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Harlequin Ichthyosis Baby with Coagulase Negative Staphylococcus Infection: A Case Report

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Abstract

BACKGROUND: Harlequin ichthyosis (HI) is a rare genetic disease caused by the lipid transporter gene ABCA12 mutation. The incidence is 1 in 300,000 live births. Clinically, the skin's keratin layer thickens to form a geometric pattern resembling a Harlequin clown costume. The mortality rate was high, mainly caused by infections and metabolic abnormalities.

CASE REPORT: We report a case of HI in a preterm baby girl with signs of respiratory distress and sepsis that can survive for 4 months.

CONCLUSION: Harlequin ichthyosis is a lethal inherited disorder and needs circumspection management. Although a promising drug has been reported, it is still not widely available. Factors known to increase the risk of developing this disease should be avoided. Prenatal screening and genetic counseling are also essential.

Introduction

Harlequin ichthyosis (HI) is the most severe type of autosomal recessive congenital ichthyosis causing abnormalities in the expression of epidermal keratin and in the structure of lamellar granules in the stratum granulosum that results in unformed extracellular lipid lamellar [1], [2], [3], [4]. There is no predilection for race or sex, and inbreeding increases the incidence [1], [2], [5]. In most cases, an affected baby is born preterm and dies within a few days or weeks of age [6], [7], [8], [9], [10].

The clinical manifestation is present at birth, characterized by a thickened layer of skin that was separated by a deep reddish fissure, ears and nose deformities, ectropion, eclabium with fish's mouth appearance, deformities of all joints, and hypoplastic digits. Respiratory distress can also occur due to skin tension [1], [2]. Prenatal examination with ultrasound, fetal skin biopsy, chorionic villus sampling, and amniocentesis can also be performed to diagnose HI early [10].

The management is symptomatic for skin hydration and lubrication. Treatment is preferably carried out in the NICU. An isolette with a certain humidity is needed to keep the skin moist. Systemic retinoids show improvement in HI, increasing life expectancy; the most commonly used is acitretin with an initial dose of 1 mg/kg BW/day [2], [11].

Case Report

A 1-day baby girl, born at 35 weeks of gestation from a 39-year mother by normal vaginal delivery with APGAR score of 7 and 9 at 1 and 5 minutes, respectively. There was no consanguinity between the parents or family members who had the same illness. At birth, the baby's skin showed generalized hyperkeratosis, xerosis, fissure, erosion, and excoriation (Figure 1a). Ectropion and eclabium were also noted as well as syndactyly in all four extremities (Figure 1b-d). The baby also had dyspnea, with chest X-ray revealed a membrane hyaline disease grade 1. Treatment was carried out in the neonatal intensive care unit isolette to maintain body temperature and reduce body fluid loss. Laboratory tests revealed sepsis caused by *Staphylococcus haemolyticus,* which was sensitive to vancomycin. Skincare was given with

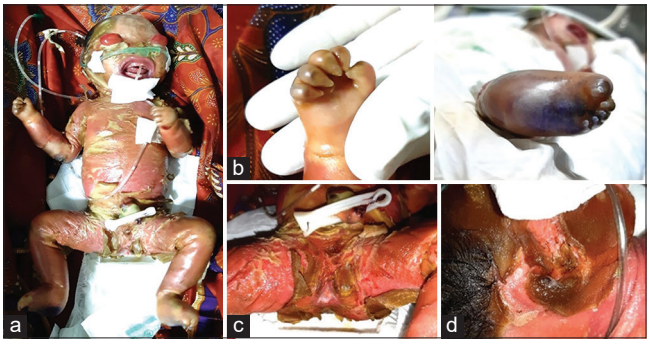

Figure 1: At birth, the baby's skin showed generalized hyperkeratosis, xerosis, fissure, erosion, and excoriation (Figure 1a). Ectropion and eclabium were also noted as well as syndactyly in all four extremities (Figure 1b-d).

distilled water dressing and petroleum jelly. For eye care, the patient was given Gramicidin and Neomycin Sulfate eye ointment mixture and Sodium Hyaluronate. After 45 days of hospitalization, marked improvement in the respiratory system, hyperkeratosis, ectropion, and eclabium. The dyspnea resolved, the orogastric tube was removed, and the patient could suck well. Parents were educated to continue skincare and ambulatory care at outpatient clinic (Figure 2). Unfortunately, the baby passed away at 4 months of age at home.

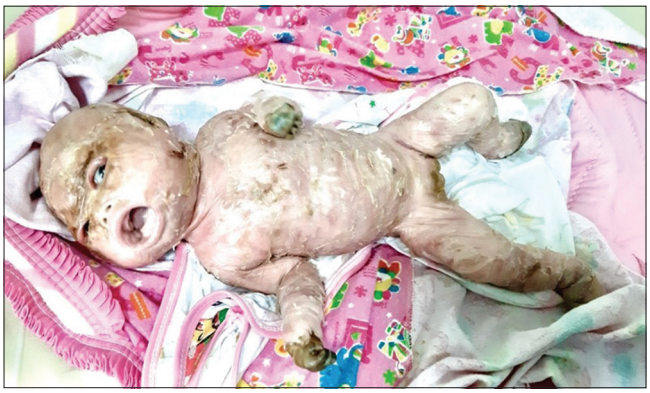

Figure 2: Skin care and ambulatory care at outpatient clinic

Discussion

The genetic disorder underlying HI is a mutation in the lipid-carrying gene *ABCA12* that codes for adenosine triphosphate (ATP)-binding cassette transporter (ABC), subfamily A, member 12, in the region of chromosome 2q35 [12]. The type of mutation determines the length of survival of newborns with HI. This mutation leads to faulty lipid secretion within epidermal keratinocytes, which causes losing the skin lipid barrier, leading to body fluids loss and impaired thermoregulation. In the end, there can be fluid and electrolyte imbalance. In the present case, the child survived for four months, but there was no available facility of genetic testing to establish the type of mutation if present; therefore, the diagnosis was established based on the pathognomonic clinical picture. Inbreeding also increased the incidence but in this case, there was no family relation between the parent.

HI can be diagnosed antenatally on ultrasound examination in the third trimester; fetal skin thickening can be found with a dysmorphic face accompanied by an open mouth and protruding tongue. Other characteristics include short extremities, joint contracture, and intra-uterine retardation.

During the neonatal period, the baby should be managed in an intensive care unit in a humid isolette which was needed to meet nutritional needs, monitor for body temperature, fluids, electrolytes balance, and prevent respiratory problems and sepsis. Respiratory problems are caused by limited chest movement caused by hyperkeratosis and lung immaturity if the patient is born prematurely, as in this case. This patient also experienced sepsis caused by *Staphylococcus hemolyticus*, which is only sensitive to vancomycin.

Skincare includes topical emollient and cleaning the skin once to twice a day to moisturize and help exfoliate the stratum corneum. Early administration of systemic retinoids, such as acitretin (initial dose 1mg/kg BW/day), has improved and increased life expectancy. Unfortunately, systemic retinoid therapy could not be given to this patient due to unavailability in the market.

The mortality rate is high, with the worldwide rate about 50%. A review of 45 cases by Rajpopat *et al*. found that 25 people were still alive (56%), aged 10 months to 25 years. The most common causes of death were sepsis and respiratory distress [13]. This case was survived for four months and passed away at home with an unknown cause.

Conclusions

Harlequin ichthyosis is a lethal inherited disorder and needs circumspection management. Although a promising drug has been reported, it is still not widely available. Factors known to increase the risk of developing this disease should be avoided. Prenatal screening and genetic counseling are also essential.

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