Original Article

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Hypokalaemic periodic paralysis in patients presenting with severe limb paralysis at PUMHSW Nawabshah

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ABSTRACT

Objective: To determine the hypokalemic periodic paralysis rate in patients presenting with severe limb paralysis at Peoples University of Medical and Health Sciences for Women Nawabshah.

Methodology: This descriptive was conducted Medical department of Peoples Medical College & hospital Nawabshah. The study duration was six months from October 2017 to April 2018. All the patients having age 20-50 years of either gender with severe limb paralysis at the Intensive care unit & medical ward of Peoples Medical College Hospital Nawabshah were included. Demographics information was obtained. After clinical examination along with detailed medical history regarding hypokalemic periodic paralysis (HPP) and severe limb paralysis, patients were subjected to relevant investigations especially potassium and x-rays. Data was collected via self-made proforma.

Results: A total of 150 patients, were studied; their mean age was 33.4±5.69 years. Out of all study subjects 22(14.7%) study subjects were female and 128(85.3%) were male patients. Hypokalemic periodic paralysis was seen in 77(51.3%) patients, presenting with severe limb paralysis. There was a significant impact of age and gender on the frequency of Hypokalemic periodic paralysis.

Conclusion: It was concluded that hypokalemic periodic paralysis (HPP) is a significant factor of acute flaccid paralysis, as well as prompt management and early recognition of this condition would give a pleasing result and in some cases, it would prevent additional attacks.

Key Words: Hypokalemic periodic paralysis, severe limb paralysis.

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Introduction

Periodic paralysis (PP) is an autosomal dominant myopathy characterized by flaccid paralysis occurring at different intervals. Periodic paralysis includes both the primary PP and secondary PP which includes hypokalemic periodic paralysis (HPP) 0.13 per 100,000 and hyperkalemic periodic paralysis 0.17 per 100,000.[1, 2] The actual prevalence of the disease is not known but some studies have found range from 1 to 10/100,000e.[1] The prevalence of hypokalemic PP is 1 in 100,000 populations while hyperkalemia is 2%[3-5] In primary periodic paralysis patients are normal in between attacks and present during ictal phase, which is amenable to treatment. Therefore, different clinical features together with laboratory findings and EMG determine a good correlation depicting patterns that increase diagnostic accuracy and management accordingly.[6-8] The periodic paralysis due to hypokalemic is because of defect in voltage dependent calcium channels while hyperkalemic is usually the result of overactive thyroid i-e; hyperthyroidism.[8-10] The diagnosis of both of these is by specialized kind of electromyography (EMG) and thyroid function test and potassium concentration respectively. Genetic testing however in 20-37% doesn't have any mutation at all. Management involves potassium replacement, carbonic anhydrase inhibitors. Matthew et al has shown 50% of patients with congenital type periodic

paralysis responding to acetazolamide [10]. The Cochrane Neuromuscular Disease Group Trials Register tested dichlorphenamide (DCP) vs placebo and found it very effective in both hypokalemic and hyperkalemic PP[11].In a study 15/34 (44%) patients with severe limb paralysis had hypokalemic periodic paralysis (HPP).[12] Familiar HPP is a channelopathy of autosomal dominant transmission distinguished by repeated incidents of reversible muscle weakening and hypokalemia. HPP has picked up above its fair number of mysteries amongst the human diseases triggered by mutations in channel. While unusual, the timely identification of common HPP is essential to facilitate proper care and prevent related complications. However, it is a public health issue worldwide. This is an important cause of mortality and morbidity in developing and developed nations alike. Thus this study intended to determine frequency of hypokalemic periodic paralysis in patients presenting with severe limb paralysis in our society to identify the magnitude of the problem and also improve its outcome after its diagnosis and management to reduce the health burden of the community.

Methodology

This descriptive study took place at the Medical department of Peoples Medical College & hospital Nawabshah from October 2017 to April 2018. The sample size calculation was done using the raosoft software for Sample size calculation" by using the proportion of hypokalemic periodic paralysis 44%[12] with 95% confidential interval and 8% of margin of error, the sample size was (n=150). All the patients having age 20-50 years with severe limb paralysis either of gender were included. All the patients with permanent paralysis (≥ 5 months), any underlying malignancy like brain tumors, stroke, motor neuron disease, intravenous drug users, chronic Polyneuropathy and patients with a fracture of long bones of any limb confirmed through x-rays were excluded. Written informed consent was received from the patients or their relatives by the researcher before collecting data. After clinical examination and detailed history regarding HPP and severe limb paralysis, patients were subject to relevant investigations including potassium and x-rays electrophysiological were done. Hypokalemia was defined as potassium level <2.5 mmol/L. All the information was recorded on self-made proforma. Performa were filled accordingly by the researcher. The data analyses were done by using SPSS-20 software. For quantitative variables, mean and standard deviation were calculated. Frequency and percentages were calculated for qualitative variables. Effect modifiers were controlled by stratification and chi-square test was applied. A p-value <0.05 was taken as significant.

Results

The mean age of the patients was 33.4±5.69 years and mean duration of paralysis of the patients was 3.3±1.54 months. 22(14.7%) study subjects were female and 128(85.3%) were male patients. A family history of paralysis was in 34(22.7%) patients. 81(54%) patients were from the urban area and 69(46%) were from rural areas. 90(60%) were illiterate, 60(40%) were literate while 19(19.8%) have fall from height and remains had other reason of trauma. 32(21.3%) patients were from lower class, 65(43.3%) were from middle class, and rest of them 53(35.3%) were from upper class. Table no I

Table I: Demographic characteristics of patients (n=150)

Gender	N (%)
Female	22 (14.7)
Male	128(85.3
Family h/o paralysis	
Yes	34(22.7)
No	116(77.3)
Residence	
Urban	81(54)
Rural	69(46)
Educational status	
Illiterate	90(60)
Literate	60(40)
Socio Economic status	
Low	32(21.3)
Middle	65(43.3)
High	53(35.3)

Hypokalemic periodic paralysis was found in 77(51.3%) patients presenting with severe limb paralysis. Fig.No.1

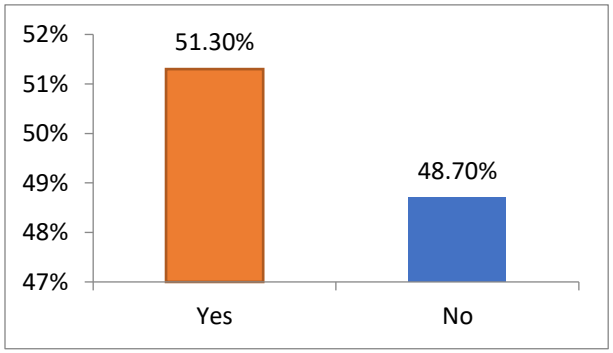

Figure I. Distribution of Hypokalemic periodic Paralysis

According to the stratification for hypokalemic periodic paralysis with respect to age and gender, there was an insignificant association (p-value>0.05). Table No II

Table III: Stratification for Hypokalemic periodic paralysis with respect to age and gender.

		Hypokalemic periodic paralysis		P-value
		Yes	No	
Age	≤35 years	49(60.5%)	32(39.5%)	0.015
	>35 years	28(40.6%)	41(59.4%)	
Gender	Female	08(36.4%)	14(63.6%)	0.001
	Male	69(53.9%)	59(46.1%)	

Discussion

Hypokalemic periodic paralysis (HPP), where serum potassium declines during paralytic episode, is the commonest form of inherited periodic paralyses. In this study Hypokalemic periodic paralysis was 77(51.3%). N. Gururaj et al[13] reported that most of the patients in this study presented as the first episode of hypokalemic periodic paralysis {27 (79.4%). Zumar Sardar K et al[14] also found comparable findings.

In the present study, 56 hypokalemic paralysis cases were detected during 24 months. While others reported 3 to 30 years.[15,16,18] Our study seems to have a substantially higher percentage of cases over such a short period than the previous Indian studies, which implies that we are likely to find a higher percentage of hypokalemic paralysis cases in this area than the other regions of the world. The frequency of hypokalemic attacks had a seasonal variability; the largest number of cases (32.14%) was symptomatic all through the summer. However, a previous Indian study showed a high incidence of hypokalemic paralysis in summer. [19] The present research, which has been recorded earlier in the Indian literature, found male preponderance. [17,18]

42.9% of hypokalemic paralysis patients had a secondary source of their disease in the current study. In 57.1 % of patients, primary hypokalemic periodic paralysis was seen, from which 48.2% were sporadic, whereas 8.9 were familial. Distal RTA had been among the leading causes of secondary hypokalemic paralysis in the current study, which was observed in 7.14 % of cases. A previous report from Kashmir recorded 21 cases of hypokalemic paralysis secondary to distal RTA during eight years of research.[20] A study from South India reported that out of 31 (42%) cases of HPP, RTA was the cause in 13 cases.[17] In the study by Maurya et al.,[18] HPP was caused by RTA in 4 cases out of 30 cases.

In present study, Periodic thyrotoxic paralysis occurred in 5.35 % of HPP cases. Asians are influenced by this disease more often, as a study found that Polynesians was 159 times greater risk in Asians than in white Europeans. [21] The Lin et al.[22] showed TPP among 40.2% of cases as the etiology of hypokalemic paralysis. An earlier study from India showed variable prevalence of TPP, varying between 6.4%[17] and 16.7%.[18]

In the current study, primary hyper-aldosteronism was found in 1 patient (1.78%) as the secondary factor of HPP. The patient had single episodic, asymmetric sporadic finger drop and was eventually diagnosed with primary hyper-aldosteronism, due to bilateral hyperplasia of the adrenal. In a study of 50 Taiwanese primary hyper-aldosteronis patients, 42 % cases developed periodic paralysis, while all fifty subjects had hypokalemia. [23] In the current study, we had a hypokalemic paralysis patient after dengue fever, with no history of a similar episode of weakness. After supplementation of potassium, the pure motor quadriparesis recovered in this subject dramatically. The subject was also tested to exclude other causes of hypokalemia but there was no other secondary cause. Hypokalemia has been confirmed and recorded in around 28 % of serologically proven cases of dengue infection concerning infectious diseases, especially dengue fever. [24] Indian findings recently confirmed cases of dengue disease with reversible, pure motor, acute quadriparesis because of hypokalemia, which were confirmed serologically. [25,26] Hypokalemia in dengue fever may be attributable to the re-distribution of potassium into the cells, transient renal tubular anomalies resulting in raised urinary potassium wastage and elevated concentrations of catecholamine due to infection, and secondary insulin resistance resulting in potassium intracellular change.[25] Two cases from our study were identified as hypokalemic paralysis secondary to hypothyroidism and three subjects had hypokalemic paralysis after heavy alcohol consumption, one of had a previous history of repeated episodes of weakness on alcohol consumption. Uncommon case reports are suggesting hypokalemic paralysis is associated with hypothyroidism. [27] Most of the cases in our study had a disease onset following 4th decade of their age, making the primary trigger of HPP questionable, and also the non-recurrence of paralysis episodes following thyroid replacement during brief follow-up supports this correlation. Atypical presentation was also documented in earlier studies from India in the context of early neck muscle weakness, bladder involvement, and finger drop that we noticed in our research. [28] Such atypical symptoms are possibly the consequence of hypokalemia arising from the loss of

nerve impulses transmission at the synaptic junctions. [29] Recovery by potassium replacement therapy has been seen in every case in the current study. The secondary group required a longer recovery time than the primary HPP cases, and the variance in recovery time was found to be significant (P = 0.002). This characteristic has been reported in the literature.[18] For patients with secondary hypokalemic paralysis this delay for recovery can be due to a substantially negative balance of total body potassium. The recovery time in alcoholics was greater in secondary group (mean-5 days vs. 3.25 days). This delay in rehabilitation may be attributed to co-existance of hypokalemia and hypo-magnesemia in alcoholic subjects as stated in previous case reports.[30] No mortality was seen during this study's entire duration, indicating a prompt intervention in this easily treatable yet life threatening disease may be life-saving.

Conclusion

In the conclusion, the frequency of hypokalemic periodic paralysis in patients presenting with severe limb paralysis was 51.3%, which was markedly higher. Diagnosis of the root causes of hypokalaemic paralysis remains necessary because these require different therapies. Periodic hypokalemic paralysis is becoming ever more widespread in Asian nations. Early diagnosis and timely treatment can prevent complications linked with hypokalemia and muscle weakness which threaten life. Clear identification and timely management of this situation can produce satisfying outcomes, and in some cases avoid further attacks.

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