


Case report

Now you C me: a case of scurvy presenting as depression and anaemia

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SUMMARY

A 66-year-old Caucasian woman was admitted with deteriorating mental health in the setting of background history of schizophrenia and depression. Her husband reported that she had increasing negative thoughts and decreased motivation regarding her self-care over a few weeks with no obvious stressors. Initial laboratory tests were unremarkable except for isolated normocytic anaemia. Physical examination revealed widespread bilateral upper limb ecchymoses and lower limb petechial rash. After an extensive investigation with no definitive results to explain her clinical presentations, diagnosis of scurvy was suspected and confirmed with severely low serum vitamin C level. Her clinical symptoms improved markedly with oral supplementation, which further supported the diagnosis of scurvy. Although it is now a rare condition in developed countries, this case will remind modern medical practitioners that patients with scurvy may present with non-specific symptoms and clinical findings such as depression and anaemia.

BACKGROUND

Scurvy is a disease that results from vitamin C deficiency. Vitamin C (L-ascorbic acid or ascorbate) was first isolated in 1928 by Albert Szent-Gyorgy: It was described as compounds that have antiscorbutic activity.^{1–3} In humans, it cannot be biosynthesised, and therefore it must be absorbed through dietary intake.⁴ Ascorbate is commonly found in a variety of fruits and vegetables.⁵ According to the WHO, 30 mg of vitamin C is sufficient as daily requirement, however, daily doses as low as 6.5 mg have been found to be adequate to prevent scurvy.^{6–8} As a reference, it is estimated that $\frac{1}{2}$ cup of orange juice contains 62 mg of vitamin C.⁹

Although there is no definitive plasma concentration at which scurvy develops, clinical signs are thought to develop when body storage level falls below 300 mg with plasma concentration of $<10 \mu\text{M}$.^{3,10} Healthy humans store approximately 1500 mg of vitamin C in the body, and this will last about 3 months with a diet completely lacking in vitamin C.^{7,8,11} Time before onset of signs varies depending on how rapidly the body consumes its storage. However, several experimental studies demonstrated that it takes approximately eight to twelve weeks of no vitamin C intake before early signs of deficiency occur.^{7,12} For these reasons, scurvy is now thought to be rare in developed countries, and it is often forgotten by many medical practitioners.

CASE PRESENTATION

A 66-year-old Caucasian woman, residing at home with her husband in a metropolitan area, was referred to emergency department by the Crisis Assessment and Treatment Team due to concern in regards to her physical and mental health on a background history of schizophrenia and depression. On initial medical workup, she was noted to have a normocytic anaemia (haemoglobin of 63 g/L) with no obvious cause. Subsequently, the patient was admitted under the medical team for investigation of anaemia.

On history, she had symptoms of lethargy and bilateral lower limb weakness. She denied any history of bleeding, pain or infective symptoms. Her regular medications consisted only of sertraline 50 mg daily. She had a psychiatric history of schizophrenia, depression and previous suicide attempts but no other significant medical history. Her husband noticed that her mental health deteriorated for the previous few weeks with increasing negative thoughts and decreased motivation regarding her self-care with no obvious stressors. It was reported that she was compliant with her regular antidepressants, and there were no changes to her medications. He also expressed concern for her nutrition noting that she only consumed small amounts of meals, primarily minced meat only, for many months.

On general examination, the patient was noted to be pale, cachectic, poorly groomed and dysphoric. She otherwise appeared comfortable. She was haemodynamically stable and afebrile. Extensive ecchymoses were observed on bilateral upper arms where the blood pressure cuff was positioned and inflated ([figure 1](#)). On her lower limbs bilaterally, a widespread petechial rash was noted ([figure 2](#)). Her abdomen was soft and non-tender with no obvious palpable mass or organs. There were no obvious signs of per rectal or per vaginal bleed.

Initial laboratory test results showed haemoglobin level of 63 g/L with mean corpuscular volume of normal range (88 fL). Further investigations focused on identifying the cause of anaemia. Differentials for normocytic anaemia include haemorrhage, generalised malnutrition, haemolytic anaemia, acquired bone marrow disease and anaemia of chronic disease. Absence of pancytopenia and high reticulocyte level (10.3%; normal range 0.3%–2.5%) were not supportive of the diagnosis of acquired bone marrow disease. Her liver function test and renal function test were unremarkable. There were no significant findings in haemolytic screen including



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Figure 1 Widespread ecchymoses on bilateral upper limbs.

Coomb's test, lactate dehydrogenase (LDH), haptoglobin and total bilirubin. Initial nutritional screen was also normal except for moderately low folate level (4.6 nmol/L; normal range >10). Despite receiving two units of packed red blood cells in addition to regular nutritional supplements, her haemoglobin level did not improve significantly (65 g/L). Further investigations including vasculitis screen (antinuclear antibody (ANA), antineutrophil cytoplasmic antibody (ANCA), anti-dsDNA, extractable nuclear antigens (ENA) and C3 and C4) to investigate for lower limb rash and delirium screen (electrolytes, thyroid function test, urinalysis and CT brain) to investigate for mental health changes were also unremarkable. A biopsy of the petechial rash was organised, however, the report was not available during her inpatient admission.

At this point, there were no definitive investigation results to explain her depression, anaemia and physical examination findings, and the diagnosis of scurvy was suspected. Additional testing for measurement of vitamin C level was performed, which revealed severely low level of serum vitamin C (<5 umol/L; normal range 40–120) and confirmed the diagnosis of scurvy. For academic interest, more thorough examination of the patient was done to look for specific signs of scurvy retrospective to diagnosis, and a few cork-screw hairs were found on her bilateral lower limbs (figure 3).

OUTCOME

Vitamin C was replaced with oral tablets 1000 mg daily, and her clinical symptoms improved rapidly (concurrently with less than a week treatment of mirtazapine 15 mg daily and increase of regular sertraline dose to 100 mg daily). Within few days, she became noticeably more interactive and less withdrawn than initial presentation. Her bilateral lower limb weakness improved, and she started to engage with physiotherapists for rehabilitation. The consultation-liaison psychiatry team also noted significant improvement in her mood with increased appetite and motivation to rehabilitate. Mirtazapine was soon stopped. Her haemoglobin level also continued to remain above 110 g/L prior to discharge to her home, and the rash on her lower limbs had improved significantly. The histology result of



Figure 2 Widespread petechial rash on bilateral lower limbs.



Figure 3 Cork-screw hair on lower limb.

the punch biopsy was available a few weeks after her discharge, which showed perifolliculitis with fragmented hair shafts and some extravasated red blood cells. These findings also supported the diagnosis of scurvy.

DISCUSSION

Frank scurvy is rare, and it is preceded by a period of latent scurvy: this period is characterised by subtle symptoms of vitamin C deficiency including lethargy, reduced motivation and irritability.^{12 13} However, these symptoms are vague, and diagnosis of latent scurvy can be easily missed. Vitamin C is important for the biosynthesis of collagen, which is a crucial component of connective tissue.¹⁴ Therefore, in frank scurvy, the resultant weak collagen chains lead to more well-known clinical signs secondary to connective tissue weakness and capillary fragility; for example, petechial haemorrhage, perifollicular hyperkeratosis with coiled hairs, breakdown of wounds and bleeding of subcutaneous tissues.^{5 10 12 15} It is also known to cause anaemia of a variable degree mainly due to its effect on blood formation, folic acid metabolism and bleeding.¹² Additionally, although rare, it has been also reported to cause mental health changes including hypochondriasis, decrements in psychomotor performance and depression.^{3 16} Most of these clinical findings can still be non-specific, and diagnosis of scurvy can be delayed as it is often forgotten by many medical practitioners.

Similarly, our patient was admitted with depression and anaemia. She was also noted to have extensive ecchymoses and petechial rash. Extensive investigation results were unremarkable, and there was no clear diagnosis to explain her clinical findings until scurvy was suspected and confirmed. Rapid improvement in her depressive symptoms, anaemia and rash with oral supplement of vitamin C supported the diagnosis of scurvy. Scurvy can potentially be a life-threatening condition, and therefore early recognition is required. This case will remind modern medical practitioners that patients with scurvy may present with non-specific symptoms and clinical findings such as depression and anaemia: a clinical suspicion should be

Learning points

- ▶ Scurvy is a disease that results from vitamin C deficiency.
- ▶ It is thought to be rare in developed countries and it is often forgotten by many medical practitioners.
- ▶ Vitamin C is important to maintain collagen formation; weak collagen chains lead to scurvy's well-known signs, including bruising, petechial rash and cork-screw hairs.
- ▶ Less commonly, scurvy has also been reported to cause anaemia and mental health changes.
- ▶ Scurvy can be a life-threatening condition, and therefore early recognition is required as rapid resolution occurs with simple replacement therapy.

raised, especially if risk factors and typical features of scurvy including petechial rash, ecchymoses and coiled hair changes are also present.

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