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Harlequin Color Change: a brief literature review

Cambio de Color Arlequin: breve revisión de la literatura

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RESUMEN

Introducción: en 1952, Neligan y Strange describieron por primera vez un fenómeno raro, que se produce en el periodo neonatal y se caracteriza por un cambio repentino del color de la piel, con una línea recta que divide la mitad del cuerpo como si hubiera sido "dibujada con un lápiz y una regla" que discurre por la línea media, presentando la mitad del cuerpo eritematoso y la otra pálida.

Objetivo: presentar literatura relacionada con el fenómeno del cambio de color arlequin y sus diferentes presentaciones clínicas.

Métodos: se llevó a cabo una revisión no sistemática de la literatura disponible utilizando palabras claves como "Harlequin Color Change", "Harlequin Newborn", "Harlequin Color Change NOT Syndrome NOT ichthyosis" además de sinónimos, que se combinaron con los conectores "AND" y "OR", tanto en inglés como en español, en las bases de datos PubMed, ScienceDirect y Google Academics.

Resultados: el cambio de color arlequin se caracteriza por un aspecto de la piel dividida en dos zonas de color distinto. Se desconoce su etiología, pero se cree que está causado por inmadurez de la regulación hipotalámica del tono vascular periférico. Afecta aproximadamente 10% de los neonatos sanos.

Conclusiones: el cambio de color arlequin es una condición benigna, idiopática y autolimitada que no necesita tratamiento. El médico debe reconocer este fenómeno, que presenta una variedad de patrones de cambio de color. Es esencial informar a los padres de esta afección cutánea benigna y transitoria para evitar pruebas y tratamientos innecesarios. No debe confundirse con la ictiosis arlequin.

Palabras Clave: Síndrome de Arlequin; Pediatría; Recién nacido; Dermatología; Manifestaciones cutáneas.

ABSTRACT

Introduction: in 1952, Neligan and Strange first described a rare phenomenon, which occurs in the neonatal period and is characterized by a sudden change in skin color, with a straight line dividing half of the body as if it had been "drawn

with a pencil and ruler” running down the midline, with one half of the body erythematous and the other pallor.

Objective: to present literature related to the Harlequin color change phenomenon and its different clinical presentations.

Methods: a non-systematic review of the available literature was conducted using key terms such as “Harlequin Color Change”, “Harlequin Newborn”, “Harlequin Color Change NOT Syndrome NOT ichthyosis” using other Boolean operators such as “AND” and “OR”, both in English and Spanish, in the PubMed, ScienceDirect, and Google Academics databases.

Results: Harlequin Color Change is characterized by an appearance of skin divided into two distinctly colored areas. Its etiology is unknown but thought to be caused by immaturity of hypothalamic regulation of peripheral vascular tone. It affects approximately 10% of healthy neonates.

Conclusion: Harlequin Color Change is a benign, idiopathic, and self-limited condition that does not need treatment. The physician must recognize this phenomenon, which has a variety of color change patterns. It is essential to inform parents of this harmless and temporary skin condition to prevent needless testing and treatment. Not to be confused with ichthyosis Harlequin.

Keywords: Harlequin syndrome; Pediatrics; Newborn; Dermatology; Skin Manifestations.

INTRODUCCIÓN

The first description of this strange autonomic vascular phenomenon, which occurs in the neonatal period and is characterized by a sudden, brief change in skin color, with a sharp and straight line dividing half of the body as if it had been “drawn with a pencil and ruler” that ran precisely within the midline of the head and trunk, with half of the body presenting erythema and the other half pallor, was made in 1952 by Neligan and Strange (1,2) who named it a “Harlequin” color change. This behavior has been reported in newborns (3,4,13,5–12), infants (13–18), children (19–22), and adult patients (2,23,32–41,24,42,43,25–31) since that time.

METHODS

A non-systematic review of the literature was carried out using key terms such as “Harlequin Color Change” and “Harlequin Newborn” as well as “Harlequin Color Change NOT Syndrome NOT

ichthyosis” using other Boolean operators such as “AND” and “OR” in the PubMed databases, ScienceDirect and Google Academics, both in English and Spanish, to find relevant articles. Case studies and narrative reviews were included in the research.

It was decided to include 50 Potentially relevant papers that offered data about its clinical manifestations, pathophysiology, epidemiology, diagnosis, and treatment. During the review, which was carried out until August 2021, just a small amount of current literature on the subject was discovered.

RESULTS

Definition

Harlequin color change (HCC) is a rapid and transient alteration in the color of the skin that occurs along the midline. It is particularly evident when the baby is lying on his side and is characterized by the

abrupt formation of a line demarcating the midlines, clearly dependent on gravity. The dependent side's skin becomes erythematous extremely fast, while the upper side's skin becomes pale. Typically, neonates with HCC do not exhibit any more signs or symptoms and do not appear to be in pain or discomfort (6).

Etymology

Neligan and Strange were the first to describe and named this condition after the poor Italian clown, Harlequin, in 1952. Harlequin is an Italian (*arlecchino*) or Old French (*Harlequin, Hellequin*) word that means "variegated, speckled, spotted, with a variety of colors." Harlequin was a 16th-century character from an ancient Italian comedy. He is shown as a buffoon, naïve and ignorant but full of joy, clad in white robes with several holes and patches (1,6,44).

Epidemiology

Under close observation, its true frequency in newborns is reported to be close to 10% and is described in textbooks as a "rare" phenomenon. However, there is much incoherence in the literature concerning the actual incidence of HCC; Selimouglu quotes that it "can affect up to 10% of full-term babies" (4,6,8,44,45)

Its transient and benign nature with the short duration of episodes (30 seconds to 20 minutes) might account for its under-recognition. Usually occurring between 2 and 5 days of age (4,8,9), HCC has been observed as late as 9½-month of age (4)

In Deshpande et al. study (46) of physiological skin manifestation in neonates, out of 120 newborns, HCC was seen in 1 (0.8%) baby who was preterm. First reports published about HCC suggest a raised prevalence in preterm neonates (4,7,9,11,18) However, recent observations show HCC as a common finding in full-term neonates (2,5,8,47).

There are very few reports of this condition. (48) In Latin America the prevalence is difficult to estimate due to the lack of registries in these countries. In 2016 in Panama a newborn presented HCC on the

second day characterized by a red coloration of the right side and pallor of the left side (49) As of today, there is no published articles of HCC in Colombia.

Clinical features

Neligan and Strange (1) reported this condition first in march 1952. They described it as a sharp and straight line dividing the two halves as if it had been "drawn with a pencil and ruler" that ran precisely within the midline of the head and trunk.

HCC consists of a sudden change in skin color, more often with a distinct limiting edge along body midline, dividing the neonate's body skin into a pale half and a plethoric half. (2,6). In some cases, HCC can present itself in patches with sharp edge borders (5) on one limb and sparing arms, legs, trunk, face, or genitalia (2,9).

HCC is often a transient, benign, and rapidly reversible condition that resolves within minutes (2,5,8). It disappears spontaneously in 30 seconds to 20 minutes with a change in posture. Notably, it can happen again when the baby is turned on its side (9,44).

Although HCC can occur as a single episode, it can recur. A single newborn may experience one to several episodes in just a few days, with varying degrees of severity depending on the infant. While gravity plays a role in the newborn stage, the exact triggers of HCC episodes are unknown. The episodes can occur in any decubitus position but are more common in lateral decubitus, and the color changes location as the infant rotates. Newborns with HCC are generally healthy and show no other signs or symptoms. (2,6,50,51).

Physiopathology and associated conditions

Although the etiology is unknown, all evidence points to a hypothalamic immaturity resulting in a transitory imbalance in cutaneous vascular function. If it occurs later in life, it is usually secondary to a lesion in the hypothalamus or brainstem or the second or third thoracic spinal cord segments. It can be traumatic, tumoral, or vascular.

The physiopathologic mechanism seems to be the same at all ages: sympathetic dysautonomia, primary in infants, while in later age groups, it is a peripheral autonomic failure. Unilateral cutaneous vasodilation causes hemibody erythema as sympathetic vasoconstriction activity decreases homolaterally. HCC is observed in healthy neonates; However, it has also been associated with hypoxia, preterm birth, and low birth weight.

Exacerbation of the phenomenon has been reported in patients with congenital cyanotic cardiomyopathy receiving prostaglandin E1 treatment (6,50).

Diagnosis

Because of HCC specific traits, it is unlikely to be mistaken with other systemic rashes.

HCC transitory quality and usual distribution (splitting the body into pale and plethoric halves) aids the physician in distinguishing it from other entities.

Cutis marmorata, Port wine stain, and nascent hemangioma are all differential diagnoses that may be mistaken for HCC. Prompt identification of HCC is critical since the rapid color change may worry parents and care professionals (2,9,12,52).

HCC should not be confused with Harlequin fetus, a genetically determined cutaneous disorder that manifests as very hard, thick skin prone to cracking and splitting, leading to deformation and respiratory restriction. It is unrelated to the HCC (6,8,12,47)

The skin conductance responses may be helpful to identify harlequin syndrome (HS), which is a persistent and pathological state of nerves. If no spontaneous remission is seen, then it must be HCC and not HS (12,51)

Treatment

No treatment is needed. Recognizing this benign condition is necessary to minimize needless research and treatment that may damage the infant. Recognizing this skin condition helps reassure

parents about its benign nature and avoids unnecessary diagnostic testing (3,10,44,53,54).

CONCLUSIONS

Harlequin color change is a benign, idiopathic, and self-limited condition that does not need treatment. This differentiates it from other severe conditions since it does not persist long, causing little to no hemodynamic, respiratory, or neuromuscular abnormalities.

Physicians must be aware of this phenomenon, which has a variety of color change patterns. It is essential to inform parents of this harmless and temporary skin condition to prevent needless testing and treatment. Although it affects around 10% of healthy newborns, many doctors claim to have never seen one in their years of practice.

HCC is not to be confused with the harlequin fetus, a severe and very uncommon type of congenital ichthyosis.

Additional observations and research may help us establish a complete understanding of this strange occurrence; it should be reinforced and updated.

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