Segmental vitiligo with segmental morphea: An autoimmune link?

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ABSTRACT

An 18-year-old girl with segmental vitiligo involving the left side of the trunk and left upper limb with segmental morphea involving the right side of trunk and right upper limb without any deeper involvement is illustrated. There was no history of preceding drug intake, vaccination, trauma, radiation therapy, infection, or hormonal therapy. Family history of stable vitiligo in her brother and a history of type II diabetes mellitus in the father were elicited. Screening for autoimmune diseases and antithyroid antibody was negative. An autoimmune link explaining the co-occurrence has been proposed. Cutaneous mosaicism could explain the presence of both the pathologies in a segmental distribution.

Key words: morphea, segmental, vitiligo

INTRODUCTION

Localized scleroderma and vitiligo are two distinct entities of unknown etiology. Segmental vitiligo is a distinct form of vitiligo with typical distribution along the dermatomes or Blaschko’s lines. Segmental morphea has rarely been reported. Various pathogenesis have been proposed for the two entities, of which autoimmune mechanism is common to both. Herein we report a young female with co-occurrence of segmental vitiligo and morphea.

CASE REPORT

An 18-year-old unmarried female presented to our outpatient department with complaints of white discolouration of skin involving left upper limb and left side of chest for six years. The discolouration gradually improved without any treatment over the next six years with patchy involvement at the time of presentation. Patient also had reddish-brown bound down plaques over right upper limb and right side of abdomen for four years. The bound down plaques started as a single lesion involving the right side of the trunk, which progressively increased in size and similar new lesions appeared at the vicinity of the old lesion and on the right upper limb as well. There was no history of preceding drug intake, vaccination, trauma, radiation therapy, infection, or hormonal therapy. Family history of stable vitiligo involving both the legs was present in the brother. There was a history of type II diabetes mellitus in the father.

Cutaneous examination revealed hypopigmented to depigmented macules with ill-defined margins in a segmental distribution involving left upper limb extending on to left side of trunk over the breast, without crossing the midline. [Figures 1 and 2] She also had multiple hyperpigmented indurated plaques with lilac borders involving right upper limb extending onto the right side of abdomen in a segmental distribution without crossing the midline. [Figures 1 and 3] Surface of the plaques showed epidermal as well as dermal atrophy and loss of hair. There was no palpable underlying bone defect. There was no sclerodactyly. Girth and length of upper limb and thorax did not reveal any asymmetry. There was no restriction of joint mobility or muscle weakness involving the right limb. Genital and oral mucosa did not reveal any abnormality. Systemic examination was normal.

Histopathology of morphea plaque revealed mild basket weave orthokeratosis with keratotic plugging and focal flattening of rete ridges. Dermis showed dense bands of collagen with pulling up of eccrine ducts. Mild periappendageal and perivascular mononuclear infiltrate was also seen [Figures 4 and 5].

Chest radiograph, radiographs of limbs and spine and ultrasound of the abdomen did not show any
abnormality. Other investigations including hemogram, serum biochemistry, and electrocardiography (ECG) were normal. Anti-thyroid antibodies and antinuclear antibodies (ANA) were negative. Patient was started on narrow-band ultraviolet B (NBUVB) for both vitiligo and morphea. After one month, there was an improvement in morphea lesions; however, the vitiligo lesions did not show any significant repigmentation. The patient is being followed up for development of autoimmune diseases.

**DISCUSSION**

Vitiligo is an acquired loss of pigmentation that presents as hypopigmented macules with a variable progression to complete depigmentation. Segmental form of vitiligo, which follows a dermatomal or Blaschko’s lines-like distribution has an earlier age of onset, exhibits rapid progression and is relatively resistant to therapy. Several hypotheses for segmental vitiligo have been put forward, including (i) neuronal mechanisms, (ii) somatic mosaicism and (iii) microvascular skin homing, whether or not leading to an autoimmune destruction of melanocytes.

A three-step theory for segmental vitiligo has recently been proposed. First step is a release of inflammatory cytokines and neuropeptides triggered by exogeneous or endogeneous factors. This may lead to vascular dilatation and stimulation of cellular immune responses. Second step involves increased antigen presentation or formation of neoantigens (due to enhanced oxidative stress) by a vulnerable subpopulation of melanocytes with subsequent development of melanocyte-specific T-cells. Finally, activated melanocyte-specific T-cells proliferate in the draining lymph node and migrate to the skin and elimination of melanocytes accessible to immune-mediated destruction or vulnerable to apoptosis is found.

**Figure 1:** Segmental involvement of trunk and upper limbs by morphea and vitiligo lesions

**Figure 3:** Hyperpigmented indurated plaques with lilac borders involving right upper limb and right side of abdomen in a segmental distribution

**Figure 2:** Ill-defined hypopigmented to depigmented macules in a segmental distribution involving left upper limb

**Figure 4:** Histopathology of morphea lesion showing mild basket wave orthokeratosis with keratotic plugging and focal flattening of rete ridges. Dermis shows dense bands of collagen with pulling up of eccrine ducts along with mild peri-appendageal and peri-vascular mononuclear infiltrate. (H and E, ×10)
In addition to trauma, neurological and infectious agents, immunological abnormalities have been postulated as the causative agents for morphea as well.\textsuperscript{[6]} Morphea has been associated with vitiligo\textsuperscript{[9]} and other autoimmune phenomena like Hashimoto’s thyroiditis\textsuperscript{[7]} and autoimmune thrombocytopenic purpura\textsuperscript{[8]} with improvement on treatment with systemic steroids. An increased frequency of serum autoantibodies has also been reported with morphea.\textsuperscript{[5]} Based on these findings, an autoimmune basis has been proposed for morphea.\textsuperscript{[10]} In addition, elevated serum cytokines and cell adhesion molecules have also been related to the immune activation in morphea.\textsuperscript{[11]} Another mechanism proposed is the decrease in regulatory T-cells contributing to loss of tolerance.\textsuperscript{[12]}

The association between localized scleroderma and vitiligo has been reported infrequently.\textsuperscript{[8,13,14]} Co-occurrence of linear scleroderma and homolateral segmental vitiligo has also been reported.\textsuperscript{[7]} The concurrence of these two diseases can be by sheer chance also, but the recent understanding of the pathogenesis of these diseases suggest that it is more than a mere coincidence. Based on the various pathogenetic factors proposed for the two disorders, the immunological factor seems to be playing an important role in our patient. The presence of vitiligo in the brother of patient provides impetus to the autoimmune theory. Moreover, van Geel et al., have also described a case with simultaneous presence of segmental vitiligo, alopecia areata, psoriasis and a halo naevus and have proposed a shared autoimmune-mediated process as the underlying mechanism.\textsuperscript{[4]} Similarly, Bonilla-Abadía et al., have also proposed an autoimmune mechanism to explain an association of localized scleroderma type morphea, vitiligo, autoimmune hypothyroidism, pneumonitis, autoimmune thrombocytopenic purpura and central nervous system vasculitis.\textsuperscript{[15]} In the present case, the screen for autoimmune diseases did not reveal any autoantibodies but the patient needs to be screened regularly in the future. In fact, it may be imperative to screen and follow up these patients for the development of autoimmune diseases in future. Another interesting finding in our patient was the segmental distribution in both the diseases, which has been hitherto unreported. A possible mechanism explaining this finding is cutaneous mosiacism as linear morphea following Blaschko’s lines reflecting embryological development has also been reported previously.\textsuperscript{[16]} Decrease in T-regulatory cells leading to loss of tolerance can also be a common link. The reported association provides us with a window of opportunity for understanding the pathogenesis of these disorders.

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