

A Rare Case of Mainly Unilateral Focal Dermal Hypoplasia (Goltz Syndrome) in an Adult Male: A Case Report and Review of the Literature

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Abstract

Focal dermal hypoplasia (Goltz syndrome), is an exceedingly rare X-linked dominant genetic disorder. It is a multisystem disease, but it is hallmarked by characteristic skin changes. Focal dermal hypoplasia typically occurs in females (90%), and males are thought to only survive through having either a sporadic new mutation or somatic mosaicism. This report details a 48-year-old male diagnosed with predominately unilateral focal dermal hypoplasia that was reviewed decades post his initial diagnosis. He presented with multiple atrophic hyperpigmented macules and fat herniation along the lines of Blaschko, across primarily the right side of the body. Skin biopsy is the mainstay for the diagnosis and therefore dermatologists need to be aware of the classical cutaneous findings of familial dermal hypoplasia to ensure accurate diagnosis. Familial dermal hypoplasia is best managed through the collective minds of multidisciplinary teams.

Keywords: Focal dermal hypoplasia; Goltz syndrome; Male; Unilateral; X-linked dominant condition; Fat herniation

Introduction

Focal dermal hypoplasia (FDH), also known as Goltz syndrome, is a rare genetic disorder [1]. It is a multisystem disorder, classically affecting the skin, but also the teeth, eyes, face, skeletal, cardiovascular, central nervous and gastrointestinal systems [2]. It is inherited as an X-linked dominant condition, and it is characterised by typical reticulate or linear atrophic macules, papillomas, fat hernias and associated with multiple dental, skeletal and ocular defects [2]. This report describes an exceedingly rare case of congenital FDH, predominately affecting the right side of the body.

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Case Report

A 48-year-old male was day 1 post a laparoscopic cholecystectomy and repair of umbilical hernia, where he additionally had an outpatient dermatology clinic for a periodic review of his FDH. He was diagnosed with FDH in early childhood at age 5. He had initially presented with asymptomatic non-healing skin lesions that affected mainly his right hand side of his body. Additionally, he was found to have syndactyly of hands and feet, digit hypoplasia, fingernail deformity, dental misalignment, hypodontia and nail thickening. He had normal milestones and development. His blood tests were normal, and a skin biopsy showed dermal atrophy with thin collagen fibres and impacting adipose tissue, which is consistent with a diagnosis of FDH. No molecular testing was completed.

Upon review during his appointment, he was noticed to have multiple atrophied hyper and hypopigmented macules, papules and fat herniation along the lines of Blaschko (Fig. 1a, b), predominately affecting the right side of the patient. Additional cutaneous examination revealed scattered telangiectasia (Fig. 2).

He has a past history that includes gastroesophageal reflux disease, urinary tract infections, coronary artery bypass, basal cell carcinoma and squamous cell carcinoma. He has had multiple surgeries including an appendicectomy, tonsillectomy, repair of umbilical hernia, correction of dental alignment and surgical correction of finger and toe syndactyly. He currently takes esomeprazole, perindopril and panadeine forte and has given up on using regular moisturiser, as nothing in particular seems to aid his skin. He lives independently, works in administration and socially drinks alcohol and is a non-smoker. He is the first person in his family to be diagnosed with FSH, and he is yet to have children.

Mainly his general practitioner is currently managing him, with periodic input by a dermatologist. Ophthalmologists, pediatricians, oral and maxillary surgeons and general surgeons have all been involved in a multidisciplinary management approach.

Discussion

Although remarkably rare, FDH is a significant disorder that affects multiple body systems. It is an X-linked dominant



Figure 1. (a) Clinical photograph of the patient's back. This photograph demonstrates the atrophy, pigmentation skin changes and fat herniation along the lines of Blaschko that are seen in FDH. These changes are seen predominately unilaterally, on the right side. (b) Clinical photograph of the patient's right arm and torso. This photograph demonstrates the atrophy, pigmentation skin changes and fat herniation along the lines of Blaschko that are seen in FDH. FDH: focal dermal hypoplasia.

condition, caused by mutations to the *PORCN* gene on chromosome Xp11.23. This is responsible for the encoding of a



Figure 2. Clinical photograph of the patient's right side of his face. The photograph demonstrates the telangiectasia that is seen in FDH across the cheek. FDH: focal dermal hypoplasia.

protein involved in Wnt signalling embryogenesis [3, 4]. The protein is responsible for the endoderm, mesoderm and ectoderm development during embryogenesis [3, 4]. FDH is normally lethal in males, and this is evidenced by still births, miscarriages and through the lack of transmission from father to son [5]. Only 10% of cases occur in males, and survival is thought to be due to either sporadic new mutation or somatic mosaicism [5-7]. Consequently, there are not many published case reports on male patients. The variations in the severity of FDH are thought to be caused by either post-zygotic genomic mosaicism or X chromosome lyonization [8].

FDH was first described by Goltz in 1962; he described three females who had severe congenital thinning of the skin and yellow papules, which represented herniation of adipose tissue [9]. The primary diagnostic features of FDH are skin changes [10]. These include patchy congenital skin aplasia following the lines of Blaschko (95%), which are white or pink in color and represent hypoplastic or atrophic areas of skin [11]. Congenital hyper- or hypopigmentation occurs in approximately 95% of patients, and again follows the lines of Blaschko. Fat nodules in the dermis of the trunk and extremities represent congenital fat herniation (65%). Other skin conditions include telangiectasias (80%), pebbled textured skin (60%), papillomas (60%) and photosensitivity [11]. Other cutaneous manifestations can include hair abnormalities including abnormalities of the hair shaft (85%), scalp alopecia (80%) and nail abnormalities that can include hypoplastic, dysplastic and ridged nails (85%) [10, 11].

The next most common extracutaneous manifestations are skeletal abnormalities; these are seen in approximately 50-90% of cases [5, 8, 11]. These include ectrodactyly, syndactyly, polydactyly, oligodactyly, digit hypoplasia and vertebral abnormalities. Additionally, dental manifestations can include dental crowding, hypodontia, supernumerary teeth, oligodontia, microdontia, enamel defects and root morphology abnormalities [12, 13]. Ocular manifestations can occur in FDH, ranging from 20% to 60% and can include microphthalmia, iris and chori-

retinal colobomas, nystagmus, cataracts and strabismus [5, 8, 11]. Other abnormalities can include horseshoe kidneys, hernias, hearing defects, intellectual disability and congenital heart disease [11, 14]. From published research relating to FDH, there are only nine cases of unilateral/almost unilateral FDH, out of approximately 250 cases [15-22]. This report demonstrates a rare case of FDH presenting with unilateral symptoms and will subsequently only be the 10th unilateral FDH published in the literature and only the second male case.

The differential diagnosis of FDH includes incontinentia pigmenti, MIDAS (microphthalmia, dermal aplasia, and sclerocornea), Rothmund-Thomson syndrome, nevus lipomatosus superficialis, Adams-Oliver syndrome and aplasia cutis [23]. The gold standard for diagnosis includes a skin biopsy of an atrophic lesion [23]. The histopathology shows a thinned epidermis, hypoplastic dermis and the epidermis being impinged by adipose tissue [23, 24]. Scattered collagen bundles are seen on electron microscopy, and detection of the *PORCN* gene mutation through gene sequence analysis can also be performed [24]. Treatment of FDH involves mainly supportive therapy as currently; there is no effective treatment [25]. A multidisciplinary approach is imperative, and requires specialist teams including a dermatologist, pediatrician, ophthalmologist, plastic and orthopaedic surgeons.

Telangiectasia and papillomas can be treated with dye laser and cryotherapy [26]. The physical and functional problems related to FDH may require psychological input. Genetic counselling is imperative for preventative measures [3, 26]. For females, the prognosis is excellent and the life expectancy may be normal [3, 26]. The prognosis for males is utero lethality or if a mutation is present, 10% may survive. However, there is insufficient data pertaining to prognostic outcomes.

Conclusions

Although very rare, early recognition of familial dermal hypoplasia is important to ensure reduced morbidity and timely effective intervention. Skin biopsy is the mainstay for the diagnosis and therefore dermatologists need to be aware of the classical cutaneous findings of familial dermal hypoplasia to ensure accurate diagnosis. Familial dermal hypoplasia is best managed through the joint minds of multidisciplinary teams, which may include dermatologists, pediatricians, plastic and orthopaedic surgeons. Particularly in females, the prognosis is often good and the life expectancy may not be altered. Once diagnosed, genetic counselling is important for preventative measures.

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Conflict of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Informed Consent

Informed consent was gathered from the patient for publication of the case and accompanying photos.

Author Contributions

Duncan Lyons retrieved the case information and wrote the initial manuscript. Christopher Rushton and Sandeepal Sidhu edited the manuscript for submission.

Data Availability

The authors declare that data supporting the findings of this study are available within the article.

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