Laryngospasm and neonatal seizure due to hypocalcaemia and vitamin D deficiency: an emergency condition in NICU and challenge to the neonatologist

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A term male infant, 8 days old, was admitted to our neonatal intensive care unit with abnormal movements of the upper limbs. The infant was born in our hospital with birth weight of 3.2 kg and had an Apgar score of 8/9/9 at 1, 5 and 10 min, respectively. The infant was breastfed and also formula fed. The physical examination did not reveal any malformation or abnormal facies. The infant was investigated for neonatal seizure, the results of which showed serum sodium of 138 mg/dL, potassium of 3.8 mg/dL, sugar of 87 mg/dL, serum calcium of 4.6 mg/dL (1.15 mmol/dL) and serum magnesium of 1.6 mg/dL (0.65 mmol/L). The ECG showed a prolonged QTc interval (0.52 s). Head ultrasound showed no significant abnormality. The baby was given stat injectable calcium for symptomatic hypocalcaemia and was taken up on a maintenance dosage of calcium at 80 mg/kg/day. On morning rounds he had a seizure in the form of fistling of upper limbs with increase in tone of limbs. He had laryngeal spasms with stridor leading to cyanosis of limbs (video 1). The infant was again given a stat dose of calcium, which led to cessation of the laryngeal spasms and there was no recurrence of seizure. The infant was further evaluated for causes of hypocalcaemia, which showed serum phosphorus of 4.2 mg/dL (1.355 mmol/L), ionised calcium 0.62 mmol/L (normal 1.14–1.29 mmol/L) and serum alkaline phosphate was 436 U/L (normal 110–300 U/L). The endocrine evaluation showed an elevated serum parathyroid level of 108 ng/L (normal 10 to 65 ng/L) and a very low 25-hydroxyvitamin D level of 5.59 ng/mL (normal 20–80 ng/mL). EEG study showed a normal electrical wave pattern for gestation. The mother was also evaluated for vitamin D deficiency, which showed results of a vitamin D3 level of 12.09 ng/mL (normal 20–80 ng/cc), which was also low. There was no recurrence of seizure after therapeutic calcium supplementation. The baby was discharged on calcium and vitamin D supplementation and is now on regular follow-up. The mother was also treated with calcium and vitamin D supplementation.

Discussion

Hypocalcaemia is a common metabolic problem frequently experienced in newborns. A total serum Ca concentration less than 8 mg/dL (2 mmol/L) in term infants or premature infants with birth weight greater than 1500 g is considered as hypocalcaemia while in preterm infants with birth weight less than 1500 g the cut-off is taken as having ionic calcium less than 4.4 mg/dL (1.1 mmol/L) or total serum Ca concentration less than 7 mg/dL (1.75 mmol/L). The incidence of hypocalcaemia typically has two peaks in the neonatal period.

1. Early onset hypocalcaemia: within 72 h of life. The condition is commonly seen in low birth weight babies, infants of mothers with diabetes and in cases of perinatal asphyxia.2 3

2. Late onset hypocalcaemia: onset occurring after 72 h of life. Usually, cases are of full-term infants. Usual causes include:4 5

A. Neonatal hypoparathyroidism;
B. Vitamin D deficiency;
C. Maternal hyperparathyroidism;
D. Sick neonate;
E. Hypomagnesaemia;
F. High phosphate intake from milk (cow’s milk).

The clinical manifestations of hypocalcaemia are varied and include:6

- Jitteriness;
- Hyperactive reflexes in areas such as the knees and ankles;
- Jaw clonus;
- Muscle jerking or twitching;
- Generalised or focal seizure;
Stridor (because of laryngospasm);
Wheezing;
Vomiting;
Prolonged QTc interval on ECG.

Laryngeal spasms (such as our patient had) and cardiac arrhythmias are life-threatening conditions that need immediate intervention. Diagnosis can be established by evaluating the serum calcium level and taking note of an ECG that shows prolonged QTc interval. Other investigations for hypocalcaemia include serum phosphorus level, serum albumin, parathyroid hormone, 25-hydroxyvitamin D, 1,25-dihydroxyvitamin D and urinary calcium to creatinine ratio.

Learning points

- A hypocalcaemic seizure should be considered a medical emergency as laryngeal spasms are life threatening to the infant.
- An infant should be evaluated thoroughly for the cause of hypocalcaemia to avoid recurrence of seizures, which may lead to a deleterious effect on neurodevelopment.
- Late onset hypocalcaemic seizures have an excellent prognosis when timely managed.

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