Diffuse Reticulate Purpura in Anorexia Nervosa

Pin-Chi Chiu  Chih-Jung Hsu  Hsien-Ching Chiu

Anorexia nervosa is a psychiatric eating disorder with multisystemic complications. Several dermatologic abnormalities have been described but an association with purpura is rare. We report two cases of anorexia nervosa presenting with diffuse reticulate purpura over the trunk and extremities. The skin lesions resolved after the patients’ nutritional status improved. We emphasize that the diffuse reticulate purpura is a rare, unique and characteristic cutaneous manifestation of anorexia nervosa. (Dermatol Sinica 21 : 68-74, 2003)

Key words: Anorexia nervosa, Purpura

Introduction

Anorexia nervosa is an eating disorder associated with potentially serious medical complications and psychiatric morbidity. It may present with several special dermatological signs. Because of the poor prognosis of untreated anorexia nervosa, an awareness of the dermatologic manifestations of the disorder, which the patient typically cannot hide or deny, is important as they may provide a clue that an eating disorder is present. This may further prevent misinterpretation of the cutaneous symptoms and the consequent unnecessary dermatologic investigations. We present two cases of anorexia nervosa with characteristic reticulate purpura over the trunk and extremities. To our knowledge, this rare but unique cutaneous manifestation of anorexia nervosa has not been reported in Taiwan.
CASE REPORT
CASE 1

A 17-year-old male had been well before. He had acne vulgaris about one year before. Under the suggestions of his classmates, he began to restrict his food intake to treat his acne nine months before. He only ate steamed buns, breads, vegetables and multi-vitamin tablets. Prior to the event, he weighed 70 kg. No uncontrollable gorging or vomiting was noted during the period of dieting. Body weight loss accelerated six months before. Generalized weakness with bilateral lower limb pitting edema and constipation developed three months before. One week prior to his admission, a progressive diffuse reticulate purpuric rash developed over the trunk. He denied any trauma and was taking no medications. On the admission day, he looked emaciated and weighed 40 kg. The skin was rather dry and that on the trunk showed diffuse fine reticulate purpuric macules (Fig. 1a and 1b). On the back, the bony prominences of the spine and the vertebral border of the scapula seemed to be spared with the rash. In addition, bradycardia (50 bpm), hypotension (100/70 mm Hg), hypothermia (35 °C), cold extremities and pitting edema of the lower legs were noted, but no follicular hyperkeratosis, corkscrew hair, gingival hemorrhage, alopecia, parotid gland enlargement, spoon nail, clubbing finger, lanugo-like hair or hair and nail fragility was found. Laboratory examination revealed anemia, leukopenia, thrombocytopenia and elevated serum levels of aspartate transaminase (GOT), creatine kinase (CK) and lactic dehydrogenase (LDH), while other tests including reticulocyte count, haptoglobin, coagulation profiles, autoimmune profiles, serum levels of vitamin B12, folic acid, albumin and electrolytes, renal function, urinalysis and stool occult blood test were all within normal limits. Chest roentgenogram and brain magnetic resonance imaging showed no organic lesions. Skin biopsy only showed prominent erythocyte extravasation in the dermis without obvious vascular injury, hemosiderin deposition or macrophage infiltration (Fig. 2). Anorexia nervosa (restricting type) was diagnosed after the psychiatric
consultation. Adequate nutritional and caloric supply were given and he gained weight about 10 kg during the 15 days of hospitalization. The reticulate purpuric rash and pitting edema of the lower legs subsided gradually. Serum levels of GOT, CK and LDH also returned to normal. After discharge, his body weight increased continuously and the skin rash disappeared completely within one month (Fig. 3).

CASE 2

A 15-year-old female had a history of chronic constipation before. Due to the fear of abdominal fullness and discomfort caused by constipation, she began to restrict her oral intake since November 2001. She only had some steamed buns, breads, vegetables, milk and fruits for meals. Prior to the event, she weighed 50 kg. No uncontrollable gorging or vomiting was noted during the period of dieting. She had progressive body weight loss during the following months, and cold extremities, numbness sensation of the hands, general malaise, secondary amenorrhea, gradual weakness of the proximal muscles and pitting edema of the lower legs occurred subsequently. In March 2002, diffuse reticulate purplish discoloration occurred over the abdomen initially and extended to the chest, back and thighs gradually. She had no trauma and was taking no medications. On admission, she weighed 34 kg. She was rather emaciated and weak with a dry skin, and a diffuse reticular purpuric rash was present on her trunk and thighs with sparing of the bony prominences at the iliac crests, spine and coccygeal region (Fig. 4a, 4b and 4c). Some round ecchymoses were also noted over her chest due to previous attachment of electrocardiogram leads. Bradycardia, hypotension, hypothermia, proximal muscle weakness, acrocyanosis, multiple decayed teeth, acquired ichthyosis at the pretibial areas and pitting edema of the lower legs were found on physical examination. No follicular hyperkeratosis, corkscrew hair, gingival hemorrhage, alopecia, parotid enlargement, lanugo-like hair or hair and nail fragility was found. No specific organic lesions were revealed by abdominal, renal and cardiac echography, chest roentgenogram and brain magnetic resonance imaging study. Laboratory examination revealed anemia, lower serum lev-

Fig. 2
The histopathology of the reticulate purpura revealed dermal hemorrhage without vasculitis or vascular damage. (H & E stain, x200)

Fig. 3
Resolution of the reticulate purpura over the chest one month after hospitalization
els of triiodothyronin and elevated levels of GOT, CK and LDH, while other tests including platelet count, blood smear, serum levels of albumin, electrolytes, thyroxin, FSH, LH and E2, coagulation profiles, autoimmune profiles, immune function tests, renal function, urinalysis and stool occult blood test were all within normal limits. Skin biopsy revealed focal erythrocyte extravasation in the dermis and atrophy of fat lobules. No obvious vascular injury, hemosiderin deposition or macrophage infiltration was noted. After psychiatric consultation, anorexia nervosa (restricting type) was impressed. Peripheral parenteral nutrition supplement was given and her body weight increased steadily. Her purpuric skin rash and acrocyanosis resolved, and the serum levels of GOT, CK and LDH gradually returned to normal during the hospitalization.

**DISCUSSION**

Severe and rapid body weight loss is a critical problem in adolescents. After exclusion of the organic factors of body weight loss by phys-

![Fig. 4a](image1.png)
**Fig. 4a**
The font view of Patient 2

![Fig. 4b](image2.png)
**Fig. 4b**
The back view of Patient 2

![Fig. 4c](image3.png)
**Fig. 4c**
The close-up view of the reticulate purpura over the buttock of Patient 2
ical, laboratory and imaging examinations, psychiatric and behavioral factors should always be considered, and anorexia nervosa is a relatively common cause under this situation. The prevalence rate of anorexia nervosa is estimated as being up to 1% in Western countries. The diagnostic criteria according to the 4th edition of Diagnostic Statistical Manual of Mental Disorder (DSM IV) are as follows:

1. Refusal to maintain body weight at or above a minimally normal weight for age and height;
2. Intense fear of gaining weight or becoming fat, even though underweight;
3. Disturbance in the way in which one's body weight or shape is experienced and
4. In postmenarcheal females, amenorrhea occurs.

It can be further divided by clinical presentations into two subtypes: restricting type and binge-eating/purging type. In the restricting type anorexia nervosa, the person does not regularly engage in binge-eating or purging behavior during the disease course. The onset of anorexia nervosa is usually in adolescence and more common in females than males. Acne is thought to be a risk factor for anorexia nervosa of teenagers in Chinese. Crude mortality rates for anorexia nervosa are around 5.9 to 6.6 percent. About 5% of patients die of suicide and approximately 1% of medical complications of starvation.

Apart from the direct somatic consequences of undernourishment and malnutrition, such as electrolyte imbalance, alterations of the circulatory system and hormone dysfunction, changes in the skin and its appendages have been well described and documented in patients with anorexia nervosa. Dermatologic findings in anorexia nervosa can be subdivided into four groups, i.e., secondary to dietary alteration and malnutrition, self-induced vomiting, drug consumption and psychocutaneous association, and are summarized in Table I. The most common dermatologic manifestations were those secondary to dietary alterations or starvation such as xerosis, hypertrichosis lanuginosa, alopecia, brittle hair and nail, acne and acrocyanosis, while those conditions secondary to vomiting, drugs and psychocutaneous associations were less common. The cutaneous manifestations of anorexia nervosa can be well differentiated from those caused by other closely related nutritional deficiency or malnutrition disorders (Table II).

Reviewing the English literature, only three cases of diffuse purplish rash in anorexia nervosa have been reported. The rash was only described briefly and no skin biopsy was done. By analyzing the history and disease course of our two patients, we found some more characteristics of the specific skin rash: it is a kind of diffuse, homogeneous, fine reticulate,
non-palpable purpura mainly localized to the abdomen, chest, back, buttocks and upper thighs;  ② its onset and resolution is rapid, and is highly correlated with changes of body weight; ③ upon its resolution, no residual hyperpigmentation or discoloration is left; ④ the bony prominences and pressure sites are free of the rash; ⑤ the purpuric rash is not consistent with that caused by thrombocytopenia, coagulopathy, physical trauma, vasculitis, thromboembolic disorders, or deficiency of vitamin C and/or vitamin K; ⑥ there is only dermal hemorrhage without obvious vasculitis, vascular damage, intravascular thrombus or dermal infiltrate histologically.

The presence of the purpuric rash may be a grave warning of impending decompensation and an indication of severe malnutrition. It has been speculated that the rash is the result of bone marrow depression from starvation and the subsequent thrombocytopenia. But the hypothesis seems unable to fully explain the whole clinical picture. Based on the clinical and pathological findings in our patients, we surmise that multiple eliciting and aggravating factors might contribute to the development of the rash (Table III). Loosened capillary wall and weakened dermal supporting structure induced by severe malnutrition and rapid weight loss may be the most probable contributing factors of the reticulate purpura. But further studies are needed to clarify the underlying mechanisms of the dermatologic manifestations and their complex interrelations with nutritional status and

<table>
<thead>
<tr>
<th>Disorders</th>
<th>Frequent cutaneous manifestations</th>
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<tr>
<td>Anorexia nervosa</td>
<td>Xerosis, hypertrichosis lanuginosa, alopecia or hair effluvium, brittle nail and hair, acne, acrocyanosis, multiple caries</td>
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<tr>
<td>Privation starvation in adults</td>
<td>Xerosis, loss of subcutaneous fat, cold and pallor skin, brittle nail and hair, follicular hyperkeratosis, hyperpigmentation</td>
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<tr>
<td>PEM* - Marasmus</td>
<td>Xerotic, wrinkled, and loose skin, loss of subcutaneous fat, &quot;monkey facies&quot;, no peripheral edema</td>
</tr>
<tr>
<td>PEM* - Kwashiorkor</td>
<td>Xerosis, hypopigmentation, cold extremities, peripheral edema, &quot;enamel paint spots&quot;, &quot;flaky paint or crazy paving dermatosis&quot;, &quot;flag sign&quot; of the scalp hair</td>
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<tr>
<td>Vitamin C deficiency</td>
<td>Corkscrew hairs, follicular hyperkeratosis, perifollicular hemorrhage, poor wound healing, intracutaneous hemorrhage, gingival hypertrophy and bleeding</td>
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<tr>
<td>Vitamin K deficiency</td>
<td>Intracutaneous hemorrhage</td>
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* PEM - Protein energy malnutrition

**Table II. Differential diagnosis of cutaneous manifestations of anorexia nervosa**

**Table III. The hypothesis of the causes of the reticulate purpura in anorexia nervosa**
systemic conditions in anorexia nervosa.

In summary, the range of cutaneous manifestations associated with anorexia nervosa is wide. We have described a diffuse reticulate purpuric rash in two patients with anorexia nervosa. This characteristic rash might be a rare and unique cutaneous manifestation of anorexia nervosa.

REFERENCES