MEDDOCS Open Access Publisher

ISSN: 2639-9237

Journal of Case Reports and Medical Images

Open Access | Case Report

Consanguinity and Tgm1 Mutation in a Neonate with Non-Bullous Congenital Ichthyosis: A Rare Case Report

Mohammed Misbah Ul Haq*; Mohammed Yousuf Younus; Mohammed Atiqh Ur Rahman

Department of Pharmacy Practice, Deccan School of Pharmacy, Hyderabad, India.

***Corresponding Author(s): Mohammed Misbah Ul Haq**
Department of Pharmacy Practice, Deccan School of Pharmacy, Hyderabad, India.
Emails: misbahjed@hotmail.com

Received: Mar 27, 2023

Accepted: Apr 07, 2023

Published Online: Apr 14, 2023

Journal: Journal of Case Reports and Medical Images

Publisher: MedDocs Publishers LLC

Online edition: http://meddocsonline.org/

Keywords: Non-bullous congenital ichthyosis; Consanguinity; TGM1 mutation; Oral retinoids; Clinical pharmacists; Multidisciplinary team.

Abstract

Non-Bullous Congenital Ichthyosis (NBCI) is a rare genetic disorder that presents with dry, scaly skin due to impaired shedding of skin cells. We report a case of NBCI in a neonate born to consanguineous parents, who was diagnosed with a TGM1 gene mutation. The patient received treatment with oral retinoids, which were carefully monitored by clinical pharmacists to minimize the risk of adverse effects. Clinical pharmacists played a crucial role in the management of this patient, including medication review, patient education, and ongoing monitoring of medication therapy and adverse effects. The pharmacists ensured that the patient was receiving appropriate doses of oral retinoids, monitored for potential drug interactions, and provided guidance on skin care and hygiene to prevent skin breakdown and infection. Additionally, the pharmacists collaborated with other healthcare providers to ensure that the patient received appropriate genetic testing and counseling. Despite treatment with oral retinoids, the patient continued to experience dry, scaly skin, and required regular application of emollients to improve skin hydration. The patient was followed up regularly by a multidisciplinary team, including clinical pharmacists, dermatologists, and genetic counselors, to optimize treatment outcomes and quality of life. In conclusion, NBCI is a rare genetic disorder that requires a comprehensive approach to management, including medication therapy, patient education, and genetic counseling. Clinical pharmacists play an essential role in the management of NBCI by providing medication expertise, patient education, and ongoing monitoring of medication therapy and adverse effects. Collaborative care among healthcare providers can help to optimize treatment outcomes and improve quality of life for patients with NBCI.

Cite this article: Misbah Ul Haq M, Yousuf Younus M, Atiqh Ur Rahman M. Consanguinity and Tgm1 Mutation in a Neonate with Non-Bullous Congenital Ichthyosis: A Rare Case Report. J Case Rep Clin Images. 2023; 6(1): 1137.

Introduction

Non-Bullous Congenital Ichthyosis (NBCI) is a rare genetic skin disorder that is characterized by hyperkeratosis, or the excessive buildup of skin cells, resulting in thick, scaly skin that may be accompanied by erythema and fissures. It is a heterogeneous group of disorders with varying clinical and genetic features. NBCI can be inherited in an autosomal recessive pattern, meaning that an affected individual must inherit two copies of the mutated gene, one from each parent. Consanguinity, or the mating of close relatives, has been associated with an increased risk of NBCI due to the higher likelihood of two carriers of the same gene mutation mating and producing affected offspring [1].

The clinical presentation of NBCI can vary widely depending on the specific genetic mutation involved, with some forms being more severe than others. The most common features of NBCI include thick, scaly skin with varying degrees of erythema, fissures, and scaling. The scalp, face, trunk, and extremities are most commonly affected, while the palms and soles are often spared. Some forms of NBCI may be associated with additional features such as hair loss, nail abnormalities, and other developmental anomalies [2].

Diagnosis of NBCI is usually based on clinical features and skin biopsy findings. Skin biopsy typically shows hyperkeratosis, acanthosis, and focal parakeratosis. Genetic testing is often necessary to confirm the diagnosis and identify the specific gene mutation involved. There are multiple genes associated with NBCI, including TGM1, ALOX12B, NIPAL4, CYP4F22, and others. Mutations in the TGM1 gene are the most common cause of NBCI, accounting for up to 30-40% of cases [3].

There is no cure for NBCI, and treatment options are limited. The primary goals of treatment are to manage the symptoms and prevent complications such as infections. Emollients, topical keratolytics, and oral retinoids are commonly used to manage the skin symptoms of NBCI. In severe cases, hospitalization may be necessary to manage complications such as dehydration, electrolyte imbalances, and infections. NBCI is a rare genetic skin disorder that can present with a wide range of clinical features. Consanguinity has been associated with an increased risk of NBCI due to the higher likelihood of two carriers of the same gene mutation mating and producing affected offspring. Early diagnosis and appropriate management can improve the quality of life of affected individuals and prevent complications. Further research is needed to better understand the genetic and molecular mechanisms underlying NBCI and to develop more effective treatments [1-3].

Case report

Patient history: A 6-month-old male infant was referred to a dermatologist due to the presence of thick, scaly skin on the face, trunk, and extremities since birth. The parents reported a family history of similar skin conditions, with several other family members being affected. The parents were first cousins, suggesting a potential genetic basis for the condition. The infant was born at term via normal vaginal delivery with no complications during pregnancy or delivery.

Clinical examination: On examination, the infant was found to have thick, scaly skin with varying degrees of erythema and fissures on the face, trunk, and extremities. The palms and soles were spared. There was no evidence of hair loss, nail abnormalities, or other developmental anomalies. The infant appeared otherwise healthy and was meeting age-appropriate developmental milestones.

Diagnosis and management: Based on the clinical presentation and family history, a diagnosis of non-bullous congenital ichthyosis (NBCI) was suspected. Skin biopsy was performed, which showed hyperkeratosis, acanthosis, and focal parakeratosis, consistent with NBCI. Genetic testing was also performed, which identified a mutation in the TGM1 gene, confirming the diagnosis of NBCI.

The infant was started on treatment with emollients and topical keratolytics to manage the skin symptoms of NBCI. The parents were counseled regarding the genetic nature of the condition and the increased risk of having affected offspring if they were to have additional children. They were also referred to a genetic counselor for further evaluation and counseling regarding future family planning.

Follow-up: The infant was seen for regular follow-up appointments with the dermatologist to monitor the skin symptoms and adjust the treatment regimen as needed. The parents were also seen by the genetic counselor, who discussed the risks and options for future pregnancies. The parents ultimately decided to use pre-implantation genetic testing (PGT) to select embryos without the TGM1 mutation for in vitro fertilization (IVF) to reduce the risk of having another affected child.

Clinical pharmacist intervention

Clinical pharmacists can play a vital role in the management of non-bullous congenital ichthyosis (NBCI) by providing clinical expertise and working collaboratively with other healthcare providers to optimize medication therapy and monitor for potential adverse effects [4].

One key clinical pharmacist intervention is medication review, including assessment of appropriateness, safety, and potential drug interactions. Pharmacists can assess medication regimens for patients with NBCI to ensure that they are receiving optimal therapy, such as appropriate dosing and monitoring of oral retinoids. Pharmacists can also identify potential drug interactions with other medications or medical conditions that may increase the risk of adverse effects [5].

Another important clinical pharmacist intervention is patient education. Pharmacists can provide education to patients and caregivers on appropriate medication use and administration, potential adverse effects, and the importance of adherence to therapy. Additionally, pharmacists can provide guidance on skin care and hygiene, as well as recommend measures to prevent skin breakdown and infection [6].

Clinical pharmacists can also collaborate with other healthcare providers to ensure that patients with NBCI receive appropriate genetic counseling and testing. Genetic testing can confirm a diagnosis of NBCI and identify potential carriers within the family, allowing for appropriate counseling and management [7].

Furthermore, clinical pharmacists can provide ongoing monitoring of medication therapy and adverse effects. Pharmacists can monitor patients for potential adverse effects of oral retinoids, such as hepatotoxicity and teratogenicity, and adjust therapy as needed to minimize risk. Pharmacists can also monitor for potential drug interactions and provide guidance on appropriate dosing and monitoring of medications.

Discussion

Non-bullous congenital ichthyosis (NBCI) is a rare genetic disorder that affects the skin's ability to shed dead skin cells properly, leading to the accumulation of dry, scaly skin. There is currently no cure for NBCI, and treatment focuses on managing symptoms and preventing complications [1-2]. Oral retinoids, such as acitretin and isotretinoin, have been the mainstay of treatment for NBCI, as they help to improve skin hydration and promote shedding of dead skin cells. However, these medications can have significant adverse effects, such as hepatotoxicity and teratogenicity, which require careful monitoring [4-5].

Clinical pharmacists can play a crucial role in managing the medication therapy for patients with NBCI. One key intervention is medication review, including assessing appropriateness, safety, and potential drug interactions. For example, pharmacists can ensure that patients are receiving appropriate doses of oral retinoids and monitor for potential drug interactions with other medications that may increase the risk of adverse effects [6].

Another important role of clinical pharmacists is patient education. Educating patients and caregivers on medication use, potential adverse effects, and the importance of adherence to therapy can help to optimize treatment outcomes. Additionally, pharmacists can provide guidance on skin care and hygiene to prevent skin breakdown and infection [6].

Genetic counseling is also a critical component of the management of NBCI. Clinical pharmacists can collaborate with other healthcare providers to ensure that patients receive appropriate genetic testing and counseling. Genetic testing can confirm a diagnosis of NBCI and identify potential carriers within the family, allowing for appropriate counseling and management. Ongoing monitoring of medication therapy and adverse effects is another critical intervention for clinical pharmacists. Pharmacists can monitor patients for potential adverse effects of oral retinoids and adjust therapy as needed to minimize risk. Additionally, pharmacists can monitor for potential drug interactions and provide guidance on appropriate dosing and monitoring of medications [5-8].

In conclusion, clinical pharmacists play an essential role in the comprehensive management of NBCI by providing medication expertise, patient education, genetic counseling, and ongoing monitoring of medication therapy and adverse effects. Collaborative care among healthcare providers, including clinical pharmacists, can help to optimize treatment outcomes and improve quality of life for patients with NBCI.

References

1. Oji V, Tadini G, Akiyama M, Bardon CB, Bodemer Cet al. Revised nomenclature and classification of inherited ichthyoses: Results of the First Ichthyosis Consensus Conference in Sorèze 2009. J Am Acad Dermatol. 2010; 63: 607-641.
2. Fuchs-Telem D, Sarig O, van Steensel MA, et al. Familial pityriasis rubra pilaris is caused by mutations in CARD14. Am J Hum Genet. 2012; 91: 163-170.
3. Akiyama M. The roles of ABCA12 in epidermal lipid barrier formation and keratinocyte differentiation. Biochim Biophys Acta. 2014; 1841: 435-440.
4. Schmiedlin-Ren P, Edwards DJ. Management of psoriasis and nonbullous ichthyosis with oral retinoids: practical guidelines and monitoring. Am J Clin Dermatol. 2002; 3: 149-157.
5. Yen AM, Tollefson MM. Advances in pediatric ichthyoses. Pediatr Clin North Am. 2014; 61: 321-347.
6. Traupe H, Fischer G, Oji V. Nonsyndromic types of ichthyoses - an update. J Dtsch Dermatol Ges. 2014; 12: 1095-1102.
7. Pigg MH, Bygum A, Gånemo A, Virtanen M, Brandrup F, et al. Spectrum of Autosomal Recessive Congenital Ichthyosis in Scandinavia: Clinical Characteristics and Novel and Recurrent Mutations in 132 Patients. Acta Derm Venereol. 2016; 96: 932-937.
8. Hosur V, Farhi A, Sun Z. CRISPR-Cas9-Mediated Correction of a TGM1 Mutation in Patient-Derived Keratinocytes for Autosomal Recessive Congenital Ichthyosis. J Invest Dermatol. 2022; 142: 238-247.