Bilateral Eyebrow Sclerosis: A New Clinical Entity

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Summary: We report a man with sparse eyebrows and recurrent bilateral subcutaneous nodules beneath the eyebrows. Their histopathologic features were sclerosis of a subcutaneous lesion. The proliferation of muscle was not obvious and inflammatory cell infiltration was inconspicuous, but some dilated capillaries were noted. Collagen was regularly interlaced, thickened, and hyalinized with dispersed fibroblasts. Various skin tumors can occur on adult faces, but this presentation, to our knowledge, was unique and could not be characterized as a known condition. Plastic surgeons, dermatologists, and pathologists may encounter similar conditions, so it should be considered as a new clinical entity called bilateral eyebrow sclerosis. This may be of comfort to patients with similar conditions. Moreover, we propose enlarged resection to include the skin surface and underlying muscles as an effective treatment for recovery of the eyebrows and prevention of recurrence.

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Our patient had bilateral subcutaneous sclerosis beneath the eyebrows, a unique presentation to our knowledge. Fibrotic or sclerotic skin diseases include various conditions, such as systemic sclerosis, localized scleroderma, eosinophilic fasciitis, lichen sclerosus, hypertrophic scars, and keloids. Diagnosis of these diseases can sometimes be difficult due to the lack of specific features other than fibrosis or sclerosis, and these conditions are often irreversible and/or resistant to treatments. Our patient’s manifestation did not match with various previously reported conditions, so we suspect this may be a new clinical entity.

CASE REPORT

A 30-year-old Japanese man visited our hospital for treatment of swollen bilateral eyebrows. There was no family history of any similar conditions. He had atopic dermatitis, but the eczematous changes were slight and did not require treatment. He noticed subcutaneous nodules on both eyebrows without known cause 1 year before the first visit (Fig. 1). The lesions gradually became larger and more easily visible, and the eyebrows became sparse.

After incisional biopsy, simple bilateral enucleation was performed. The lesions recurred up to the same size, however, and surgical enucleation was performed again after 1 year. (See figure, Supplemental Digital Content 1, which displays additional clinical pictures. Clinical picture of recurrent lesions 1 year after first operation, http://links.lww.com/PRSGO/B399.) The patient presented regrowth of the tumor within 2 years after the second resection. The sparse eyebrows did not recover.

Thirteen years since the second excision, the patient visited our hospital again and hoped for relapsed lesions to be resected. By that time, the patient had developed type 2 diabetes and was treated with dapagliflozin propylene glycolate hydrate and voglibose. On physical examination, subcutaneous nodules beneath the left and right eyebrows were found to be 10 × 15 and 30 × 20 mm, respectively (Fig. 2). The sparsity of the eyebrows had exacerbated. Laboratory results of blood cell counts, blood chemistry analysis, chest radiography, electrocardiography, and pulmonary function tests were within normal limits, except for high blood glucose levels. Ultrasonography depicted subcutaneous hyper-echoic lesions (See figure, Supplemental Digital Content 1. Clinical manifestation and surgical procedure at third operation. A. Ultrasonographic findings, http://links.lww.com/PRSGO/B399.) MRI revealed nonspecific findings of ill-defined bilateral subcutaneous lesions showing low signal intensity on both T1- and T2-weighted images beneath the eyebrows (See figures, Supplemental Digital Content 1. Clinical manifestation and surgical procedure

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at third operation. B, MRI (T2-weighted image) findings. Yellow arrow indicates the lesion, [http://links.lww.com/PRSGO/B399](http://links.lww.com/PRSGO/B399). The third series of surgical procedures were performed under local anesthesia using 0.5% lidocaine with 1:100,000 epinephrine. A skin incision of approximately 3 cm was designed in the lower part of both eyebrows (See figures, Supplemental Digital Content 1. C, The incision line at the third operation, [http://links.lww.com/PRSGO/B399](http://links.lww.com/PRSGO/B399).), and scar-like tissue located in the subcutaneous layer was removed (See figures, Supplemental Digital Content 1. D, Macroscopic image at the resection. [http://links.lww.com/PRSGO/B399](http://links.lww.com/PRSGO/B399)).

Histopathologic features were similar to those of the incisional biopsy, first, second, and third resection: skin sections showed sclerosis of mainly subcutaneous lesions (Fig. 3). The epidermis was slightly thickened, and eyebrow appendages including follicles were intact, but the fat tissue was replaced by collagens. Proliferation of muscle was not obvious, and inflammatory cell infiltration was inconspicuous, but some dilated capillaries were noted. Collagen was regularly interlaced, thickened, and hyalinized with dispersed fibroblasts (See figures, Supplemental Digital Content 1. Histopathologic findings: high magnification (H&E, original magnification ×100). Collagen was regularly interlaced, thickened, and hyalinized with dispersed fibroblasts, [http://links.lww.com/PRSGO/B399](http://links.lww.com/PRSGO/B399)).

No recurrence was detected for 6 month after the fourth operation, and notably, regrowth of the eyebrows was observed after 2 months: despite the removal of about half of the eyebrow skin, the sparsity of the eyebrows improved from the remaining hair follicles (Fig. 4).

**DISCUSSION**

The histopathologic feature of this patient was sclerosis, not fibrosis with cellular infiltration. We considered hypertrophic scars, keloids, morphea profunda, and rhabdomyomatous mesenchymal hamartoma as the differential diagnoses of his eruptions.

Of these, hypertrophic scar was the most histopathologically compatible. The original trigger in our patient could have been scratching due to atopic dermatitis. If that was the case, the relapses may have also been caused by surgical resection themselves. However, bilateral lesions are not typical of hypertrophic scars. Moreover, although atopic dermatitis is very common, similar conditions specifically found in the eyebrows have not been reported elsewhere.

Keloids are compatible with the nature of growth than the original wounds themselves, as seen in our case. Cellularity was histopathologically very sparse, however, and the lesion was mainly seen in subcutaneous tissue, not in dermis.

Deep morphea, previously known as morphea profunda, is a rare variant of localized scleroderma. Inflammation and collagen deposition occur in the deep dermis, fat tissues, fascia, or even the underlying superficial muscle. In our patient, however, inflammatory cells were not histopathologically obvious.

Rhabdomyomatous mesenchymal hamartoma is also rare and present as polypoid striated proliferation of muscle in perioral and periorbital regions. The lesions were seen in the periorbital area in our case, designed on both eyebrows with a long meridian of 6 cm and a short diameter of 2 cm (See figures, Supplemental Digital Content 1. B, The design of the incision line at the fourth operation, [http://links.lww.com/PRSGO/B399](http://links.lww.com/PRSGO/B399)). The skin surface, fat, and scar-like tissue including some of the orbicular and frontal muscles were removed as a lump under local anesthesia (See figures, Supplemental Digital Content 1. C, Macroscopic image at the resection. [http://links.lww.com/PRSGO/B399](http://links.lww.com/PRSGO/B399)).

Although slight hair growth was observed after the operation, there was recurrence of the lesion at 6 months (See figures, Supplemental Digital Content 1. Clinical picture and surgical procedure at fourth operation. A, Clinical picture before the fourth operation, [http://links.lww.com/PRSGO/B399](http://links.lww.com/PRSGO/B399).), and the eyebrows became sparse again. Accordingly, we decided to extendedly remove the subcutaneous nodules together with the skin surface and underlying muscles: a skin incision line was designed on both eyebrows with a long meridian of 6 cm and a short diameter of 2 cm (See figures, Supplemental Digital Content 1. B, The design of the incision line at the fourth operation, [http://links.lww.com/PRSGO/B399](http://links.lww.com/PRSGO/B399)). The skin surface, fat, and scar-like tissue including some of the orbicular and frontal muscles were removed as a lump under local anesthesia (See figures, Supplemental Digital Content 1. C, Macroscopic image at the resection. [http://links.lww.com/PRSGO/B399](http://links.lww.com/PRSGO/B399)).

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but rhabdomyomatous mesenchymal hamartoma usually occur in infants or children. Bilateral and recurrent lesions may also be atypical for rhabdomyomatous mesenchymal hamartoma.

We could not find similar cases in databases such as PubMed; these symptoms could therefore be considered as a new clinical entity. This may be of comfort to patients with similar conditions.

In the current case report, we described our effective surgical treatment for this condition. The clinical problem was the recurrent nature and the sparse eyebrows. Our last surgical procedure has prevented regrowth of the tumor and resulted in satisfactory recovery of the eyebrows. Our proposed mechanism is that the lesions may inhibit blood flow to hair follicles, and the sufficient removal possibly recovers it. Alternatively, the lesions may directly inhibit hair growth via cytokines or intercellular signal transduction.

As the limitation, because we did not consider the possibility that the eruption was induced by other diseases suggested as differential diagnosis, other medical modalities for treatment were not attempted before engaging in surgical excision. Additionally, the patient did not undergo other workup for rheumatologic etiologies or collagen vascular disorders. Because we have not encountered any additional cases, plastic surgeons, dermatologists, and pathologists should accumulate similar cases.

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PATIENT CONSENT STATEMENT
The patient provided written consent for the use of his image.

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