age group (yrs)		
Mean $\pm$ SD	37.98 $\pm$ 9.18	
Age Range	21-60	
Gender		
Male	42	80.7%
Female	10	19.3%
Education		
Illiterate	14	26.9%
Upto 8 th	35	67.3%
Upto 12 th	3	5.7%
Dietary Habits (Bassi, Rice)		
Person taking Fermented Rice in diet	51	98%
Person not taking Fermented Rice	1	1.9%
Frequency of fermented rice intake in a day		
Twice	27	51.9%
Thrice	21	40.38%
Four Times	4	7.6%

Demographic profile of the study subjects, and it reveals that the mean age of the patients was 37.98 $\pm$ 9.18 years with the age range of 21-60 yrs. Our study also shows that the most of the subjects are male (n=42, 80.7%), educated up to have studied up-to 8th standard (n=35, 67.3%), taking fermented rice (bassi) in diet (n=51, 98%) and take fermented rice (Bassi) twice a day (n=27, 51.9%). [Table 1]

Table 2: Precipitating factors for Hypokalemic Periodic Paralysis

Precipitating factors	No. of cases (n=52)	Percentage (n%)
Diarrhea	2	3.8%
Exertion	2	3.8%
Heavy Meal	9	17%
None	39	51%

Precipitating factors for Hypokalemic periodic Paralysis and it reveals that the majority (n=39, 51%) of the patients had no precipitating event, 9 patients (17%) had a heavy meal before this episode, followed by 4 patients out of which 2 patients(3.8%) had diarrhoea and exertion.[Table 2]

Table 3: Clinical profile of the study subjects

Clinical Profile of the subjects	No. of cases (n=52)	Percentage (n %)
Tone in all limbs		
Decrease in all 4 limbs	50	96.2%
Normal in both upper limbs and decrease in both lower limbs	2	3.8%
DTR		
Diminished	19	36.5%
Absent	33	63.46%
Planter Response		
Bilateral Flexor	23	46.15%
Bilateral Mute	27	53.84%

Clinical profile of the study subjects and it reveals that the most of the subjects (n=50, 96.2%) had decreased tone in all 4 limbs, DTR is absent (n=33, 63.46%), and had bilateral mute planter response (n=27, 53.84%) followed by bilateral flexor planter response (n=23, 46.15%). [Table 3]

Table 4: Biochemical profile of the study subjects

Biochemical profile of the subject	No. of cases (n=52)	Percentage (n%)
Hemoglobin level		
Less than 12 gm%	34	65.4%
More than 12 gm%	18	34.6%
TLC		
4,000-11,000	40	76.0%
>11,000	10	19.6%
<4,000	02	3.9%
Platelet count		
1.5-4.5 lakh	39	75.0%
<1.5 lakh	07	13.5%
>4.5 lakh	06	11.5%
Serum Urea Level		
15-45mg%	44	83.0%
>45mg%	4	7.5%
<15mg%	4	7.5%
Serum Potassium Level		
3.5-5.5 mg%	10	19.3%
<3.5 mg%	42	80.7%
>1.5mg%	6	11.3%
Serum sodium Level		
135-145meq/L	34	65.38%
>145 meq/L	02	3.8%
<135 meq/L	16	30.7%
ECG changes		
Sinus Bradycardia	13	25.0%
ST flattening	05	9.6%
QT prolongation	06	11.5%
U-wave	11	21.1%
Normal	17	32.0%

Biochemical profile of the study subjects and it reveals that the most of the subjects had haemoglobin level <12gm% (n=34, 65.4%), Normal TLC (n=40, 76.9%), normal serum urea level (n=44, 83%), normal creatinine level (n= 46, 88.7%), low serum potassium level<3.5meq/l

(n=42, 80.7%), and normal serum sodium level (n=34, 65.38%), This table also reveals that the among majority of the subject had sinus bradycardia in ECG (n=13, 25%) followed by U-wave (n=11, 21.1%).[Table 4]

Discussion

The patients in our study ranged in age from 21 to 60 years old, with a mean age of 37.98 years for those with hypokalemic periodic paralysis. The majority of the subjects in our study are male and have only completed primary school, as well. Similar results were found in studies by Mohapatra et al. [6], Garg et al. [7], and Kayal et al. [8], which came to the conclusion that it was more common for male, earning members of society to experience hypokalemic periodic paralysis. Our study shows that majority of the patients had no precipitating event while some patient had heavy meal, Diarrhea and exertion before this episode. Studies conducted by Mohapatra et al [6] and Garg et al [7] also could not identify any precipitating factors in the majority of the subjects. Furthermore, they concluded that the high carbohydrate intake was the most common precipitating factor associated with such paralytic attacks. Chhattisgarh is the region where most of the people were working in the field, residing in rural areas and taking fermented rice (bassi) twice a day in their regular diet which may be the leading factors for precipitating periodic paralysis. Our study revealed that majority of the subjects had decreased tone in all 4 limbs and DTR is absent. Study conducted by Mohapatra et al [6] showed that the Deep tendon reflexes were preserved in the patient with HPP, while study conducted Garg et al[7] and Kayal et al[8] found similar result and concluded that in majority of the patient the deep tendon reflexes were absent or hypoactive.

Our study shows that the most of the subjects were anemic with a haemoglobin level of <12gm%, and had low serum potassium level <3.5meq/l. Most of the subjects had normal serum urea level, normal creatinine level, and had normal serum sodium level. Our study also reveals that the among the majority of the subject had sinus bradycardia in ECG, followed by U- wave. Studies conducted by Mohapatra et al[6], Garg et al[7] and Kayal et al[8] concluded that the serum potassium concentrations were lower in patients with secondary hypokalemic paralysis than in those with primary hypokalemic paralysis though the difference was statistically not significant.

Conclusion

Hypokalemic paralysis is an important cause of acute flaccid paralysis in the Emergency Room of any hospital. Hypokalemia can cause significant respiratory and cardiac problems resulting in death of patients as seen in our study. Immediate treatment is beneficial as well as gratifying due to rapid recovery. Extensive evaluation to diagnose secondary causes is essential for successful prevention of relapses.

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