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CHILD syndrome: A case report from a resource limited setting

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Abstract

Congenital hemidysplasia with ichthyosiform erythroderma and limb defect syndrome also known as CHILD syndrome is a rare X-linked defect inherited in dominant gene mode. An acronym, CHILD syndrome, was proposed by Happle et al in 1980. The first classical clinical presentation was described by Otto Sachs in 1903. The syndrome present with ichthyosiform skin patches demarcated on one side of the body accompanied with limb(s) defect on the same side. We present a 7 years old girl with clinically evident classical presentation of CHILD syndrome. To our knowledge this is the first case of CHILD syndrome reported in Tanzania.

Keywords

CHILD syndrome; ichthyosiform; erythroderma ichthosiform in resource limited settings; congenital naevus.

Introduction

CHILD syndrome is a rare X-linked genetic disorder caused by mutation of NSDHL (NADPH steroid dehydrogenase-like protein) at Xq28 gene. The mutation causes the defect in cholesterol synthesis [1] which is implicated for the phenotypic presentation of this syndrome [2]. In literature approximately 60 cases have been reported since it was first described in 1903 to date. It has predilection towards female heretozygous with an early male embryonic lethality [3]. The female to male ratio 19:1 [4] have been reported. It clinically present with unilateral inflammatory epidermal cutaneous lesions and ipsilateral limb hypoplasia.

Case Presentation

A 7 years old girl, fourth born to a non-consanguineous couple, presented to our district hospital (Sengerema District Hospital, Mwanza, Tanzania) outpatient section with red colored scaly skin lesion on

the left side of the body showing a characteristic strict midline demarcation, and ipsilateral limb defect. The clinical symptoms were noted at birth. Mother had an uneventful pregnancy and no family history of the same or any abortion in her life so far. Physical examination revealed left-sided erythematous patches with dry yellowish scales on the posterior aspect of the upper limb, lower part of the trunk and buttock (Figure 1A & D). The upper part of the back, neck, face and anterior aspect of the body were spared. Left hand fingers were also involved whereby the thumb, second and fifth fingers nails were covered with raspberry-like scaly lesions (Figure 1B). There were patches of alopecia on the left side of the head. The left lower limb has dry scaly lesion on the medial aspect of the thigh. No skin lesions on the left leg and foot except for obvious shortening with leg-length discrepancy (anisomelia) of 10 centimeters and left side bending of the thoracic spine which most likely results from compensation of the limb deformity. Laboratory investigations revealed normal full blood count. Ultrasound revealed no abnormality of the intra-abdominal organs. Liver and renal function tests were within normal limits. Echocardiogram was normal. On the account of a well and apparent clinical picture the diagnosis of CHILD syndrome was made. Genetic studies were not possible due to unavailability.

(A) (B) (C) (D)

Figure 1: Erythematous skin lesions on the posterior aspect of the left upper limb, obvious kyphoscoliosis and short left lower limb(A). Raspberry like verrucous lesions are seen covering the nails of the thumb, second and fifth fingers (B).

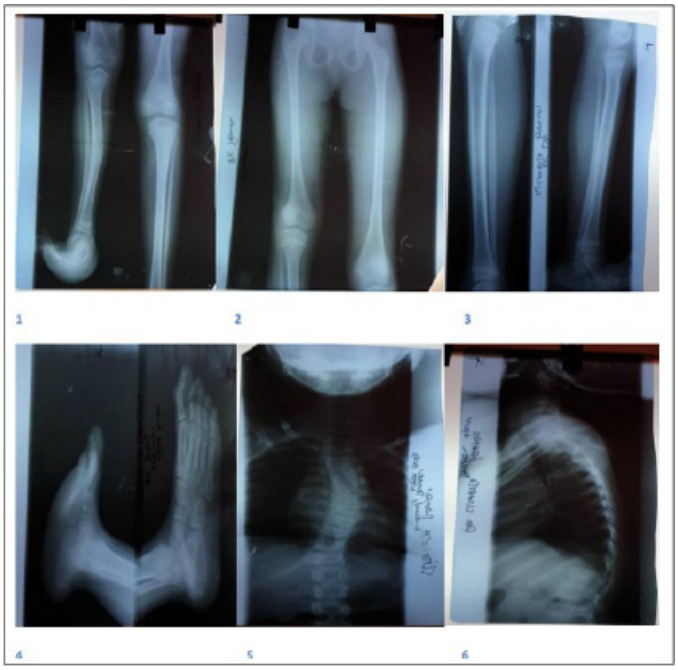

Figure 2: Features of osteodysplasia on the left femur and hypoplasia on the left limb with shortening (1, 2 & 3). Thoracic kyphoscoliosis was observed with normal vertebrae and disc spaces (5 & 6)

Discussion

Cholesterol is one of the important structural components of the cell membrane and membrane of cytoplasmic organelles which maintains membranes fluidity. CHILD syndrome occurs as a result of mutation in the NSDHL (NADPH steroid dehydrogenase-like protein) at Xq28 gene that encodes a 3-b-hyroxysteroid dehydrogenase [2]. Mutation in the X-linked NSDHL gene results into the loss of function and thus affecting the cholesterol biosynthetic pathway [5,6]. This results in low cholesterol in the body. Defective metabolism lead into accumulation of toxic cholesterol metabolites and abnormal sonic hedge-hog signaling which is useful in the patterning of embryos [3]. Reduction in the activity of NSDHL gene affect the availability of cholesterol in the stratum corneum resulting into a loss of epidermal barrier function observed in CHILD syndrome [7]. Cholesterol synthesis is essential in the formation and maintenance of the stratum corneum which provide a cutaneous barrier. Therefore, this explains the clinical and histological abnormalities observed with this syndrome [8]. The extent of physical presentation differs from one individual to another most likely due to the extent of X inactivation pattern. Phenotypically it is characterized by strictly midline demarcated nevus with ipsilateral limb defect of varying degrees [9]. Lesions are usually limited to one side of the body, most of the time the right side. Left-sided patients have severe visceral presentation and higher probabilities of early death [10]. Face and mucosa are usually spared like in our patient. The severity of limb defect varies from complete absence of the entire limb, absence or hypoplasia of small bones [11–13] and internal organs may as well be affected [3,5], however our patient did not have any internal organs malformation on ultrasound. Bone scan by X rays in our patient revealed thoracic kyphoscoliosis with normal vertebrae, disc spaces and paravertebral tissues. The left femur was shorter with features of osteodysplasia. The extra-cutaneous abnormalities comprise neurologic abnormalities like ipsilateral hemispheric hypoplasia, skeletal defects, cardiac anomalies, deafness, and absence or hypoplasia of the same side visceral organs [8,14]. Majority of cases present at birth like our patient even though reported to us at age of 7 years. There have been no exacerbations of the skin lesions except for recurrent purulent bacterial infections treated using antibiotics. Topical applications like lotions or ointments containing simvastatin or lovastatin mixed with cholesterol have shown to achieve improvement by reducing inflammations, skin thickening, and scaling of the nevus in CHILD syndrome [5,15,16]. Skin grafting and dermabrasion have also been successful in some cases [17]. Apart from life threatening cardiac malformations reported [8,18], a case of squamous cell carcinoma was reported in a 33 years old female with CHILD syndrome [19]. The average age of survival has not been established in this syndrome.

Conclusion

CHILD syndrome is rare. Understanding its classical clinical presentation and initiating early care of the skin lesions is vital. This will minimize recurrent superimposed bacterial infection on the skin lesions.

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