

Neonatal Seizures Secondary to Maternal Hypovitaminosis D: About Two Cases

Assem O^{1,2}, Lalaoui A^{1,2}, Bennaoui F^{1,2*}, Abi Alalaa K^{1,2}, El Idrissi Slitine N^{1,2} and Maoulainine FMR^{1,2}

¹Neonatal intensive care unit, Mother and Child Hospital, Mohammed VI University Hospital, Marrakech, Morocco

²Research Laboratory for Childhood, Health and Development, FMPM, Cadi Ayyad University, Marrakech, Morocco

*Corresponding author

Bennaoui F, Neonatal intensive care unit, Mother and Child Hospital, Mohammed VI University Hospital, Marrakech, Morocco, Research Laboratory for Childhood, Health and Development, FMPM, Cadi Ayyad University, Marrakech, Morocco.

Received: February 26, 2025; Accepted: March 05, 2025; Published: March 10, 2025

ABSTRACT

Introduction: Maternal vitamin D deficiency is an etiology of neonatal hypocalcemia. We report two cases of neonatal convulsions secondary to maternal hypovitaminosis D.

Case Report 1: Newborn admitted on day 2 of life for afebrile neonatal convulsions. The clinical examination was normal. Biology showed normal blood sugar, hypocalcemia at 54 mg/l, normal parathyroid hormone and a low 25-hydroxyvitamin D dosage of 13.5 ng/l. Maternal assessment showed hypocalcemia at 62 mg/l and vitamin D deficiency at 4 ng/l. The diagnosis of neonatal deficiency hypocalcemia due to maternal hypovitaminosis D was retained. The evolution was favorable under correction of calcium and vitamin.

Case Report 2: Full-term newborn, delivery was vaginal with an APGAR score of 8/10. He was hospitalized for a weak sucking reflex, the infectious history was negative and the infectious assessment returned without abnormalities. At H12 the newborn presented generalized apyretic convulsions of the boxing and pedaling type, capillary blood sugar was 0.87 g/l and calcemia was low at 62 mg/l. The patient received oral calcium gluconate 10% at a dose of 4 ml/kg/day combined with Alfacalcidol, which improved the clinical manifestations. The newborn's phosphocalcic profile showed a vitamin D deficiency of 9.1 ng/ml and that of his mother showed hypocalcemia at 69 mg/l, hypovitaminosis D at 13 ng/ml and PTH at 57.9 pg/ml.

Conclusion: maternal vitamin D supplementation and sun exposure are essential to prevent neonatal hypocalcemia which can lead to serious neurological sequelae.

Keywords: Vitamin D, Hypocalcemia, Neonatal Seizures, Supplementation

Introduction

Maternal health plays an important role in the well-being of newborns [1]. Several maternal pathologies can directly influence the health of the child, particularly in the neonatal period [1,2]. Neonatal hypocalcemia is a common and potentially serious metabolic disorder of variable etiology in pediatrics [2]. Maternal vitamin D deficiency has been described as a cause of neonatal hypocalcemia [2]. We report two cases of neonatal convulsions directly linked to maternal hypovitaminosis D.

Cases Report

Case Report 1: Newborn admitted on day 2 of life for afebrile neonatal convulsions. His mother was 32 years old, a housewife

with less than 30 minutes of sun exposure per day. The baby was born at 38 weeks of amenorrhea with a birth weight of 3590g by vaginal delivery without incident. The clinical examination was normal. Biology showed normal blood sugar, hypocalcemia at 54 mg/l, normal parathyroid hormone and a low 25-hydroxyvitamin D dosage at 13.5 ng/l. The maternal assessment showed hypocalcemia at 62 mg/l and a vitamin D deficiency at 4 ng/l. The diagnosis of neonatal deficiency hypocalcemia due to maternal hypovitaminosis D was retained. The infant received calcium gluconate 10% orally at a dose of 2 mL/kg/day, which improved the clinical manifestations.

Case Report 2: Full-term newborn, delivery was vaginal with an APGAR score of 8/10. He was hospitalized for a weak sucking reflex with hypotonia, the infectious history was negative and the infectious assessment and brain imaging returned without

Citation: Assem O, Lalaoui A, Bennaoui F, Abi Alalaa K, El Idrissi Slitine N, et al. Neonatal Seizures Secondary to Maternal Hypovitaminosis D: About Two Cases. Open Access J Clin Images. 2025. 2(1): 1-3. DOI: doi.org/10.61440/OAJCI.2025.v2.10

abnormalities. At H12 the newborn presented generalized apyretic convulsions of boxing and pedaling types, capillary blood glucose was 0.87 g/l and calcemia was low at 62 mg/l. The patient received oral calcium gluconate 10% at a dose of 4 ml/kg/day combined with Alfacalcidol, which improved the clinical manifestations. The newborn's phosphocalcic profile showed a vitamin D deficiency of 9.1 ng/ml and that of his mother showed hypocalcemia at 69 mg/l, hypovitaminosis D at 13 ng/ml and PTH at 57.9 pg/ml.

Discussion

Vitamin D is an essential nutrient for the proper absorption of calcium, a mineral vital for bone health and proper functioning of the nervous system and it also plays a crucial role in the development of the immune system, regulation of blood sugar levels [3]. Pregnant women with insufficient levels of vitamin D may put their babies at risk by exposing them to the risk of calcium deficiency at birth, which can lead to a variety of neonatal complications. Both mothers resided in sunny urban areas in Morocco and had a skin phototype of 1--2 on the Fitzpatrick scale, a low level of physical activity (took a few walks each week) and a body mass index less than 30 kg/m², and neither took vitamin D. Both mothers were successfully treated with calcifediol supplementation postpartum. Tremors, which are involuntary shaking movements, are the most common symptom of hypocalcemia in newborns [1,3]. Other disturbances may also occur, such as seizures, excessive lethargy, muscle weakness, wheezing (stridor), and QT interval abnormalities on the electrocardiogram [3,4]. It is important to distinguish between early-onset neonatal hypocalcemia, occurring within the first 3 days of life, and late-onset hypocalcemia, occurring after this time [4]. A study in Spain found that even with vitamin D supplementation of 200 IU per day, 63% of pregnant women had insufficient vitamin D levels and 26% were deficient [4]. Another study found that 64.4% of mothers and 41.3% of newborns had vitamin D levels below 20 ng/mL. This research also identified multiple pregnancy and non-European ethnicity as risk factors for vitamin D deficiency, while vitamin D supplementation during pregnancy, physical activity and sun exposure were associated with protection against this deficiency [4]. Historically, vitamin D deficiency has not been considered an early cause of neonatal hypocalcemia. Several Previous data suggest that higher doses of supplementation may have a positive impact on the infant, including on calcium levels [5]. Given the above, we recommend suspecting maternal vitamin D deficiency as a possible cause of neonatal hypocalcemia, whether early or late onset. Screening for this deficiency should be systematic in all pregnant women, especially those with risk factors such as: sedentary lifestyle, unbalanced diet, lack of sun exposure, taking corticosteroids and other calcium-chelating treatments, chronic renal failure, etc. [6]. It is therefore crucial for expectant mothers to maintain adequate levels of vitamin D throughout their pregnancy to ensure the health and well-being of their children. It is recommended that pregnant women consult their healthcare professional to determine if they need vitamin D supplements during pregnancy. Moderate exposure to sunlight can also help maintain adequate levels of vitamin D. By ensuring a balanced diet and promoting healthy exposure to sunlight, expectant mothers can contribute to the health and well-being of their unborn children.

Table 1: Causes of neonatal hypocalcemia [7]

Early onset	Late start
Prematurity	Maternal vitamin D deficiency
Intrauterine growth retardation	Maternal hypoparathyroidism
Hypomagnesemia	Hyperparathyroidism
Hyperbilirubinemia	Alkalosis
Toxaemia	Malabsorption
Perinatal asphyxia	Phototherapy
Maternal hyperparathyroidism	Hyperphosphatemia
Maternal type 1 diabetes	Hypomagnesemia
Anticonvulsant drugs	Diuretic drugs

Table 2: Risk factors for vitamin D deficiency in pregnant women [8]

Maternal factors	General factors
Low intake of foods low in vitamin D (less than 2 cups/day of milk or fortified soy beverage, low intake of fish and marine mammals)	Dark skin pigmentation Food insecurity Obesity Place of residence in a community located north of a latitude of 55°†
Lack of vitamin D supplements during pregnancy	Place of residence in an area where vitamin D deficiency is common
Taking certain medications (certain antiretrovirals and antiepileptics)	Liberal use of sunscreen, skin covered by clothing or very limited exposure to light
Multiple pregnancies	Disadvantaged socioeconomic situation
Smoking	

Conclusion

By shedding light on these cases, we hope to raise awareness of the importance of maternal nutrition during pregnancy and the potential consequences of vitamin deficiencies on neonatal health. Health care providers should prioritize screening pregnant women for vitamin D levels and provide appropriate supplementation with this associated vitamin to sun exposure adequate to prevent such complications which can cause neurological after-effects serious in newborns.

References

- Collins M, Young M. Benign neonatal chills, shivering, nervousness, or tremors: early signs of vitamin D deficiency. *Pediatrics*. 2017. 140: e20160719.
- Thomas TC, Smith JM, White PC, Adhikari S. Transient neonatal hypocalcemia: presentation and outcomes. *Pediatrics*. 2012. 129: 1461-1467.
- Harvey NC, Holroyd C, Ntani G, Javaid K, Cooper P, et al. Vitamin D supplementation during pregnancy: a systematic review. *Health Technology Assessment*. 2014. 18: 1-190
- De la Calle M, Garcia S, Duque M, Bartha JL. Vitamin D concentrations are decreased in singleton and twin pregnancies. *Med Clin (Barc)*. 2016. 147: 371-372.
- Blarduni E, Arrospide A, Galar M, Castaño L, Mar J, et al. Factors associated with the prevalence of hypovitaminosis D in pregnant women and their newborns. *A Pediatrician (Barc)*. 2019. 91: 96-104.

6. Palacios C, Kostiuk LK, Peña-Rosas JP. Vitamin D supplementation for women during pregnancy. Cochrane Database Syst Rev. 2019. 7: CD008873.
7. Rodríguez-Fanjul J. Neonatal hypocalcemia due to maternal vitamin D deficiency. Review of supplementation. Spanish Association of Pediatrics. 2022. 96: 153-154.
8. James Irvine, Leanne M. Ward. Prevention of symptomatic vitamin D deficiency and rickets in Aboriginal infants and children in Canada. Pediatric Child Health. 2022. 27: 128.