A Sporadic Case of Ichthyosis Bullosa of Siemens

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Few cases of ichthyosis bullosa of Siemens(IBS) have been reported since 1939, as a distinct entity from bullous congenital ichthyosiform erythroderma(BCIE). IBS can be differentiated from BCIE by the absence of congenital erythroderma and a different distribution of involved skin area. It's characteristic features include blistering, superficial erosion or moulting of the outer skin.

Histological features are tonofilaments aggregation confined to the granular and upper spinous layer of the epidermis. However, in BCIE these findings are present in the whole suprabasal compartment.

The original reports of Siemens and cases from other authors showed an autosomal dominant inheritance. Our patient developed IBS sporadically without a familial background.

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Key Words : Ichthyosis bullosa of Siemens(IBS) Bullous congenital ichthyosiform erythroderma(BCIE) sporadic

Ichthyosis Bullosa of Siemens(IBS) is a mild type of epidermolytic hyperkeratosis first described by Siemens in 1939 as an entity distinct from bullous congenital ichthyosiform erythroderma(BCIE)[1]. IBS can be differentiated from BCIE by the absence of congenital erythroderma and a different distribution of involved skin area.

It is characterized by mild changes particularly on the flexures, shins and the periumbilical region. Blistering occurs in response to mild physical trauma and results in superficial erosion or moulting of the outer skin[2,3]. Electronmicroscopic examination shows that the tonofilaments aggregation is confined to the granular and upper spinous layer of the epidermis , whereas in BCIE these findings are present in the whole suprabasal compartment[4].

Since the original report by Siemens and cases from other authors, all the reported cases are autosomal dominantly inherited.

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Kim reported a sporadic case of IBS in a Korean boy in 1995[5], and we report another sporadic case of IBS with no familial background.

REPORT OF A CASE

A 3-year-old boy presented with blistering and dark grey hyperkeratosis which he had had since 100 days of age. There was no family history of such a condition(Fig. 1). Apart from his dermatologic disease the boy was healthy. He had never suffered from erythroderma. Blisters developed after mechanical trauma and appeared to be related to hyperhidrosis of the hands and feet. During the summer, the bullae occurred more frequently.

On examination, he displayed several intact and ruptured bullae on the left shin and right upper arm. Dark grey hyperkeratoses covered the flexural aspects of the extremities, buttocks, ankle, the medial aspects of the thighs and neck(Fig. 2). Furthermore, circumscribed parts of the axillae, the upper flexural aspects of the arms, the periumbilical area, and the lower part of the back were involved. On the lower aspects of the legs, knees and the dorsa of the hands and feet, superficially denuded areas were

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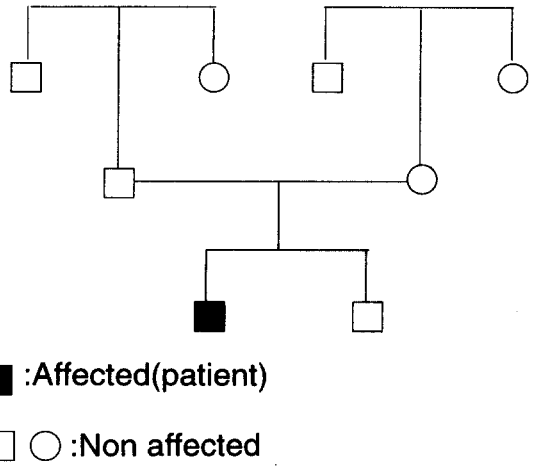

Fig. 1. The patient's pedigree. There was no family history of such a condition.

noted(Fig. 3), the bottom of which appeared to be of increased thickness(moulting effect). The nails and hair were normal.

Light microscopic examination revealed subcorneal blisters with a basket weave patterned hyperkeratosis. The granular layer exhibited the granular degeneration which is characteristic of epidermolytic hyperkeratosis(Fig. 4).

On electron microscopic examination the keratinocytes of the granular and upper spinous layers showed marked cytoplasmic edema. There were thickened bundles of regular tonofilaments and clumps of tonofilaments composed of filamentous material of moderate electron density. Keratinization of the tonofilaments resulted in irregularly shaped electron-dense inclusions(figure 5 A,B).

He was treated with an ointment containing corticosteroid,urea and tretinoin. The skin became smoother with this therapy, but the scaling and superficial denudation continued.

DISCUSSION

Ichthyosis bullosa of Siemens(IBS) is an autosomal dominantly inherited mild type of epidermolytic ichthyosis, characterized by circumscribed dark grey hyperkeratoses particularly on the flexures, shins and periumbilical region. Blistering occurs in response to mild physical trauma and results in superficial erosion or 'moulting' of the outer skin. Light microscopic findings show epidermolytic hyperkeratosis in the granular and uppermost spinous layer. Electron microscopic examination shows that the filament aggregation is confined to the granular and upper spinous layer of the epidermis

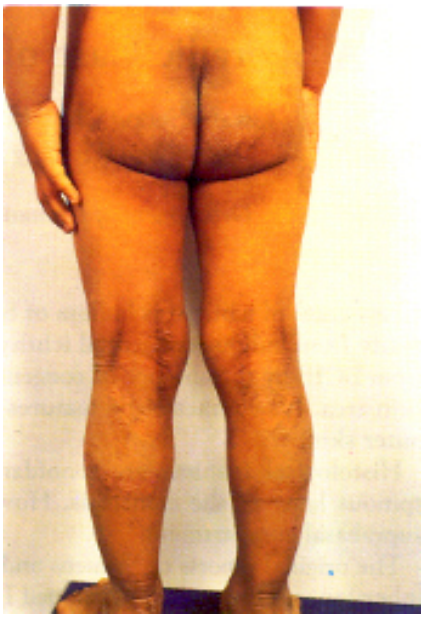

Fig. 2. Dark grey hyperkeratoses are covering the flexural aspects of the extremities, buttocks, ankle and the medial aspects of the thigh.

IBS has been considered as a distinct entity from BCIE by it's milder hyperkeratosis and blistering. Furthermore, it can be differentiated by the absence of congenital erythroderma and different distribution. Light and electron microscopic findings show that the features of the epidermolytic hyperkeratosis and keratin filament aggregation is confined to the stratum granulosum and upper part of of the stratum spinosum, whereas in BCIE these findings are present in the whole suprabasal compartment.

The cytoskeleton of epithelial cells is largely composed of keratin intermediate filaments which are sequentially changed to other subfamilies as the keratinocytes differentiate[6,7].The basal cells predominantly express keratin K5(type II) and K14(type I), and it is replaced by K1 and K10 in suprabasal cells. An additional type II keratin, K2e which is similar to K1 in structure,are reported to appear in the third and fourth cell layers of the epidermis. The point mutation in keratin gene K5 and K14 lead to various forms of epidermolysis

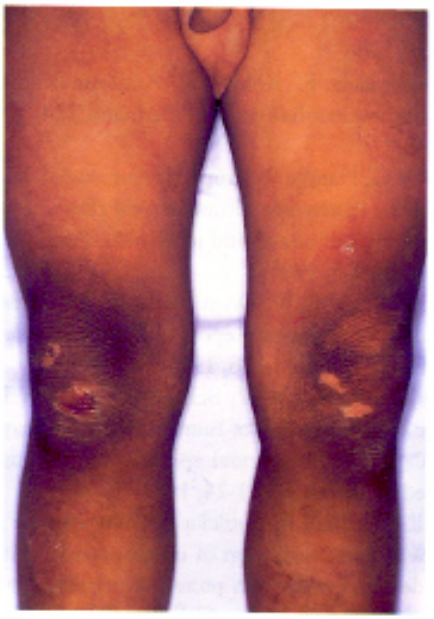

Fig. 3. Superficially denuded areas were noted on the knee. The bottom of these stripped skin areas appeared to be normal (moulting effect).

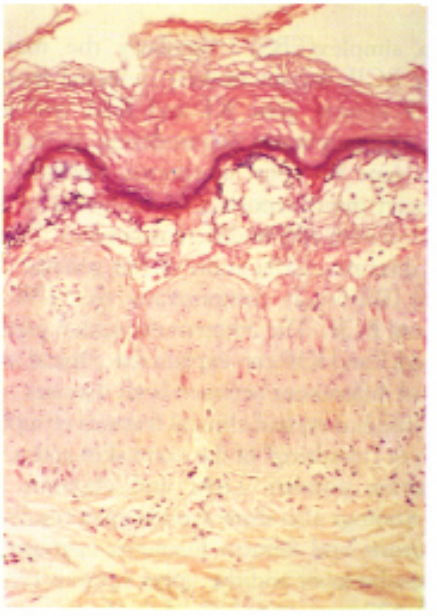

Fig. 4. Light microscopic examination revealed subcorneal blisters with a basket weave patterned hyperkeratosis. The granular layer exhibited granular degeneration which is characteristic of epidermolytic hyperkeratosis(H & E stain, ×200).

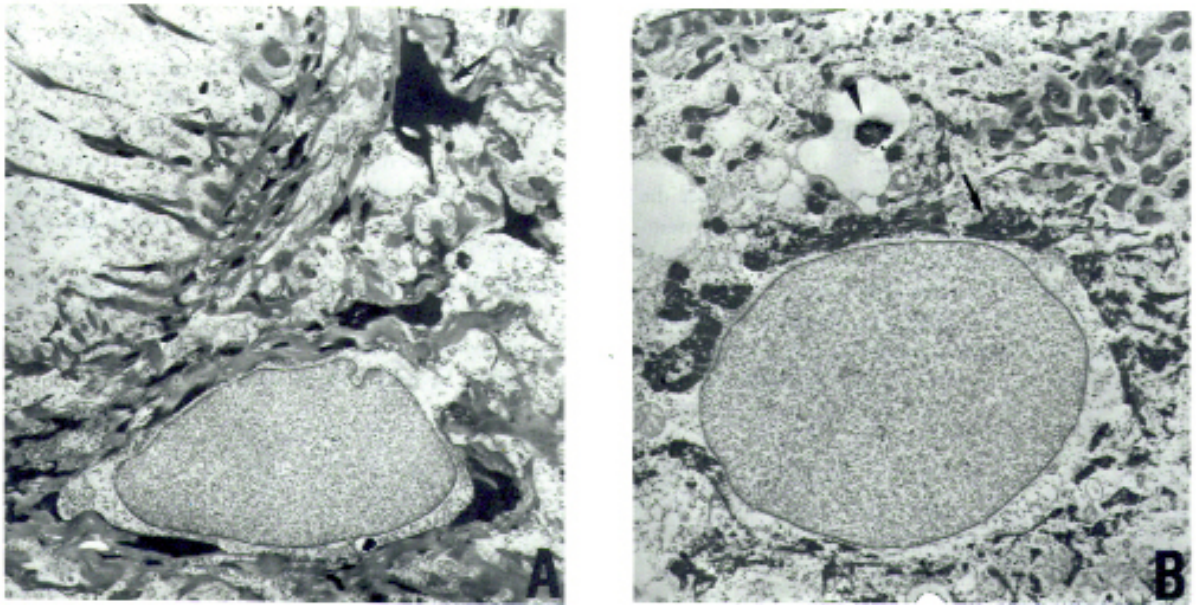

Fig. 5(A,B). On electron microscopic examination, thickened bundles (arrow,figure 5A) of regular tonofilaments and clumps(arrow,figure 5B) of tonofilaments composed of filamentous material of moderate electron density. Keratinization of the tonofilaments resulted in irregularly shaped electron-dense inclusion(arrowhead,figure 5B)(×7,000).

bullosa simplex(EBS)[8]. Similarly the mutations causing BCIE are exclusively detected in the regions of keratin gene K1 and K10, and epidermolytic palmoplantar keratoderma is caused by keratin gene K9 point mutations. Recently, there have been many reports that mutation of K2e is associated with IBS in different families[9,10,11].

The discrete clarification of the genetic defects causing IBS finally demonstrates that IBS is distinct from BCIE. The different expression patterns of k2e and k1 and K10 can explain the clinical and histological differences between both diseases.

Our case has typical clinical features of superficial erosion or "moulting" of the outer skin and a typical distribution pattern. Light and electron microscopic findings also show typical epidermolytic hyperkeratosis and keratin filaments aggregation in the granular layer and the upper spinous layer. We have done genetic analysis of the keratin gene K2 and the result showed a mutation at the end of beta-domain of K2e. The detailed result of the genetic analysis was submitted to Arch. Dermatol.. Compared to most previously reported cases, our patient had no hereditary background.

In conclusion, our patient is another report of sporadic case of IBS which showed typical clinical features of "moulting".

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