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A Case of Dengue Fever Presenting Hypokalaemic Paralysis - A Rare Manifestation of a Common Disease

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Abstract: ***Potassium is the major intracellular cation. It plays a role in membrane stability and function. Its deficiency can impair neuromuscular communication, potentially causing paralysis with diminished or absent reflexes in muscles. Dengue fever is a mosquito-borne viral infection, highly prevalent in India and among crowded and low socio-economic classes. It is characterized by sudden onset of high-grade fever, severe joint and muscle pain, rash, and in some cases bleeding. Complications include circulatory failure, encephalopathy, cardiomyopathy, renal failure, pleural effusion, and ARDS. Discussed is a rare presentation of dengue fever in the form of hypokalaemic paralysis.***

Keywords: Dengue fever, Hypokalaemia, Areflexic paralysis

1. Introduction

Potassium is the major intracellular cation. It plays a role in membrane stability and function. Its deficiency can impair neuromuscular communication, potentially causing paralysis with diminished or absent reflexes in muscles. Dengue fever is a mosquito-borne viral infection, highly prevalent in India and among crowded and low socio-economic classes. It is characterized by sudden onset of high-grade fever, severe joint and muscle pain, rash, and in some cases bleeding. Complications include circulatory failure, encephalopathy, cardiomyopathy, renal failure, pleural effusion, and ARDS. Discussed is a rare presentation of dengue fever in the form of hypokalaemic paralysis.

2. Case Report

A 45-year-old male working as a mechanic with no comorbidities or addictions was admitted to the hospital with a complain of weakness in both legs which was sudden in onset since 8-10 hours before presentation.

The patient had a history of one spike of fever with chills in the morning, along with body ache for which he had taken paracetamol, following which the fever subsided followed by sweating. The patient did not have any history of vomiting, loose stools, or bleeding from any site, or any other complains, the patient did not have any history of any other medications.

On examination, the patient was conscious, cooperative, and oriented to time, place, and person. Among vital signs, included; normal temperature by palpatory method, pulse rate of 94 beats per minute, and a blood pressure of 116/80mmHg. The patient did not have any other remarkable features on inspection.

Neurological examination revealed 0/5 power in bilateral lower limbs from toes up to hip joint. Deep tendon reflexes were absent at ankle and knee joint. Plantars were flexor. Rest of neurological examination including higher mental function, sensory including touch, pain, temperature, vibration, joint postion, cranial nerves and autonomic nervous system were unremarkable. Nutrition seemed normal.

Upon investigating the patient further, ECG was suggestive of changes of hypokalaemia in the form of ST depression and prominent U waves.

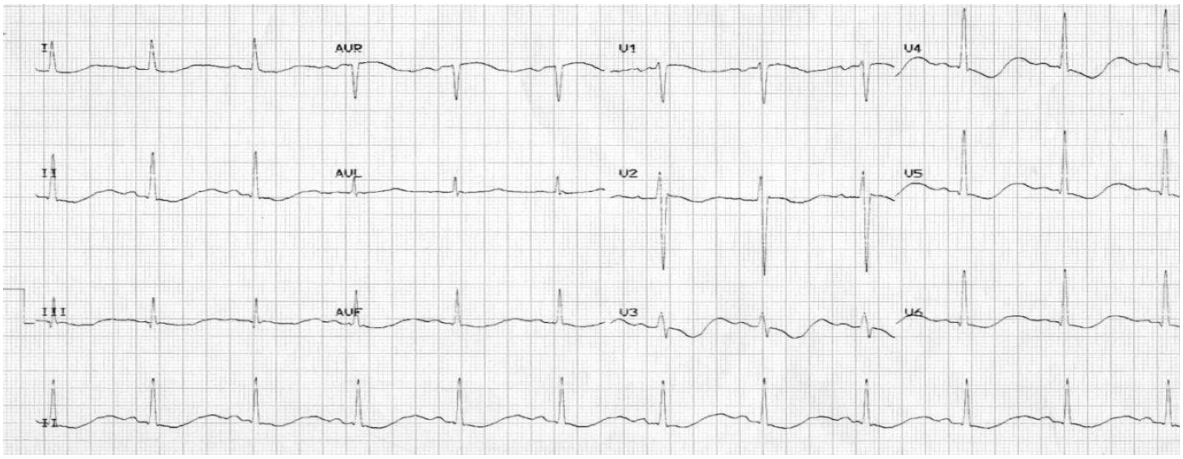

Image 1

The serum electrolytes panel showed decreased potassium levels at 1.9mEq/Lit with rest electrolytes normal.(Sodium-144mEq/Lit,Calcium8.4mg/dl, Chloride 107mEq/Lit, Mg 2.46 mg/dl).

Arterial blood gas analysis was within normal limits and showed no respiratory or metabolic decompensation (Ph 7.4, PCO2 35, HCO3 21.7, SO2 99, PO2 -100).

Among other metabolic parameters, the patient had an elevated level of Alanine aminotransferase at 132 IU/L with otherwise normal liver profile.(S.Creat – 0.87mg/dl, Urea-29mg/dl, Bilirubin 0.6mg/dl, Alkaline Phosphatase 102IU/L, TSH 0.8uIU/ml., S.Protein 6.5g/dl, Albumin 3.5g/dl, INR 1.10, Creatine Kinase (Total) – 167IU/L)

A complete blood count revealed normal Haemoglobin (12.8mg/dl), total counts (3400), and differential count (76/20/2/2) but platelets count on the lower side (1.2 lakhs). Urinary potassium was 8mmol/gCreat.

A fever profile for malaria, enteric fever, and dengue done as per local prevalence came positive for dengue NS1 Antigen by immunochromatographic method. Abdominal ultrasound was suggestive of gall bladder edema with normal liver and kidneys. Based on the patient's history, clinical examinations, and laboratory investigations, a diagnosis of hypokalaemic paralysis was made.

Table I: Investigations

	On admission	12 Hrs	Day 2 (24 Hrs)	Day 3	Day 4	Day 5
Sr K+ (mEq / L)	1.9	2.6	3.4	3.6	40	3.9
Sr Na+ (mEq / L)	144	-	136		140	
Sr Cl- (mEq / L)	107	-	105		103	
SGPT (IU/L)	132	-	138	152	134	90
Hb (mg /dL)	12.8	-	12.4	11.5	12.3	13.0
WBC (per cu.mm)	3500	-	4200	2800	6200	6800
APC (in lakhs)	1.24	-	0.98	0.78	0.98	1.15

The patient was treated with injectable KCl (Potassium Chloride) at the rate of 10mEq/ hour in normal saline infusion as well as oral potassium supplementation of potassium chloride which resulted in clinical improvement of lower limb weakness. Serum potassium was repeated 12 hours which showed a gradual improvement reflecting clinical improvement following which it stayed normal during the patient's hospital stay.

The patient's platelets and SGPT worsened for 2 days before starting to improve. The patient had occasional fever spikes which were managed by sponging and paracetamol tablet, and adequate hydration was maintained. The patient had no complains or lab abnormalities on follow-up.

3. Discussion

Dengue is the most rapidly spreading mosquito-borne viral disease in the world. It is spread by the Aedes aegypti mosquito. It is caused by the dengue virus which is an RNA virus belonging to the Flaviviridae family, it has 4 serotypes (DEN1, DEN 2, DEN 3, DEN4). Antibodies to one serotype increase the severity of subsequent dengue virus infection by different serotypes.

Potassium is essential for neuromuscular junction functioning, severe hypokalaemia presents as are flexic paralysis. It is essential to differentiate hypokalaemia paralysis from other causes of neuromuscular weakness such as Myositis, and Guillian Barre syndrome as treatment modalities differ, and delay in diagnosis might lead to disastrous consequences such as respiratory muscle paralysis and death. ECG and Serum electrolytes measurement can be useful to identify hypokalaemic paralysis from the other two. Also, supplementations of potassium leads to rapid improvement of symptoms in the former.. Creatine Kinase can be a useful guide for Myositis. Both GBS and Hypokalemic Paralysis present with areflexic quadriparesis, although some asymmetry in reflexes may be observed along with preserved sensations and plantars, which were present in our patient.

Possible mechanisms regarding low potassium of dengue fever include redistribution of potassium in cells or transient renal tubular abnormality leading to increased urinary potassium excretion, unlikely in our patient because of non renal potassium loss observed on urine testing. Augmented potassium loss can also be in the form of perspiration as noted in our case, and GI losses in the form of diarrhoea or vomiting.

4. Conclusion

Although the exact incidence of hypokalaemic paralysis in dengue infection is not known, in rare cases, it can be a presenting manifestation and should lead to prompt clinical suspicion in such cases and early initiation of specific therapy is likely to improve patient's outcome.