Chronic Ulceration of the Scalp Associated with Genetically Different Types of Congenital Ichthyosis: A Series of Four Cases

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The term "congenital ichthyoses" refers to a heterogeneous group of monogenic diseases with gene mutations resulting in a defective skin barrier (1). On the scalp, the scales may be thick and patients may present scarring alopecia, the features of which are not that well known (2–4). There has only been one report of chronic ulceration localized to areas of alopecia to date (5).

CASE REPORTS

This paper focuses on 4 new patients. Their characteristics are presented in **Table I**. All are females presenting very severe and genetically different types of congenital ichthyosis (*TGM1* mutations ($n=2$), *ABCA12* ($n=1$), *KRT10* ($n=1$)). Alopecia presented as denudation centred on the crown (**Fig. 1**), except in the case of patient 2 who had total alopecia. Interestingly, the ulcerations were localized exclusively in areas of total baldness (Fig. 1). These

Table I. Characteristics of the 4 patients in the current case series, and of the case published by Kempton et al. (5)

Patient reference or number	P1	P2	P3	P4	Kempton et al., 2018 (5)
Sex	F	F	F	F	M
Medical history	–	Metastatic breast cancer (deceased)	–	–	–
Form of ichthyosis/gene involved	Lamellar ichthyosis/ *TGM1*	Lamellar ichthyosis/*TGM1*	Ichthyosis with confetti/*KRT10*	Harlequin ichthyosis/ *ABCA12*	Lamellar ichthyosis/ND
Oral acitretin therapy (mg/kg/day)	0.5 (started at 18 years of age)	0.3–0.7 (started at 33 years of age)	1 (started at 2 years of age)	1 (since birth)	ND
Age at evaluation (years)	20	68	21	13	20
Severity of scales/erythema (0–10)	8/3	8/8	8/10	6/10	ND/ND
Severity of palmoplantar keratoderma (0–10)	4	8	5	5	ND
Severity of ectropion	Moderate	Very severe	Very severe	Very severe	ND
Global severity of ichthyosis	Very severe	Very severe	Very severe	Very severe	ND
Baldness	Incomplete	Complete	Incomplete	Incomplete	Incomplete
Age at onset of ulceration(s)/ duration of follow-up (years)	19/1	67/1	4/17	1/12	13/7
History of ulceration(s)	Stable	Stable	Transient healing/ improvement	Transient healing/ improvement	Stable
Trigger factor	–	–	–	–	Trauma
Wig or scarf	Scarf	Wig	Wig	Wig	ND
Number of ulcerations (maximum diameter)	1 (7 cm)	4 (3 cm)	3 (1 cm)	1 (6 cm)	1 (4 cm)
Location of the ulceration(s)	Vertex	Parietal	Vertex	Vertex	Vertex
Features of the ulceration(s)	Oval, clearly delineated, hypertrophic	Round, clearly delineated, hypertrophic	Round or irregular, superficial, crusty	Round, slightly hypertrophic	Round, clearly delineated
Pustules around the ulceration(s)	+	+	+	+	+
Pain or pruritus	Pruritus	–	–	Mild pain	Pruritus
Infectious samples	*Staphylococcus aureus*	*Staphylococcus aureus* and a few colonies of *Candida albicans*	NP	None (bacteria, fungus, virus)	*Staphylococcus aureus*
Skin biopsy	Non-specific inflammatory ulceration	– Biopsy 1: non-specific inflammatory ulceration – Biopsy 2: *in situ* squamous cell carcinoma	Non-specific inflammatory ulceration	Non-specific inflammatory ulceration	NP
Ineffective treatment(s)	Steroid ointment, oral antibiotics (including sulfamethoxazole / trimethoprim)	Oral antibiotics (amoxicillin-clavulanic acid, josamycin, doxycycline)	–	– Decreased dosage of acitretin – Topical tacrolimus 1%, fusidic acid or hydrocortisone	Hydroxyzine, griseofulvin, cefalexin, dapsone, diluted bleach baths
Effective treatment(s)/ outcomes	Intralesional triamcinolone injections/ improvement		–	Topical betamethasone + gentamicin/improvement	– Intralesional triamcinolone injections + clobetasol ointment/improvement – Chorion membrane allograft/healing

F: female; M: male; NA: not applicable; ND: not determined; NP: not performed, P: patients.

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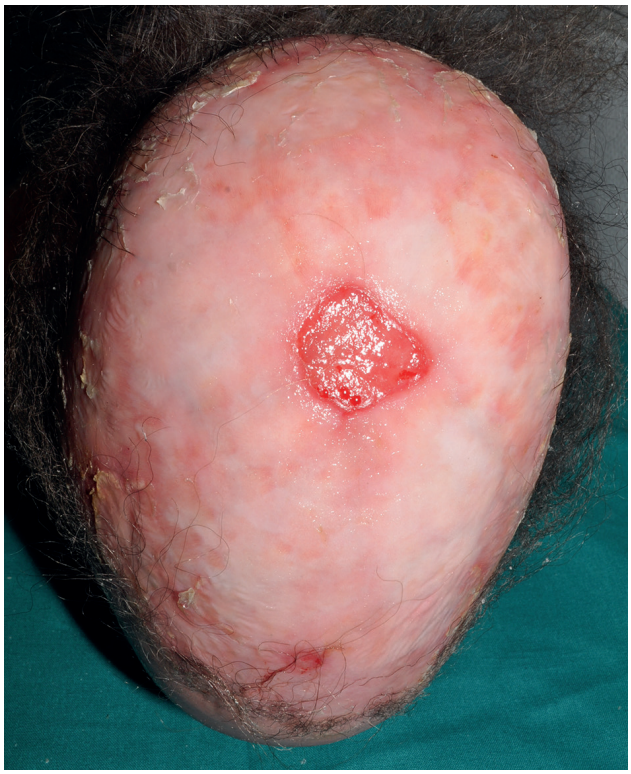

Fig. 1. Scalp ulceration in bald areas in patient 4.

areas were atrophic and covered by erythematous patches, small erosions and crusts. The hairy scalp was covered with scales. All patients reported intermittent surrounding pustular lesions. The ulceration(s) had appeared during childhood or adulthood, with no apparent trigger factor, and were chronic with transient periods of improvement. All patients received long-term oral acitretin therapy from the outset and wore a wig/scarf (without hairpins). Bacterial swabs revealed abundant *Staphylococcus aureus* in 2 cases. Histological examination of the ulcerations confirmed non-specific inflammatory ulceration (ulcerated epidermis replaced by fibrin and leukocyte exudate, underlying oedematous dermis with numerous capillaries, inflammatory infiltrate [lymphocytes, histiocytes, plasmocytes and polymorphonuclear neutrophils]). A second biopsy taken from patient 2 also revealed *in situ* squamous cell carcinoma. Topical or intralesional steroids improved the ulceration, but did not promote complete recovery.

DISCUSSION

The only patient reported with a similar lesion was a young man presenting lamellar ichthyosis, who was treated successfully with dehydrated human amnion/chorion membrane allograft (5). The author concluded the patient had erosive pustular dermatosis of the scalp (EPDS), a rare entity clinically characterized by chronic eruption of scalp pustules, erosions, crusts and scarring alopecia. Although EPDS has occasionally been reported in children, it mostly affects older individuals with androgenetic alopecia and actinic damage of the scalp, and is often preceded by trauma (6). The characteristics of our 4 patients do not closely match the diagnosis of EPDS (2 children and a young woman, no sun exposure as they avoided the sun and wore a wig/scarf, no reported trauma). The cause of such ulceration is unknown. Staphylococcal growth may represent secondary colonization. These ulcerations may be linked to skin barrier anomalies responsible for abnormal inflammatory processes and disturbed microflora. Gene mutations may also be responsible for the selective expression of antigenic proteins by hair follicles (3). Other contributory factors cannot be ruled out: repeated trauma/maceration secondary to wearing a wig or scarf and pruritus. Scalp ulcerations might also be an unusual and uncommon side-effect of long-term retinoid therapy.

The presence of in-situ squamous cell carcinoma in one patient raises questions. It may be due to the skin-ageing process (despite long-term sun avoidance) but could also be indicative of the potentially cancerous nature of these chronic ulcerations. Close follow-up is therefore required.

In conclusion, these new cases increase our knowledge of alopecia-related scalp anomalies, but further studies are required in order to gain a better understanding of this rare condition and identify new treatments.

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