

# NEONATAL HYPOCALCEMIA DUE TO MATERNAL HYPOVITAMINOSIS D: A COHORT OF CHILDREN IN A REGION OF NORTHERN SPAIN

M L. Bertholt<sup>1</sup>, MC Freijo<sup>1</sup>, P Gortazar<sup>2</sup>, S Vilanova<sup>2</sup>, AB Pérez Santos<sup>2</sup>, M Garmendia<sup>1</sup>, I Palenzuela<sup>1</sup>.

<sup>1</sup> Endocrinology Unit. <sup>2</sup> Neonatology Unit. Pediatric Department. Hospital Universitario Marqués de Valdecilla. Santander. Spain

## Background:

- Neonatal hypocalcemia is defined when the total **calcium levels** are under **8mg/dl (Ionic Ca < 1.1 mmol/L)** in the **full-term** newborn, and **under 7 mg/dl (Ionic Ca < 1 mmol/L)** in the **preterm**.
- The **fetus** entirely depends on the **maternal contributions of 25-OH-vitamin D**, whose levels are directly correlated with diet and solar exposure.
- The **largest transfer in calcium and vitamin D** occurs in the **third trimester of gestation**, so prematurity is an important risk factor.

**Objective:** To evaluate the clinical characteristics of **11 neonates** diagnosed with hypocalcemia due to maternal hypovitaminosis D in the **last 3 years**.

**Method:** Retrospective study of medical records. Statistical analysis with SPSS v.24.

**Results: 11 patients:** 5 females, 6 males. Gestational age: **7 full-term** and 4 preterm neonates. Discrete **winter predominance (4 cases)**. All appropriate for gestational age (**AGE**). **Feeding:** 7 formula feeding, 4 cases breastfeeding plus formula. Average age at diagnosis **3.8 days**.

	Age (days)	GE	Clinical Presentation	Plasmatic Ca mg/dl (NV 8.2-10.9)	Ca <sup>++</sup> mmol/l	P mg/dl (NV 3-6.6)	PTHi pg/ml (NV 10-45)	25-OH-VitD ng/ml (Insuf. <20)	Maternal Study		Treatment Ca	Treatment Vit D (IU/day)
									PTHi	25-OH-Vit D		
1	1	37+5	Tremor	6.9	1.07	9.4	96	11	26	5	Ca iv	800
2	5	38+4	Asymptomatic	6.8	1.06	6.6	28	16	13	16	Ca oral	800
3	3	37+4	Asymptomatic / Vomit	7.6	0.96	8.1	28	8	16	18	No	800
4	3	37+1	Asymptomatic	7.3	0.98	7.8	114	7	9	6	No	800
5	2	36+5	Tremor	6.8	0.98	7.2	6	10	30	<5	Ca iv	400/800
6	3	34+1	Asymptomatic	7	0.99	6.8	54	26	34	13	Ca iv	400
7	2	34+4	Tremor	7.3	0.97	7.6	165	10	85	<4	Ca iv	800
8	5	40+1	Asymptomatic	7.5	0.98	9.7	63	8	44	11	No	600/800
9	5	38+4	Asymptomatic	7.9	1.02	9.4	159	16	90	14	No	800
10	6	39+6	Asymptomatic	7.9	0.97	5.7	53	7	27	7	Ca oral	800
11	7	35+1	Asymptomatic	6.2	0.90	9.4	88	12	33	10	Ca oral	800

## Neonates Study:

- **Plasmatic Ca** mean **7.2 ± 0.5 mg/dl**
- **Ca<sup>++</sup>** mean **0.99 ± 0.05 mmol/l**
- **25-OH VitD** median **10 pg/ml** (range 7-26) (1 insufficiency (20-30) y 10 deficiencies (<20))
- **PTHi** median **52.4 pg/ml** (range 6-165 pg/ml)

## Maternal Study:

- **25-OH-vitamin D** mean **11, 1 ± 4.5 mg/dl (deficiency in all cases)**
- **PTHi:** normal (9), high (2)
- **Supplementation during pregnancy:** only folic acid and iodine. Only 2 mothers received 200 UI/day of vitamin D (Natalben supra®)

## Treatment:

- **4 intravenous calcium** (mean 6 days) and **3 oral calcium**.
- **Vitamin D supplements**, doses of 800 IU/day in 10 cases and 400 UI/day in the patient with insufficiency.
- **10 patients in follow-up** by pediatric endocrinology: 6 with normal values of 25-OH-vitamin D at 2 months, 5 patients at 5 months.

**Discussion:** -Although **current recommendations** in our country only include **maternal supplementation** with iodine and folic acid during normal pregnancy, **it may be necessary to modify** them in the contribution of vitamin D, especially in regions of northern Spain where there is scarce solar exposure.

- It is important to consider that the **effects of the vitamin D deficiency are extended** far beyond the phospho-calcium metabolism.
- **Longer studies are required.**
- **Many cases** of neonatal hypocalcemia and hypovitaminosis course **asymptotically**, so it could be an **underdiagnosed** entity.