Hypocalcemia in an 11 Year Old Child: A *Difficult Case to Treat*

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Abstract Hypocalcemia is a laboratory and clinical abnormality that is observed especially in neonates and paediatric patients. Laboratory hypocalcaemia is often asymptomatic but it can manifest as central nervous system irritability, paraesthesia, tetany (i.e. contraction of hands, arms, feet, larynx, bronchioles), seizures, and even psychiatric changes in children. Cardiac function may also be impaired because of poor muscle contractility. We report a unique case of an eleven year old male child who presented with chronic kidney disease associated with severe hypocalcemia, tonic-clonic seizures, hypovitaminosis D but normal electroencephalogram and electrocardiography. The child required prolonged intravenous calcium gluconate therapy to correct his ionised calcium levels.

Keywords Pediatric hypocalcemia · Seizures · Vitamin D · Intravenous calcium gluconate therapy

Dear Sir,

A case study ‘Hypocalcemia Presenting as Life Threatening Torsade’s de Pointes with Prolongation of QTc Interval’ published online in your esteemed journal in August 2017 drew our attention. As suggested by the authors, Torsade’s de pointes is a life threatening condition with ventricular tachycardia. However we would like to report a case that we came across in paediatric inpatient department of our centre, with severe hypocalcemia but normal ECG findings. An 11 year old male child presented with

difficulty in walking associated with deformity of knees. He had history of 5–6 episodes of abnormal body movements in the form of spasms of both hands, lasting for 2–3 min, subsiding spontaneously and 2 episodes of generalized tonic, clonic seizures associated with up-rolling of eye balls lasting for 2–3 min and spontaneously subsiding in the past 1 year. The perinatal and developmental history was normal. Physical examination showed knock knees, double malleoli and mild pallor. Central nervous system examination was unremarkable except for hypotonia. Abdominal examination was normal except urinary bladder found to be distended.

Biochemical investigations showed deranged kidney function tests, extremely low serum calcium and ionized calcium, normal serum phosphorus, raised alkaline phosphatase, deficient vitamin D and raised parathyroid hormone (Table 1). Peripheral blood film suggested hypochromic microcytic anaemia. Ultrasound of kidneys and urinary bladder showed bilateral gross hydronephrosis, with thinning of cortex and dilated ureters throughout their course. On day one of admission child developed tonic-clonic seizures, which were managed by loading with intravenous calcium gluconate and 6 hourly maintenance dose of intravenous calcium was continued. In view of severe vitamin D deficiency, hypocalcaemia and doubt of compliance, we gave intramuscular 300,000 IU of vitamin D2 and oral calcium at 500 mg/day. Electrocardiogram was done and regularly monitored, which was normal, corrected QT interval was 0.39 s. A paediatric surgeon reference was taken for hydroureteronephrosis. Posterior urethral valve was suspected and a cystoscopy was planned. However anaesthetic approval for surgery could not be acquired due to hypocalcaemia and the child was maintained on 10 ml of calcium gluconate every 6 h. Ionised calcium levels were monitored every third day. But the

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Table 1 Biochemical, haematological and radiological investigations of the child

	Day 1	Day 10	Day 16	1 month follow up	6 weeks follow up	14 weeks follow up
Urea (10.8–38.4 mg/dL)	109	115	–	105	–	104
Creatinine (0.26–0.77 mg/dL)	3.87	2.32	–	2.82	–	2.9
Serum calcium (4.0–7.0 mg/dL)	3.35	5.93	7.99	8.75	–	9.1
Ionized calcium (1.1–1.35 mmol/L)	0.2	0.5	0.6	0.8	0.5	0.9
Serum phosphorous (8.8–10.8 mg/dL)	5.1	–	3.77	3.71	–	4
Serum sodium (136–146 mmol/L)	138	138	–	132	–	134
Serum potassium (3.5–5.1 mmol/L)	3.61	4.65	–	4.71	–	4.8
Alkaline phosphate (42–362 IU/L)	1401	2264	1514	2741	–	704
Vitamin D (> 30 ng/ml)	10.1	–	–	–	15.5	28.9
Parathyroid hormone (11.7–61 pg/ml)	558	–	–	–	–	–
Hemoglobin (11.5–15.5 g/dl)	8.2	–	–	–	–	9.8
Ultrasound kidneys, urinary bladder	Gross hydronephrosis with trabeculated urinary bladder wall suggestive of reflux and back pressure changes					
Renal DMSA# scan	Cortical scarring seen in mid pole region in the left kidney					
Renal DTPA* scan	Bilateral hydro-ureteronephrosis, moderate-severely impaired cortical function and delayed clearance					

hypocalcemia was persistent (ionised calcium 0.5 mg/dl). Tablet calcitriol 0.25 mcg/day was also started and dose of oral calcium was increased to 1000 mg/day. Finally after 3 weeks of intravenous calcium therapy, ionized calcium improved to 0.8 mg/dl and cystoscopy was executed which revealed posterior urethral valve and fulguration of the same was done. 2 weeks after discharge the child again had tonic–clonic seizures for which he reported to the outpatient department and his ionized calcium was found to be 0.5 mg/dl. His vitamin D level was repeated which was again low (15.5 ng/ml) in spite of compliance with oral calcium and calcitriol and he was given 2nd dose of intramuscular vitamin D2 therapy (300,000 IU). 2 months after this treatment, he is seizure free and his vitamin D and serum calcium levels have normalised.

Hypocalcemia as a cause of tonic–clonic seizures has been reported earlier [1–3], however a thorough literature search revealed none with as low ionised calcium in paediatric population as observed in the present case. The current case is unique in itself considering the extremely low levels of ionised calcium associated with chronic kidney disease and hypovitaminosis D but normal

electroencephalogram and electrocardiography. The generalised seizures were a result of the extreme hypocalcemia encountered. We conclude that severe hypocalcemia due to chronic kidney disease in paediatric age group may be difficult to manage, requiring prolonged intravenous calcium gluconate infusion and paediatricians should be mindful of such cases.

Compliance with ethical standards

Conflict of interest The authors declared no conflict of interest.

Informed Consent Informed consent was obtained.

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