Case Report

Recurrent Hypokalaemia Due to Gittleman Syndrome: A Case Report

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Abstract

Gittleman syndrome (GS) is autosomal recessive renal tubulopathy caused by mutation of genes encoding protein for sodium chloride cotransporter and magnesium channel in the distal convoluted tubule.[1] We present the case of a-20-years old female patient admitted in our Internal Medicine Department for recurrent hypokalaemia. She presented with recurrent quadriparesis. There was no history of taking inhaled salbutamol, insulin, steroid, diuretics and vomiting or diarrhoea. Investigations revealed hypokalaemia. Hypomagnesaemia, normal urinary excretion of sodium and potassium and hypercalcaemia. Her Serum albumin was within normal limit and renal function was normal. Diagnosis of Gittleman syndrome was established and was given potassium chloride and magnesium sulphate. Subsequently, the patient improved clinically and biochemically.

Keywords: *Gittleman syndrome, autosomal recessive, recurrent hypokalaemia, hypomagnesimia.*

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INTRODUCTION

Hypokalaemia is a common electrolyte imbalance encountered in hospitalized patients. Chronic hypokalaemia commonly results from gastrointestinal or urinary loss. Gitleman syndrome is an autosomal recessive disorder causing channelopathy that leads to hypokalaemia and metabolic alkalosis.[2] In comparison to barter syndrome, it is milder form of renal tubular channelopathy. It is sometimes complicated by hypomagnesemia. Hypocalciuria is also common.Although mortality is very rare from this but decrease quality of life significantly. Genetic mutation in Sodium Chloride co-transporter results in improper function in thiazide sensitive channel in distal renal convoluted tubule which secondarily leads to potassium, magnesium and calcium concentration.

CASE REPORT

A-20-years old woman presented to the hospital with recurrent episodes of weakness of both upper and lower limbs for 2 years. It involved both proximal and distal parts of limbs all at once and onset was sudden. It made her unable to walk during that period. For which, she was admitted in hospital for few occasions and diagnosed as a case of hypokalaemic periodic paralysis for which she was treated with oral potassium supplement with improvement of symptom. Her bowel and bladder habits were normal. She didn't have any history of breathing difficulty, nasal regurgitation, difficulty on swallowing, fever, dirrhoea, vomiting. She didn't take any drug except oral potassium chloride. There is no family history of such illness. On examination, her pulse was 78 beats per minute and regular, BP-120/80 mmHg. There was no neurological deficit at the time of presentation. Investigation revealed hypokalaemia (Potassium- 2.2 mmol/L), hyponatraemia (Sodium- 134 mmol/L), decreased bicarbonate level (21 mEq/L) with normal chloride level (Chloride-102 mmol/L). Her serum magnesium was low (1.5 mg/dl) with normal renal function (Serum creatinine- 0.48mg/dl) associated with alkalosis (pH-7.473). Her urinary calcium excretion was low (11.4 mg/24Hrs) with normal sodium (110mmol/24 Hrs) and

potassium (40 mmol/24 HRs) urinary excretion. Her thyroid function tests were within normal limit. Laboratory investigation have been shown in the table-1. Renal ultrasound shows both kidneys are swollen and measuring about left kidney (128mm*71mm) and right kidney (127mm * 56mm). Cortical echogenicity is raised. Normotensive patient with hypokalaemia, hypomagnesemia, alkalosis, hypocalciuria was suspected to have diagnosis of Gittleman syndrome which was also correlated with clinical findings.The patient was treated with oral supplement of potassium chloride 500mg twice daily and magnesium sulphate 4% infusion once daily and was given high sodium and potassium containing diet. She had significant improvement of her symptoms after treatment.

Table-I: Laboratory investigation profile of the patient

Investigation	Result	Reference range
Complete blood count		
	Hb:9.6 g/dl	Adult female:11.5-15g/dl
	RBC: 5.5 * 10^{12}/L	Femlae:4.5-5.5*10^{12} /l
Seum electrolytes		
	Na^+--134 mmol/L	Na^+--135-145 mmol/L
	K^+--2.2mmol/L	K^+--3.5-5.5 mmol/L
	TCO_2—25.7mmol/L	TCO_2—20-31 mmol/L
Serum creatinine	0.48mg/dl	0.5-1.3 mg/dl
Free T_4	1.42 ng/dL	0.80-1.80 ng/dL
TSH	4.17 micro IU/ml	0.35-5.50 micro IU/ml
Serum Iron	3.7 micro mol/L	9-30.4 micro mol/L
TIBC	103 micro mol/L	44.8-80.6 micro mol/L
Transferrin Saturation	3.59%	15-50 %$
Serum Ferritin	12 ng/ml	8-252 ng/ml
Serum Albumin	53 gm/L	32-48 gm/L
Serum Calcium	11.4 mg/dl	8.3-10.6 mg/dl
Serum Magnesium	1.5 mg/dl	1.6-2.6 mg/dl
Arterial blood gas analysis		
	pH-7.473	7.35-7.45
	pCO_2-28.8 mmHg	35-45 mmHg
	HCO_3^---21 mEq/L	22-28 mEq/L
24 hrs Urinary Sodium	110 mmol/24hrs	40-220 mmol/24hrs
24 hrs Urinary Potassium	40 mmol/24hrs	25-125 mmol/24hrs
24 hrs Urinary Calcium	11.4 mg/24hrs	100-300 mg/24hrs
CRP	2.1 mg/L	<5 mg/L

DISCUSSION

Gitelman syndrome is usually caused by mutations in the SLC12A33 gene. Less often, the condition results from mutations in the CLCNKBB gene. The proteins produced from these genes are involved in the kidneys' reabsorption of salt (sodium chloride or NaCl) from urine back into the bloodstream. Mutations in either gene impair the kidneys' ability to reabsorb salt, leading to the loss of excess salt in the urine (salt wasting).[3]

Gitleman syndrome (GS) also known as familial hypokalaemia-hypomagnesemia,is combined picture of hypokalaemia, hypomagnesemia, metabolic alkalosis and low urinary calcium excretion. Prevalence of this disease is 1:40000 and heterozygotes prevalence is around 1% in Caucasian population, making it one of the most common inherited renal tubular disorders. It is uncommon before the age of six years and most of the cases diagnosed during adolescence or adulthood. Most uncommon manifestation are muscle weakness, tetany, abdominal pain, vomiting, fever. Facial paraesthesia is not uncommon. Many patients may remain asymptomatic till adulthood. Blood pressure often remain lower in comparison to age matched control. Growth retardation is uncommon unless severe hypokalaemia and hypomagnesaemia is persistent.[5]

Our patient 20 years old female presented with recurrent weakness of all four limbs for 2 years with hypokalaemia, hypomagnesemia, metabolic alkalosis with low urinary calcium excretion. There was no growth retardation. There was no family history of such disease.

Management of GS is focused on the basis of patient's conditions and symptoms. Monitoring of potential complications and progression of disease is necessary. Symptoms may progress inspite of keeping potassium level in check. Patient along with his or her parents should be counselled thoroughly about the nature of disease, symptoms and available treatment options as well as their side effect as potassium and magnesium supplement can often result in gastrointestinal upsets and thus may deteriorate quality of life. Effective counseling can motivate the patient and parent's and thus improve adherence to treatment, maintain normal social life and smooth transition into adulthood.[4]

Although Prognosis is excellent but severe fatigue and recurrent weakness can hamper patient's quality of life. Progression to renal impairment is uncommon. [5]

CONCLUSIONS

Although Gittleman syndrome is generally a mild form of renal tubular channelopathy but sometimes can cause debilitative impairment of normal functioning of daily activities. So, early detection and correction of electrolyte and metabolic derangement can improve patients quality of life.

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