

# Cautionary Tales in the Management of Transient Neonatal Hypoparathyroidism

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**Background** Hypocalcaemia is defined as a total serum calcium concentration of less than 2.1 mmol/L (8.5 mg/dL) in children, less than 2 mmol/L (8 mg/dL) in term neonates, and less than 1.75 mmol/L (7 mg/dL) in preterm neonates. (1)

Transient Hypoparathyroidism is a recognised cause of late presenting hypocalcaemia during the neonatal period, characterised by low serum calcium with an inappropriately low PTH response(2). Hypomagnesaemia, hyperphosphatemia and vitamin D deficiency can also contribute to this. It is a potentially life threatening condition, the incidence of which varies depending on gestational age, perinatal factors and co-morbidities(3). Whilst it can be an incidental finding (4) neonates can also present symptomatically with tetany, irritability, inspiratory stridor (caused by laryngospasm) and generalised seizures.(4) It can prove a diagnostic challenge to differentiate from its more permanent forms. Its management involves supplementation of calcium with or without additional alfacalcidol supplementation. (2)

**Objectives:** We present five cases that illustrate the challenges of monitoring and managing neonates with hypocalcaemia associated with inappropriately low parathyroid hormone. All cases presented had no dysmorphism or significant maternal history.

**Table 1: Comparison of Cases and Biochemistry at Presentation**

Case	Presenting Age	Symptoms	Magnesium (NR 0.78-1.02 mmol/L)	Phosphate (NR 1.36-2.91 mmol/L)	Adjusted Calcium (NR 2.2-2.79 mmol/L)	Vitamin D (5) (>30 = sufficient levels) nmol/l	PTH (NR 1.1-6.9 pmol/L)	Urine Calcium: Creatinine ratio (NR 0-1.25 mm/mm Cr) (6)
1	9 days old	Asymptomatic	0.61	1.77	1.75	31	4.2	1.13
2	7 days old	Symptomatic (Seizures)	0.6	2.79	1.61	38	2.5	3.66 (On diuretics)
3	7 days old	Symptomatic (Seizures)	0.63	3.08	1.60	51	2.4	1.32 (On diuretics)
4	3 days old	Asymptomatic	0.91	1.87	1.45	55	3.7	-
5	6 days old	Symptomatic (seizures)	-	4.16	1.38	-	1.7	-

**Case 1:** 9 day old term baby boy of Asian descent with congenital heart disease presenting with incidental finding of hypocalcaemia post-operatively. He was FISH negative for 22q11 deletion DiGeorge. He was treated with calcium and magnesium supplements, that continued to need subsequent increases in dosage. By 3 weeks of age whilst on treatment he showed a high normal calcium. All supplements were discontinued and calcium normalised, remaining stable off supplementation.

**Case 3:** A 7-day-old term baby who was ventilated from birth for persistent pulmonary hypertension presented with hypocalcaemic seizures and inappropriately low PTH response. He received calcium supplements and alfacalcidol for this. These were stopped after 3 months due to rising calcium. His calcium remained normal off supplements and renal ultrasound showed no evidence of nephrocalcinosis.

**Case 2:** 7 day old term baby boy of Asian descent with Transposition of the Great Arteries presenting with tetany and generalised seizures secondary to hypocalcaemia. He was FISH negative for 22q11 deletion DiGeorge Syndrome. He required IV calcium and magnesium followed by regular oral supplementation. He was later started on alfacalcidol. Following 2 weeks of treatment he showed a rising calcium trend. All supplements were discontinued. His calcium normalised and remained stable off treatment.

**Case 4:** A 33/40 gestation infant with oesophageal atresia and tracheaoesophageal fistula, radial abnormalities and congenital heart disease presented with asymptomatic neonatal hypocalcaemia and inappropriately low PTH response. This required treatment with calcium supplements and alfacalcidol. After 6 weeks of supplementation these were stopped due to rising calcium levels on routine monitoring. No further supplementation was required subsequently.

**Table 2. Biochemistry on Follow Up**

Case	Peak Adjusted Calcium on Treatment (NR 2.2-2.79 mmol/L)	Duration of Treatment	Adjusted Calcium off treatment (NR 2.2-2.79 mmol/L)	PTH off treatment (NR 1.1-6.9 pmol/L)	Mother's PTH	Mother's Vitamin D (5)	Mother's Adjusted Calcium F
1	2.8	3 weeks	2.65	2.9	Normal	-	Normal
2	2.97	2 weeks	2.53	1.3	Normal	Insufficient	Normal
3	2.95	3 months	2.50	2.6	-	-	-
4	2.85	6 weeks	2.65	3.7	-	-	-
5	3.91	2 years	2.53	1.4	Normal	Sufficient	Normal

**Case 5:** A 2-year-old male who presented with severe symptomatic hypercalcaemia to outpatient clinic. He had been a term birth but developed tonic/clonic seizures secondary to hypocalcaemia on day 6 of life. He had an inappropriately low PTH and was treated with calcium supplements and alfacalcidol. His biochemistry normalised on supplementation which had been continued on discharge.

From clinic he was admitted to hospital and treated with IV fluids and bisphosphonates. Renal ultrasound showed evolving nephrocalcinosis. He was discharged with a normal calcium and monitored 3 monthly for this as well as receiving regular renal follow up.

**Conclusions:** These five cases illustrate how patients with transient neonatal hypoparathyroidism require close monitoring of their calcium levels whilst on treatment. Though each was suspected of being due to transient neonatal hypoparathyroidism, diagnosis was confirmed on resolution of supplemental calcium need and return to normal calcium and PTH response off treatment. Most cases resolved within 2-3 months. Consequences of continued treatment following resolution without sufficient monitoring of serum calcium can be serious. Alfacalcidol should be used with caution to prevent the long term complications of unrecognised hypercalcaemia and nephrocalcinosis.

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