

## LETTER TO EDITOR (VIEWERS CHOICE)

# REFRACTORY SHOCK IN A NEWBORN: THE DIAGNOSTIC CHALLENGE OF PANHYPOPITUITARISM

Maria Miguel Carlos<sup>1</sup>, Inês Ferro<sup>2</sup>, Miguel M. Lopes<sup>2</sup>, Joana Gil<sup>3</sup>, Sandra Valente<sup>3</sup>, Carla Pereira<sup>4</sup>.

<sup>1</sup>Service of Pediatrics, Unidade Local de Saúde do Baixo Alentejo, Beja, Portugal,

<sup>2</sup>Department of Pediatrics, Centro Hospitalar Universitário Lisboa Norte, Lisbon, Portugal,

<sup>3</sup>Neonatology Unit, Department of Pediatrics, Centro Hospitalar Universitário Lisboa Norte, Lisbon, Portugal,

<sup>4</sup>Pediatric Endocrinology Unit, Department of Pediatrics, Centro Hospitalar Universitário Lisboa Norte, Lisbon, Portugal.

### KEYWORDS

Panhypopituitarism, Hypoglycemia, Newborn, Shock, NICU.

### ARTICLE HISTORY

Received 04 January 2024

Accepted 24 February 2024

Panhypopituitarism, a complex medical condition, results from inadequate hormone production or secretion by the pituitary gland, involving deficient production of growth hormone (GH), thyroid-stimulating hormone (TSH), adrenocorticotrophic hormone (ACTH), luteinizing hormone (LH) and follicle-stimulating hormone (FSH). Each deficiency triggers physiological disturbances, affecting growth, metabolism, reproduction and stress response.<sup>1,2</sup> Identifying neonates with panhypopituitarism is challenging.<sup>3</sup> We report the case of a full-term female infant, weighing 3120 g, with Apgar scores of 9 and 10. The pregnancy was uneventful and antenatal ultrasound raised concerns about cerebellar hypoplasia, though fetal cranial magnetic resonance imaging (MRI) at 24 weeks gestation showed no abnormalities. At the 9th hour of life, the newborn was admitted to the Neonatal Intensive Care Unit (NICU) due to hypotonia. She had a generalized myoclonic seizure associated with hypoglycemia and received phenobarbital and a 10% dextrose bolus. Persistent hypoglycemia required a maximum glucose infusion rate of 11 mg/kg/min. Hemodynamically, there was clinical deterioration with refractory arterial hypotension despite volume boluses and the need for inotropic support. Subsequent investigations excluded infectious, cardiovascular and metabolic causes. Phototherapy was required for managing hyperbilirubinemia (bilirubin level of 18.8 mg/dL) and profuse sweating was also noted. Basal endocrinological evaluation revealed significant decreases in insulin-like growth factor 1, TSH, FT4,

GH and acth levels. Imaging studies showed no visualization of the adrenal glands on abdominal ultrasound and on cranial MRI, findings consistent with pituitary stalk interruption syndrome (PSIS), namely significantly reduced size of the adenohypophysis and ectopic neurohypophysis. Genetic testing with comparative genomic hybridization (arrayCGH) showed no pathogenic alterations. With laboratory and imaging findings consistent with panhypopituitarism, treatment with hydrocortisone 15 mg/m<sup>2</sup>/day and levothyroxine 12.5 mcg/Kg/day was started with clinical improvement. Inotropic support was stopped 4 days after initiating hormone replacement therapy. GH was started on the 29th day of life.

This case highlights the intricate clinical manifestations and diagnostic challenges associated with panhypopituitarism, a rare condition with subtle presentations mimicking other neonatal issues.<sup>4</sup> The newborn exhibited nonspecific symptoms, including hypoglycemia, refractory arterial hypotension and generalized myoclonic seizures, emphasizing the multisystem effects of hormonal deficiencies. The initial presentation of shock, hypotonia and subsequent myoclonic seizures underlines the importance of considering panhypopituitarism in the differential diagnosis of neonatal seizures, especially when associated with metabolic derangements. Additionally, antenatal suspicion of cerebellar hypoplasia despite a normal 24-week MRI, shows the challenge of detecting subtle changes in the antenatal period. Postnatal imaging studies were essential in the diagnostic work-up, since cranial MRI revealed PSIS, consistent with panhypopituitarism.<sup>5,6,7</sup> Hormone replacement therapy with hydrocortisone and levothyroxine resulted in progressive clinical improvement. The successful cessation of inotropic support after initiation of hormone

**Address for Correspondance:** Maria Miguel Carlos, Rua Actor Joaquim de Almeida n<sup>o</sup>3, 4<sup>o</sup>D Lisboa, Portugal.

**Email:** mariamiguelc102@gmail.com.

©2024 Pediatric Oncall



replacement highlights the complex relationship between hormonal balance and cardiovascular stability in neonates with panhypopituitarism. Follow-up by pediatric endocrinology allows continuous monitoring, therapeutic adjustment and long-term management, including growth hormone introduction, which becomes decisive to metabolic stability and to optimize the overall growth and development.

This case emphasizes the complexity of panhypopituitarism in the newborn, necessitating a multidisciplinary approach for optimal outcomes through early recognition and long-term follow-up.

#### **Compliance with Ethical Standards**

**Funding :** None

**Conflict of Interest :** None

#### **References**

1. Castinetti F, Reynaud R, Quentien MH ., Jullien N, Marquant E, Rochette C, et al. Combined pituitary hormone deficiency: current and future status. *Journal of Endocrinological Investigation* [Internet]. 2015 Jan 1 [cited 2023 Nov 1];38(1):1-12. Available from: <https://pubmed.ncbi.nlm.nih.gov/25200994/>
2. Castinetti F, Reynaud R, Saveanu A, Quentien MH ., Albarel F, Barlier A, et al. [Clinical and genetic aspects of combined pituitary hormone deficiencies]. *Annales D'endocrinologie* [Internet]. 2008 Feb 1 [cited 2023 Oct 25];69(1):7-17. Available from: <https://pubmed.ncbi.nlm.nih.gov/18291347/>
3. Bosch i Ara L, Katugampola H, Dattani MT. Congenital Hypopituitarism During the Neonatal Period: Epidemiology, Pathogenesis, Therapeutic Options and Outcome. *Frontiers in Pediatrics*. 2021 Feb 2;8.
4. Kurtoğlu S, Özdemir A, Hatipoğlu N. Neonatal Hypopituitarism: Approaches to Diagnosis and Treatment. *J Clin Res Pediatr Endocrinol*. 2019 Feb 20;11(1):4-12.
5. Voutetakis A, Sertedaki A, Dacou-Voutetakis C. Pituitary stalk interruption syndrome. *Current Opinion in Pediatrics*. 2016 Aug;28(4):545-50.
6. Bar C, Zadro C, Gwénaëlle Diene, Oliver I, Pienkowski C, Béatrice Jouret, et al. Pituitary Stalk Interruption Syndrome from Infancy to Adulthood: Clinical, Hormonal and Radiological Assessment According to the Initial Presentation. *PLOS ONE*. 2015 Nov 12;10(11):e0142354-4.
7. Mariángel Ospitaleche, Ghione A, María José Ramírez, Silvera F. Shock neonatal como forma de presentación de panhipopituitarismo. A propósito de un caso clínico. *Archivos de pediatría del Uruguay*. 2017 Jan 6;88(3):161-7.