



## CASE REPORT

# Scurvy in Anorexia Nervosa: a case report

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### Abstract

**Introduction:** Anorexia nervosa (AN) is associated with numerous medical complications and almost every body system can be adversely affected. There may be multiple skin signs, most of them a direct consequence of malnutrition due to starvation. Humans require exogenous vitamin C (ascorbic acid) and they must obtain it from dietary intake through vegetables and fruits. Clinical manifestations occur after vitamin C has been eliminated from the diet for 1-3 months.

**Case Report:** This case report illustrates a 21-year-old woman, diagnosed with AN restriction subtype who developed ecchymosis and petechiae on the torso and legs. The diagnosis of scurvy was made based on clinical findings and dietary history, with therapeutic evidence as soon as vitamin C supplementation begins. After two weeks of treatment the cutaneous signs fully disappeared.

**Discussion:** In many patients with AN adequate intake of fruits and vegetables is preserved, so the diagnosis of scurvy is counterintuitive. The best confirmation of the diagnosis of scurvy remains a complete clinical recovery following vitamin C supplementation. Although scurvy is regarded as a disease from the past, we should be aware of its existence in developed countries as a complication of AN.

**Keywords:** Anorexia Nervosa, Scurvy, Ascorbic Acid Deficiency.

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## Introduction

A low body-mass index (BMI) is the central feature of Anorexia Nervosa (AN) [1]. This disorder is characterized by an intense fear of weight gain, which motivates severe dietary restriction or other behaviors like purging, use of laxatives or diuretics or excessive strenuous exercise [1]. AN is associated with numerous medical complications and almost every body system can be adversely affected [1]. There may be multiple skin signs, most of them a direct consequence of malnutrition due to starvation [2-4]. Humans require exogenous vitamin C (ascorbic acid) and they must obtain it from dietary intake through vegetables and fruits [5]. The total body pool of vitamin C is 1500 mg and without appropriate intake this pool is reduced to less than 350 mg in 1 to 3 months [5]. The duration of the ascorbic acid deficiency and its role in collagen synthesis sets the severity of the clinical picture of scurvy [6]. Early vitamin C deficit presents with nonspecific symptoms like weakness, asthenia, myalgias and spontaneous bleeding (ecchymosis, petechiae, mucosal bleeding and subsequent anemia) that can be seen within 8 to 12 weeks of irregular or poor ingestion [5-6]. Moderate deficit is associated with skin signs that resemble a pseudovasculitis pattern, with petechiae becoming large ecchymoses which reveal the blood vessel fragility [5-6]. Severe deficit manifests in the form of hemarthroses, gingival and subperiosteal hemorrhage, visceral bleeding, jaundice, fever, convulsions and even death [5-6]. A serum level below 11  $\mu\text{mol/L}$  suggests scurvy, but a leucocyte ascorbate level test is more accurate, because it shows the tissue storage of vitamin C (0-7 mg/dL is an indicator of deficiency) [5]. The diagnosis of scurvy is usually based on clinical findings and dietary history, with therapeutic evidence as soon as vitamin C supplementation begins [5-6]. Laboratory testing is not necessary, except to confirm atypical cases [5]. Biopsy of a follicular lesion usually shows a dilated hair follicle, non-inflammatory perifollicular hemorrhages and corkscrew hairs, however it may be nonspecific, revealing only fibrosis and hemorrhage [5]. The treatment consists of increasing the intake of vitamin C between 125 mg to 1 g per day [5-9]. The duration of treatment is variable, according to different authors, and values range from 15 days to 3 months [5,7].

## Case report

This case report illustrates a 21-year-old woman, diagnosed with AN restriction subtype since the age of 19, admitted to inpatient treatment after failure to respond to outpatient treatment. At admission, she described symptoms such as fatigue, weakness and myalgias. Physical examination showed a BMI of 11,4Kg/m<sup>2</sup>, pedal edema, ecchymosis and scattered petechiae on the torso and legs (Figure 1). Hands' xerosis, nail fragility and lanugo-like body hair on arms and back were visible. Oral abnormalities were absent. No lymphadenopathy was noted. Blood analysis revealed pan-



**Figure 1.** Ecchymosis and scattered petechiae on torso and legs, perifollicular rash in legs.

cytopenia, with normocytic normochromic anemia and low reticulocyte index, and deficit of vitamins A and D. Vitamin B12 and folate showed values at the lower limit of normality. Coagulation tests were normal, not revealing hemolysis. Liver enzymes were slightly increased. Renal function test was in the normal range. Electrocardiogram revealed sinus bradycardia and chest X-ray was normal. Results of tests for antinuclear antibodies, rheumatoid factor and antineutrophil cytoplasmic antibodies were negative. Dermatologists were consulted and recommended a skin biopsy on a perifollicular hemorrhagic abdominal lesion, the results of which were nonspecific. A vitamin C serum assay was not performed. A presumptive diagnosis of scurvy was made based on the history and clinical findings. Ascorbic acid supplementation was prescribed on a dosage of 300mg/daily p.o., at first constitutional symptoms improved and after two weeks the cutaneous signs disappeared (Figure 2). Our patient was under oral supplementation for 6 weeks.

## Discussion

Skin frequently is a canvas that shows a pattern specific enough to guide to a diagnosis [2-4]. Cutaneous manifestations in eating disorders are common, but scurvy is an extremely rare complication of AN, with only four clinical cases reported since 1975 [6-9]. These clinical findings are the consequence of collagen breakdown, that translates to various cutaneous manifestations, depending on the degree



**Figure 2.** After two weeks of oral supplementation with ascorbic acid cutaneous signs disappeared.

of the ascorbic acid deficit [5-6]. Clinical signs like perifollicular hemorrhages, ecchymosis and scattered petechiae are due to starvation and should be considered a red flag. In many patients with AN adequate intake of fruits and vegetables is preserved, so the diagnosis of scurvy is counterintuitive. Notwithstanding this it is highly important our awareness of the possibility of scurvy in AN because the treatment is simple, and it's not necessary to submit our patients (who are delicate) to expensive and painful diagnostic tests. The best confirmation of the diagnosis of

scurvy remains a complete clinical recovery following vitamin C supplementation. Although scurvy is regarded as a disease from the past, we should be aware of its existence in developed countries as a complication of AN.

#### Abbreviations

AN: Anorexia Nervosa; BMI: Body-mass index

#### Competing interests

The author declares that there are no conflicts of interests.

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