Harlequin Color Change: Neonatal Case Series and Brief Literature Review

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Abstract

First clinical report of Harlequin color change (HCC) phenomenon came in 1952 from Neligan and Strang. Since then, HCC has been described in a fairly broad number of clinical reports involving neonates, infants, children, and adult patients. We here present a small case series of HCC occurring in neonates, pointing out three of the different possible presentations (hemifacial, patchy scattered across the whole body, and hemiscrotal) of this phenomenon. A brief discussion and literature review encompassing epidemiology, clinical features, physiopathology, associated conditions, and differential diagnoses of HCC is then presented. In most cases, HCC represents a benign, idiopathic, and rapidly autoresolutive phenomenon, with no need for treatment. Some drugs (especially anesthetics and prostaglandin E) are thought to enhance HCC expression through their influence on the capillary tone in the peripheral vascular bed; this effect is anyway promptly reversible with drug withdrawal. Only in rare circumstances, HCC may act as a clue for serious central nervous system disorders (e.g., meningitis; hypothalamic, brain stem, or sympathetic nervous system lesions); anyway, in these rare occurrences HCC always represents an epiphenomenon of the disease, never acting as the sole sign of the underlying disorder.

Keywords

- harlequin color change
- preterm
- neonate
- infant
- dermatology

First clinical report of a curious autonomic vascular phenomenon occurring in neonatal period, characterized by a fleeting split appearance of skin into two well-demarcated color areas, came in 1952 from Neligan and Strang,[1] who named it "Harlequin colour change" (HCC) after the famous Venetian carnival mask dressed in patches of different colors.

Since then, HCC has been described in a fairly broad number of reports involving neonates,[2–15] infants,[16–20] children,[21–24] and adult patients,[25–58] either as an isolated finding or as secondary to a specific condition (e.g., exercise, iatrogenic damage, and associated diseases).

Case 1

A late preterm male neonate was born vaginally; he was put in antibiotic prophylaxis with IV ampicillin and netilmicin because of the maternal history of premature rupture of membranes. At 4 days of life, he developed a transient erythematous rash on the right side of the face, on which he was decumbent (►**Fig. 1**); the rest of the body was not interested. The rash rapidly vanished within 2 minutes from its start.

Case 2

A Moroccan male preterm newborn was delivered by caesarean section at 31 + 3 weeks of gestational age because of altered cardiotocographic pattern; he did very well in delivery room, not needing any resuscitation. About 10 minutes after the delivery, during acute crying, he suddenly developed a patchy skin pattern, with regional clear-cut edge cutaneous discoloration of face, right forearm, right leg, and left knee (►**Fig. 2**); skin returned evenly pink in a few minutes.

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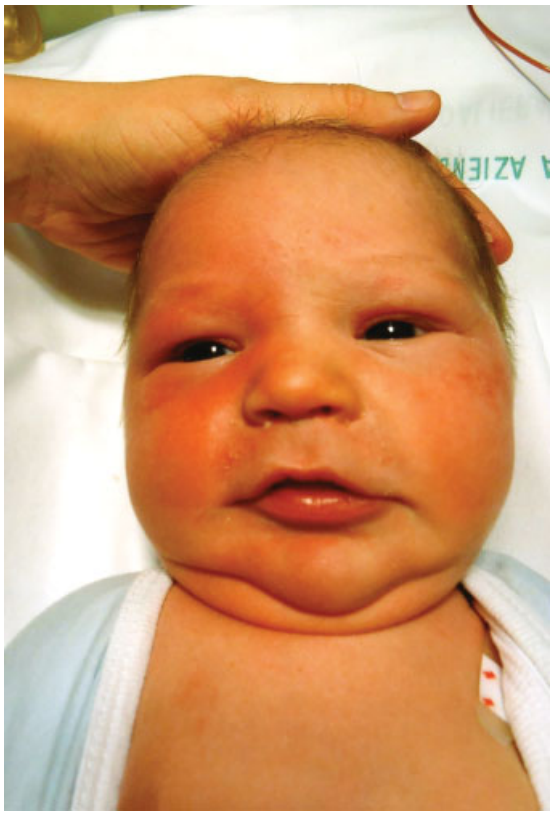

Fig. 1 Facial harlequin color change in a late preterm White newborn administered IV antibiotic therapy for a vaginal delivery with history of premature rupture of membranes; the baby was on his right side when the rash began. Overall phenomenon lasted 2 minutes and then rapidly vanished.

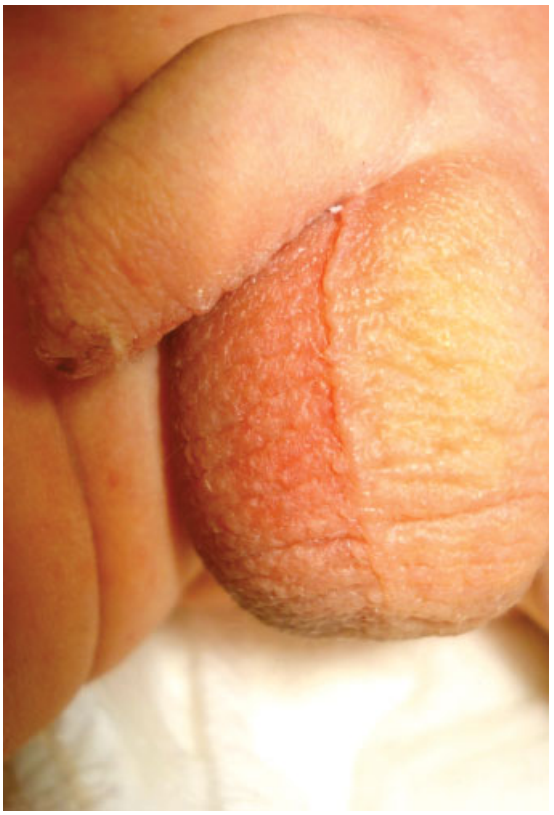

Fig. 3 Harlequin color change of the right hemiscrotum in a term Caucasian neonate after bath. The baby was otherwise asymptomatic. No other skin district was interested. Phenomenon quickly regressed in 1 minute, leaving scrotum evenly pink.

Case 3

A term, healthy neonate developed an altered color of the right hemiscrotum soon after a bath (►**Fig. 3**); no other body region was interested in the phenomenon, which quickly regressed in about 1 minute leaving no trace.

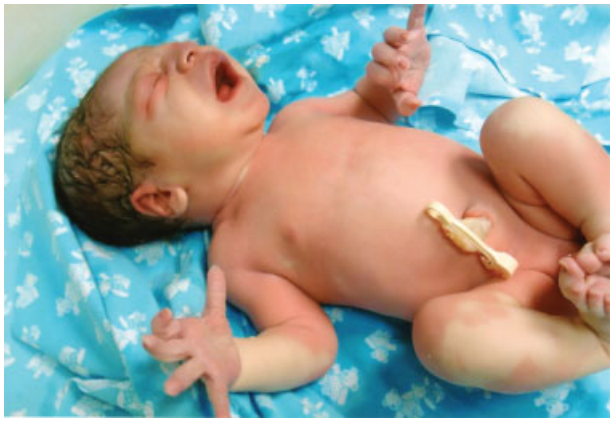

Fig. 2 Harlequin phenomenon in a Moroccan preterm newborn (31 weeks' gestational age). Regional, clear-cut edge skin discoloration started 10 minutes after delivery during intense crying, involving face and right hemibody of the neonate, and vanished minutes after.

Discussion

Epidemiology

HCC appears transiently in as up to 10% of healthy newborns,[9] more commonly on days 2 to 5 of life,[9,17] although it has been reported even later in a neonatal age.[14]

First reports published about HCC suggest a raised prevalence in "small for gestational age, especially preterm neonates,"[1] observation confirmed by some recent articles too[5,13,20]; on the contrary, several new observations register HCC as a common finding also in full-term neonates.[6,8,9,14]

Clinical Features

In most cases, HCC expression consists in a sudden change in skin color, more often with a distinct limiting edge along body midline (see ►**Figs. 1** and **3**), dividing neonate body skin into a pale half and a plethoric (usually the decumbent) half[15]; occasionally, HCC can present itself in a patchy fashion, again with sharp edge borders (see ►**Fig. 2**),[14] sometimes sparing arms, legs, trunk, face, and/or genitalia.[2,3] HCC usually is a brief and quickly reversing phenomenon; skin returns uniformly colored in a few minutes.[8,9]

Of note, most commonly HCC happens in the absence of accompanying signs or symptoms; particularly, no concurrent autonomic dysregulation symptoms (such as respiratory rate, heart beat frequency, pupil diameter, or tone alterations) are evident during an HCC episode.[6,20]

Physiopathology and Associated Conditions

Exact mechanisms responsible for HCC are still unknown, but quite robust evidence accounts for a sympathetic autonomic dysfunction in the control of peripheral capillary bed tonus, probably because of the hypothalamic functional immaturity in the newborn[1–3,17–19]; therefore, erythematous and pale skin areas result from unregulated regional capillary vasodilatation and vasoconstriction, respectively.

Associated conditions and medications may possibly accompany and/or enhance HCC phenomenon, either by influencing the peripheral vascular tone and reactivity (prostaglandin E,[8] some anesthetics[17,43]) or by being further expressions of central autonomic disturbance (meningitis,[5] seizures,[18] and—in late childhood and adulthood—headache,[32,33] parasomnia,[51] and sweating disorders[54]).

HCC can also be associated with congenital, acquired or iatrogenic lesions of hypothalamus, brain stem, cervical sympathetic nervous system, or of the second and third spinal cord thoracic segments.[15] However, most cases of the HCC are classified as idiopathic.[47,52]

Differential Diagnoses

HCC characteristics make it unlikely to be confused with other systemic rashes. Anamnesis plays a key role in distinguishing HCC from other types of rash (history of fever and flu-like symptoms in parvovirus B19 infection[59]; previous drugs intake in Steven Johnsons syndrome[60]), as does peculiar presentation of HCC (fleeting, well-demarcated rash, usually involving half of the body) in contrast to that of different rashes (generalized and poorly delimited eruption in parvovirus B19 infection[59]; vesicular or papular eruption in varicella[61] and measles,[62] respectively; pruritic, pomfoid elements in urticaria[63]; painful red or purplish rash with skin dead and shedding in Steven Johnsons syndrome[60]).

Finally, HCC in the neonate most often is not accompanied by any other significant symptom.

Conclusions and Final Remarks

In most cases, HCC represents a benign, idiopathic, and rapidly autoresolutive phenomenon, with no need for treatment. Some drugs (especially anesthetics and prostaglandin E) are thought to enhance HCC expression through their influence on the capillary tone in the peripheral vascular bed; this effect is anyway promptly reversible with drug withdrawal.

Only in rare circumstances, HCC may act as a clue for serious central nervous system disorders (e.g., meningitis; hypothalamic, brain stem, or sympathetic nervous system lesions); anyway, in these rare occurrences HCC always represents an epiphenomenon of the disease, never acting as the sole sign of the underlying disorder.

Conflicts of Interest
None.

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