Journal Homepage: -www.journalijar.com

INTERNATIONAL JOURNAL OF ADVANCED RESEARCH (IJAR)

Article DOI:10.21474/IJAR01/16388
DOI URL: http://dx.doi.org/10.21474/IJAR01/16388

RESEARCH ARTICLE

HYPOGLYCEMIA AND JAUNDICE IN A NEWBORN REVEALING PITUITARY STALK INTERRUPTION SYNDROME

Dr. Lamiaa Elazizi, Dr. Fatima Akioud, Dr. Imane Moustaghit, Pr. Sanaa Abourazzak and Pr. Mustapha Hida

Manuscript Info

Manuscript History
Received: 05 January 2023
Final Accepted: 09 February 2023
Published: March 2023

Key words: -
Hypoglycemia, Jaundice, Newborn, Pituitary Stalk Interruption Syndrome, Combined Pituitary Hormone Deficiency

Abstract

Pituitary stalk interruption syndrome (PSIS) is a rare congenital abnormality of the pituitary gland. It is associated with either isolated growth hormone deficiency or combined pituitary hormone deficiency (CPHD). Neonatal PSIS is extremely rare and difficult to diagnose and can be life threatening if diagnosed late. In this manuscript, we descripted a case of neonatal PSIS who is treated at the department ofPediatric Endocrinology atHassan II University Hospital Center of Fez.Sustained hypoglycemia and jaundice in newborns, indicate the presentation of PSIS. Early recognition is of great importance to avoid a life-threatening crisis.

Introduction:-

Pituitary stalk interruption syndrome (PSIS) is a rare congenital abnormality of the pituitary gland, responsible for anteriorpituitary failure[1]. It is associated with either isolated growth hormone deficiency or CPHD [2]. Neonatal PSISis extremely rare and difficult to diagnose and can be life threatening if diagnosed late [3]. We report through this observation the particularities of an early revelation of this syndrome.

Informed consent for publication was obtained from all the patient's parents.

Case Presentation:

We report the case of a male newborn, from a non-consanguineous marriage, his family history was unremarkableand he was born at full term (38 weeks of gestational age) by the caesarean sectionfor a breech presentationwith 1- and 5-minute Apgar scores of 8 and 10, respectively. At birth he presented a good adaptation to the extrauterine life. His birth weight was 3500 grams (25–50th birth weight percentile) with normal length (51 cm) and head circumference34 cm (13.5 inches).

Physical examination showed a micropenis shorter than 1cm and bilateral cryptorchidism, the rest was unremarkablewithoutmidline abnormalities.

After 9 hours of birth, he presented a severe hypoglycemia at 1.1 mmol/l requiring glucose intravenous infusion with strict monitoring. The newborn kept low glycemic figures with the appearance of jaundice at 2 days of life, hence the administration of glucagon.

Corresponding Author:- Dr. Lamiaa Elazizi

The hormonal assessment performed on the 2nd day of life showed damage to the various pituitary axes. The corticotropic function was altered with a collapse of adenocorticotropin (ACTH) below 18.7 pg/mL [10-60 pg/mL] associated with a low cortisol level of 1.94 ug/dL.

Thyroid function test showed central hypothyroidism with free thyroxine (T4L) lowered to 0.77 pmol/L [13-22 pmol/L] without increased thyroid stimulating hormone (TSH). The somatotropic and gonadotropic axes showed a collapse of growth hormone (GH) and somatomedin C (IGF1) (indosable hormones) as well as follicle-stimulating hormone (FSH) and luteinizing hormone (LH) levels (2, 41 mIU/mL [1.5-12.4 mIU/mL] and less than 1.55 IU/L [1.7-8.6 mIU/mL], respectively), and testosterone was low (0.002 ng/mL [0.12-0.21 ng/mL]).

Hormone supplementation immediately followed the diagnosis, including Hydrocortisone® (10 mg/m2) was started urgently followed by L-thyroxine (15 mcg/kg). The child responded well, and the hypoglycemia improved.

In order to investigate the etiology of the pituitary insufficiency, the infant underwent an injected cerebral magnetic resonance imaging (MRI) on day 2 of life. This revealed severe hypoplasia of the corpus callosum, complete interruption of the pituitary gland and an ectopic posthypophysis, leading to the diagnosis of Pituitary stalk interruption syndrome (PSIS) (figure 1).

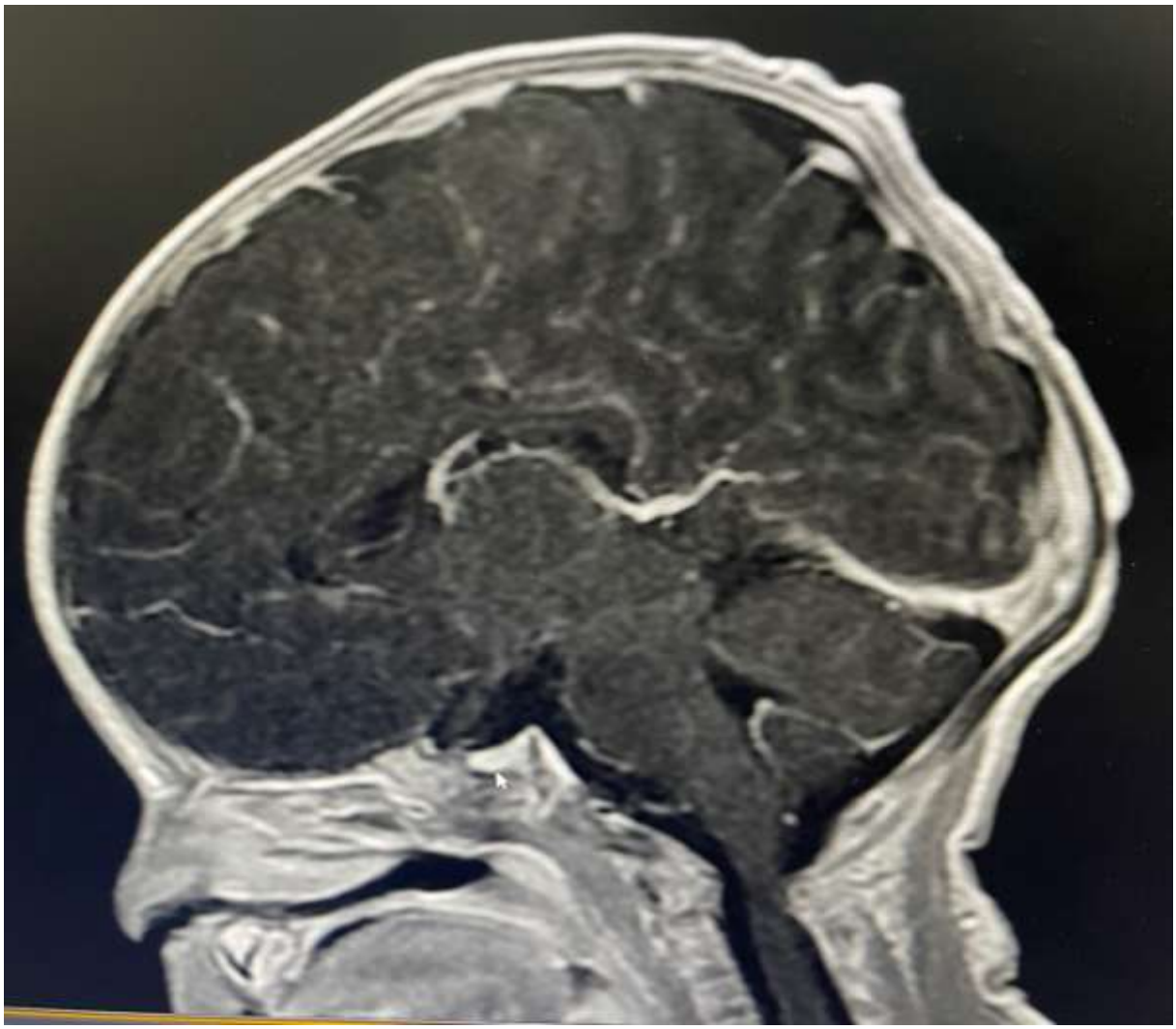

Figure 1:- Magnetic resonance imaging (MRI) scan of the pituitary in our patient: The sagittal image showed complete interruption of the pituitary gland and an ectopic posthypophysis.

The hormonal deficits of the different pituitary axes as well as the morphological clinical abnormalities directed the diagnosis of a congenital pituitary deficit.

Hormone replacement with Hydrocortisone®, L-thyroxine® allowed the infant to develop well clinically and jaundice was also significantly decreased fewweeks later. A close clinico-biological follow-up was set up to evaluate the efficiency of the therapeutic protocol in pediatric endocrinology consultation.

Discussion:-

Pituitary stalk interruption syndrome was first described by Fujisawa in 1987 [1]. It is a very rare condition with an estimated incidence of one birth per 200,000 [4] with a male predominance in 70% of cases.

Clinically, the manifestations of neonatal PSIS are complex and severe, even fatal [2-5]. Diagnosis is often delayed in neonates, probably due to its low prevalence [6]. Therefore, it is very useful to identify the clinical features of PSIS in newborns. The clinical picture is variable and may combine several of the following signs: early and repeated hypoglycemia, systemic hypotension, prolonged jaundice possibly associated with other signs of congenital hypothyroidism (macroglossia, large fontanelles, hypothermia, etc.) as well as micropenis and/or uni- or bilateral cryptorchidism.

In our patient, we observed that the persistent hypoglycemia and jaundice as well as the external genitalia abnormalities described above were the major clinical features constituting a cluster of arguments to suspect this syndrome.

The mechanisms of hypoglycemia include deficiencies of certain hormones such as GH, adrenocortical hormone and thyroxine. They play a role in the elevation of blood glucose through gluconeogenesis of hepatic glycogen, lipolysis of adipose tissue, oxidation of fatty acids, etc. Children with PSIS cannot produce enough glucose-inducing hormones, which ultimately leads to hypoglycemia.

Prolonged jaundice in PSIS remains unclear. Although isolated primary hypothyroidism is typically associated with unconjugated hyperbilirubinemia, cholestasis is also recognized as the primary cause of jaundice [7]. Analysis of data in the literature has established a strong correlation between the presence of cholestasis and a profoundly collapsed plasma cortisol level [8]. In our case, we found a particularly high total bilirubin, especially total serum bile acid and gamma-glutamyltransferase. Therefore, we believe that the prolonged jaundice may be caused by both corticotropic insufficiency and hypothyroidism.

Children with PSIS can have either isolated or combined pituitary hormone deficiency (CPHD), and the earlier the age of onset, the higher the possibility of developing CPHD [3,6]. Based on the results of the hormonal workup, our patient manifested a combined pituitary deficiency.

MRI is the key examination that allows the confirmation of the diagnosis by the demonstration of morphological abnormalities: non visible pituitary stalk, pituitary hypoplasia and ectopic post pituitary [1]. The pathognomonic triad of this syndrome was found in our patient during his brain MRI.

The treatment consists in the substitution of the different ante hypophyseal deficits, and must be instituted from the neonatal period and continued throughout life. In particular, treatment with growth hormone (0.1-0.2 mg/kg/d) should be instituted on a daily basis as soon as the diagnosis is made in order to avoid the risk of hypoglycemia [9]. We did not have recourse to use therecombinant human GH in our case.

Hydrocortisone was 10 mg/m2/d, and the dose of levothyroxine is similar to that used in congenital primary hypothyroidism. Gonadorelin infusion by micropump can be used in the treatment of hypogonadism in patients with PITS [10].

The prognosis of PSIS is relatively good, provided that it is managed from birth and that hormone replacement (cortisol, L-thyroxine, GH) is prompt. The major risk of hypoglycemia is cerebral damage, which can be responsible for convulsions and delayed psychomotor development, sometimes severe when not detected or correctly managed.

References:-

[1] Fujisawa I, Kikuchi K, Nishimura K, et al. Transection of the pituitary stalk: development of an ectopic posterior lobe assessed with MR imaging. Radiology 1987;165:487–9
[2] Parks JS. Congenital hypopituitarism. Clin Perinatol2018;45:75–91
[3] Bar C, Zadro C, Diene G, et al. Pituitary stalk interruption syndrome from infancy to adulthood: clinical, hormonal, and radiological assessment according to the initial presentation. PLoS One 2015;10: e0142354.
[4] Boueilh T, Bassi C, Rouleau S, et al. Pituitary stalk interruption syndrome: a rare and severe cause of pituitary deficiency laboratory diagnosis of a newborn case. Ann Biol Clin (Paris) 2017;75:215–21
[5] Olszewska M, Kiełbasa G, Wójcik M, et al. A case report of severe panhypopituitarism in a newborn delivered by a woman with Turner syndrome. Neuro Endocrinol Lett 2015;36:734–6.
[6] Voutetakis A, Sertedaki A, Dacou-Voutetakis C. Pituitary stalk interruption syndrome: cause, clinical manifestations, diagnosis, and management. CurrOpinPediatr2016;28:545–50.
[7] Grammatikopoulos T, Deheragoda M, Strautnieks S, et al. Reduced hepatocellular expression of canalicular transport proteins in infants with neonatal cholestasis and congenital hypopituitarism. J Pediatr2018;200:181–7.
[8] Mauvais FX, Gonzales E, Davit-Spraul A, et al. Cholestasis reveals severe cortisol deficiency in neonatal pituitary stalk interruption syndrome. PLoS One 2016;11:e0147750
[9] El Chehadeh S, Bensignor C, de Monléon JV, et al. The pituitary stalk interruption syndrome: endocrine features and benefits of growth hormone therapy. Ann d'Endocrinol2010;71:102–10
[10] Shao WM, Bai WJ, Chen YM, et al. Micropump infusion of gonadorelin in the treatment of hypogonadotropic hypogonadism in patients with pituitary stalk interruption syndrome: cases analysis and literature review. Beijing Da XueXue Bao Yi Xue Bao 2014;46:642–5.