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HI (HARLEQUIN ICHTHYOSIS) BABY

Nursing

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ABSTRACT

HI is a very rare type of genetical abnormality but can be seen and scared by seeing various social media footages. It is associated with deletion and truncation mutations of a keratinocyte lipid transporter. Harlequin disorder is categorized by diffuse epidermal hyperkeratinization along with defective desquamation. During birth, the HI phenotype is conspicuous with thick hyperkeratotic plate-like scales with deep dermal fissures, severe ectropion and eclabium, among other findings. In this ichthyosis marked eclabium and ectropion are present secondary to the taut as well as in the unyielding skin. The ears may be inattentive, absent or poorly developed. Even the arms, feet, and digits have flexion contractures and may be hypoplastic. The skin wall is harshly compromised, leading to undue water loss, causes electrolyte abnormalities, temperature alteration and an increased risk of deadly infection. Some of the primary treatments are smearing retinoids application for shedding the hard and scaly skin, topical antibiotics application can prevent infection, insertion an ET tube in the airway to assistance with breathing, applying lubricating eye drops or protective devices on the eyes. Following ongoing treatment like humidified incubator (for premature infants), continuous monitoring of TPR and SpO2, early intubation(optional), frequent cultures of the skin should be taken for lab testing, monitoring serum electrolyte levels, maintaining a germ-free environment to evade infection etc.

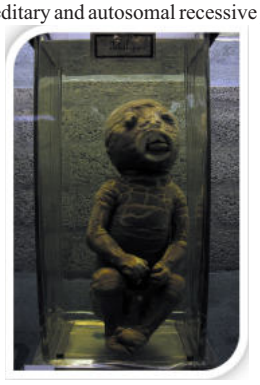
KEYWORDS

Harlequin ichthyosis, ABCA12 Gene, Hyosis Fetalis & Genetic Mutation

INTRODUCTION

Harlequin disorder is a genetic disorder which results in thickened skin over approximately the whole body. At the time of birth skin forms large, diamond or trapezoid or rectangle-shaped plates that are parted by deep cracks. These affect the figure of the nose, mouth eyelids, and ears which will restrict the movement of the arms and legs.[1]

Harlequin ichthyosis is a infrequent genetic skin disease. The newborn is shielded with plates of thick skin having cracked and split apart. The thick plates affect facial features and can even restrict breathing and eating. Harlequin infants should to cared for in the NICU immediately. This disorder is hereditary and autosomal recessive pattern.[2]



HI is not only one of the rarest but also severe form of congenital disorder. It is associated with deletion and truncation mutations of a keratinocyte lipid transporter. Harlequin disorder is categorized by diffuse epidermal hyperkeratinization along with defective desquamation. During birth, the HI phenotype is conspicuous with thick hyperkeratotic plate-like scales with deep dermal fissures, severe ectropion and eclabium, among other findings. During the first months of life, the hyperkeratotic layering is shed, revealing a wordily erythematous, flaking epidermis, which perseveres for the remainder of the patient's life. Though HI infants have historically yielded in the perinatal period associated to their weighty epidermal compromise, the scenario of HI infants has vastly enhanced over the past 20 years.[8]
There is no racial connection known for harlequin disorder. Higher occurrence may be come across in cultures where parental consanguinity is common.

Harlequin syndrome states to a different condition characterised segmental , asymmetrical, progressive & sweat loss (also known as progressive isolated segmental anhidrosis), and to unilateral sweating and flushing on the face, chest and neck.[9]

Harlequin ichthyosis affects both males and females in equal ratio. This condition affects nearly one member in 500,000 persons or about seven births annually in USA.[2]

As per another data this condition affects around 1 person in 300,000 births.[6] It was first recognized in a diary entry by Reverend Oliver Hart in America in the year 1750.[5]

Methodology

This detailed review includes revealed data about HI, updated information with possible treatment in all aspects. This information collected through computerized search from various review & research articles along with a number of renowned websites.

BACKGROUND

Harlequin ichthyosis is one of the most severe as well as rare form of autosomal recessive congenital ichthyosis. This disorder is characterized by a deep thickening of the keratin layer in foetal skin. The pretentious neonate is born with a gigantic, horny shell of impenetrable, platelike scale along with contraction aberrations of the mouth, eyes, ears and appendages.

In this ichthyosis marked eclabium and ectropion are present secondary to the taut as well as in the unyielding skin. The ears may be inattentive, absent or poorly developed. Even the arms, feet, and digits have flexion contractures and may be hypoplastic. The skin wall is harshly compromised, leading to undue water loss, causes electrolyte abnormalities, temperature alteration and an increased risk of deadly infection. The tight, arm or like scale can confine respiration too. Feeding problems and metabolic disorders are common due to impaired intestinal absorption.

This disease mostly affects the skin. Other systems may be significantly compromised due to hyperkeratosis and associated with deformities. Neonates are frequently born prematurely.

The underlying genetic aberration in this condition is a mutation in the

lipid-transporter gene ABCA12 on chromosome no 2.

Immunohistocytochemical investigation of the skin discloses characteristic abnormalities in the structure of lamellar granules and in the expression of epidermal keratin.

In earlier days Ichthyosis fetalis was consistently fatal. Better survival has been attained with intense supportive care along with systemic retinoid therapy in the neonatal period. Patients who survive apparent a debilitating, obstinate ichthyosis similar to severe congenital ichthyosiform erythroderma.[13,14]

ORIGIN OF THE NAME

The term harlequin originates from the facial appearance, the triangular and diamond-shaped pattern of hyperkeratosis. The new-born's mouth is pulled extensive open, mimicking a clown's smile.

DEFINITION ICHTHYOSIS CONGENITA

HI, sometimes called Harlequin baby syndrome or congenital ichthyosis, is a rare condition distressing the skin. It is a type of ichthyosis disorder, which refers to a group of syndromes that cause stubbornly dry, scaly skin over the whole body.[12]

OTHER NAMES

PROGNOSIS

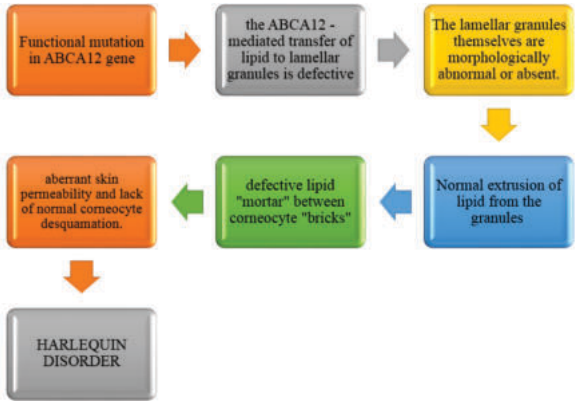
The death rate for harlequin fetalis is high, with universal figures impending 50%. An assessment of 45 cases by Rajpopat et al found 25 fighters (56%), ranging in age from 10 months to 25 years. Twenty deaths (44%) befallen from day 1 to day 52 and were as probable to be caused by respiratory let down as fulminant sepsis infection.

As per another Japanese survey of 16 patients reported persistence of 81.3% (13 of 16 patients). Respiratory function stopping, fulminant sepsis, or a mixing of both are the most communal causes of death in affected new-borns.[11]

CAUSES

Hyosis fetalis is caused by variations (mutations) in the ABCA12 gene, which gives commands for making a protein that is essential for skin cells to grow normally. It acts as a a key role in the transport of fats or lipids to most superficial layer of the skin called epidermis, generating an effective skin barrier.[32]

PATHOPHYSIOLOGY



CLINICAL FEATURES

The clinical manifestations of Harlequin ichthyosis alter with age and tend to be more fatal in infants.

In newborns

This hardened skin can cause a number of serious issues, including:

- infections in deep skin cracks
- dryness
- small and inflamed hands and feet
- restricted movement in arms and legs
- decreased body temperature
- eyelids spinning inside out
- eyes not closing
- lips dragged tight, leaving the mouth open and creating nursing difficult
- ears glued to the head
- breathing difficulties due to tight chest skin
- high sodium in the blood, hypernatremia

In older children and adults

- abridged hearing from a build-up of scales in the ears
- recurring skin infections
- finger movement problems due to tight skin
- thick fingernails sparse or thin hair as a result of scales on the scalp
- rare facial features due to stretched skin
- overheating due to scales that affect sweating[16]

DIAGNOSIS

Harlequin ichthyosis is generally diagnosed at birth based on appearance. It can also be confirmed by doing genetic testing.

Some normal tests can also regulate if it's additional type of ichthyosis. But different types of genetic testing don't offer any data on disease brutality or prognosis.[17]

HI is an enormously rare genetic skin disorder. It is the most severe type of ichthyosis. It is diagnosed by thickened, dry, rough and arm or like plates of skin with deep cracks in between. Genetic testing for autosomal recessive disorder with the majority of affected individuals being homozygous for mutation in the ABCA 12 gene.[18]

COMPLICATIONS

In the former years, it was rare for a baby born with Harlequin ichthyosis to live beyond a few days. But things are altering, widely due to better-quality ICU for newborns and the use of oral retinoids.

Nowadays, those who endure infancy have a life expectancy ranging into the teens and 20s. And the counts of teens as well as adults living with Harlequin ichthyosis continues to rise.[19]

TREATMENT

Initial treatment

An infant born with Harlequin ichthyosis disorder needs NICU as soon aspossible, which may consist of spending time in a heated incubator with high humidity.

Even tube feeding can help to avert malnutrition and dehydration. Distinct lubrication and protection can help keep eyes healthy.

Along with the above steps:

- covering the skin with bandages to avoid infection
- smearing retinoids to help shed hard, scaly skin
- topical antibiotics application can prevent infection
- insertion an ET tube in the airway to assistance with breathing
- applying lubricating eye drops or protective devices on the eyes[19]

Ongoing care

Medical Care (Post-delivery care)

- maintenance of patient's airway, breathing, circulatory steadiness,
- connecting with IV access (Peripheral access may be tough and umbilical cannulation may be necessary),
- humidified incubator (for premature infants),
- regular monitoring of TPR and SpO2,
- early intubation(optional),
- frequent cultures of the skin should be taken for lab testing,
- screening of serum electrolyte levels,
- maintaining a germ-free environment to evade infection,
- physical bonding between the parents and the baby should be

encouraged,
- Tazarotene, a topical retinoid is beneficial.[23,24]
- diluted bleach baths may cut down the risk of skin infection (Topical keratolytics like salicylic acid are not suggested in new-borns because of potential systemic toxicity),
- neonates with harlequin ichthyosis firstly do not feed well and may need tube feeding,
- giving bath twice daily and use frequent wet sodium chloride compresses[20,21]

Exposure keratitis outcomes with ectropion of the eyelids. Applying of ophthalmic lubricants often to protect the conjunctiva.[22]

As per Mr. Rajpopat et al, early retinoid treatment (by day 7) may need quick consideration, as these medications can take some days to obtain[23]

Intravenous fluids are nearly always required. Should consider excess cutaneous water losses in daily fluid requirement calculations. A risk of hypernatremic dehydration always persists.

Consultations

Formation of multidisciplinary team for safer side is recommended wit these health care staffs:
- Neonatologist
- Dermatologist
- Medical geneticist
- Ear-nose-throat specialist
- Plastic surgeon
- Ophthalmologist
- Occupational therapist
- Dietician
- Social worker
- Physical therapist

Surgical Care

Hyperkeratosis causing tightening of limbs, digits, or nasal blocking which may need to be treated surgically. Neonates can have compartmental syndrome due to the solid scales and need insincere and sometimes dermal release for averting ischemia and possible loss of limbs.

ADVERSE EFFECTS OF RETINOID THERAPY
- Mucocutaneous dryness
- Aberrant liver function tests
- Hypertriglyceridemia
- Benign intracranial hypertension,

Serum AST, ALT, total cholesterol, and triglyceride levels should be followed regularly.

Follow-up with an ophthalmologist is required. Recurrent exposure keratitis can be a problem as a result of persistent ectropion.[25]

UPDATED INFORMATION

Senai Goitom Sereke reviewed that IF is a very infrequent and life-threatening skin disorder that is very tough to treat, especially in low-resource settings.[26]

HI is a rare and severe form of inherited ichthyosis. Allied to deletion and truncation mutations of a keratinocyte lipid transporter, HI is categorized by wordy epidermal hyperkeratinization and faulty desquamation. After birth, the HI phenotype is arresting with thick hyperkeratotic plate-like gages with deep dermal fissures, eclabium and severe ectropion. During the first few months of life, the hyperkeratotic covering is shed, coming out a diffusely erythematous, scaly epidermis, which continues for the patient's life even in future. Though HI new-borns have historically yielded in the perinatal period related to their deep epidermal compromise, the prognosis of HI infants has massively improved over the past 20 years.[27]

HI is the most severe phenotype of the autosomal recessive genetic ichthyoses. HI is reasoned by mutations in the lipid transporter adenosine triphosphate linked with cassette A 12 (ABCA12). Neonates are born with a different clinical appearance, coated in a dense, platelike keratotic scale separated by deep erythematous fissures. Facial structures are slanted by severe ectropion, eclabium, flattened nose and rudimentary ears. Skin barrier purpose is noticeably diminished, leads to hypernatremic dehydration, weakened thermoregulation, augmented metabolic demands, and more risk of respiratory dysfunction as well as infection[28]

Hyosis Fetalis is a combination of heterogenous family of skin disease which the most severe genetic complicated disorder. The patients usually cannot survive for longer time, but several longlasting survivals have been noted. The vast majority of affected individuals are homozygous for mutations in case of ABCA12 gene, which reasons a shortage of the epidermal lipid transporter, resulting in hyperkeratosis and abnormal barrier purpose.[29]

HS is an erratic disease derived from the dysfunction of the SNS. It is featured by unilateral facial flushing and sweating caused by exercise, heat and emotion. In most of the cases are primary with a mysterious pathogenic mechanism. The prognosis is favourable results in Harlequin disorder. Medical or surgical treatments are not frequently required for idiopathic HS. But symptomatic treatment may be directed when symptoms disturb the quality of life of patients[30]

Approximately 200 documented cases are present worldwide of HI, with less than five printed reports in the Philippines. The patients were treated through a multidisciplinary approach, including medical appointment to the tele-ichthyosis platform of a US-based foundation for patients with ichthyosis. Thermoregulation, nutrition, and hydration are some essential and basis measures to be followed first. Bland emollients should be applied generously following normal saline soaks to progress barrier protection. Acitretin medication administered on day 2 of life to enable the desquamation of the thickened encasement. A marked reduction in erythema and the thickness of the hyperkeratotic skin, and reduced conjunctival dehiscence can be noted after one week of therapy. Improved forecast amongst HI patients is associated with optimal quality of care regardless of resource limitations. A multidisciplinary approach and early management of retinoids cannot be overemphasized.[31]

CONCLUSION

HI is a very rare type of genetical abnormality but can be observed and scared by seeing various social media footages. So, we, authors have tried to cover the related information regarding is ichthyosis disorder. We hope that the readers have received all the information about Harlequin Disorder.

List Of abbreviations-

NICU-Neonatal Intensive Care Unit
HI- Harlequin ichthyosis
ET-Endotracheal
IV-Intravenous
TPR-Temperature,Pulse, Respiration
IF-Ichthyosis Fetalis
HS-Harlequin syndrome
SNS-Sympathetic Nervous System

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Conflict of interest-

Have no conflict of interest relevant to this article

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