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# SEVERE IRON DEFICIENCY ANAEMIA CAUSED BY BED BUG PARASITISATION WITHOUT A RASH

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## ABSTRACT

*Background:* Bed bugs (*Cimex lectularius*) are blood-sucking insects widely distributed in temperate regions. While they are not known to be vectors of infectious diseases, their bites often cause dermatological symptoms, such as pruritus and rash. Rarely, chronic infestations may lead to systemic complications, including iron deficiency anaemia. Only a few case reports, most involving individuals with reduced activities of daily living (ADL) or social isolation, have described this association.

*Case report:* We report herein the case of an 82-year-old woman in whom a chronic bed bug infestation caused severe iron deficiency anaemia without skin symptoms. She presented nearly complete dependence in her ADL. On admission, her haemoglobin level was 2.7 g/dl, and the other, laboratory findings indicated iron deficiency anaemia. Various examinations excluded malignancy, haematological disease, and other sources of blood loss. Numerous bed bugs were observed on her body and clothing. Following a blood transfusion, iron supplementation, and eradication of the infestation through repeated bathing, her haemoglobin level improved. Thereafter, the anaemia did not recur. She was later transferred to a special nursing home, as eradication of the insects in her home was not feasible.

*Conclusion:* This case illustrates that elderly individuals whose living environment is chronically infested by bed bugs can experience severe iron deficiency anaemia even in the absence of bite marks on the skin. A careful, physical examination and inspection of clothing and the living environment are crucial for diagnosis. Clinicians should consider bed bug bites as a potential cause of unexplained anaemia, particularly in older patients with reduced ADL.

## KEYWORDS

Bed bugs, iron deficiency anaemia, rash, activities of daily living, social isolation

## LEARNING POINTS

- Iron deficiency anaemia may develop in elderly patients, particularly those with decreased activities of daily living or social isolation, if their living environment is chronically infested by bed bugs.
- Bed bug bites do not always present skin symptoms, as repeated exposure may lead to desensitization and an attenuated cutaneous reaction, especially in older adults.
- Careful history-taking and a thorough physical examination, including inspection of the patient's clothing and living environment, are essential to determine if bed bugs are the cause of otherwise unexplainable anaemia.

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## INTRODUCTION

Bed bugs *(Cimex lectularius)* are blood-sucking insects belonging to the family *Cimicidae* of the order *Hemiptera* and are widely distributed throughout the temperate regions of the world. While they are normally not considered vectors of infectious diseases, their infestations are clinically relevant because they can cause significant discomfort and health-related complications. Bed bug-related anaemia, while rare, highlights the potential harm of chronic parasitisation to human health.

Herein, we present a case of severe iron deficiency anaemia in an elderly woman caused by a chronic bed bug infestation without any apparent skin rash.



*Figure 1. Bedbugs at different stages of development were found on the patient's body.*

## CASE DESCRIPTION

The patient, an 82-year-old woman living with her son, had no previous history of any internal medical condition. She had cataracts and glaucoma, which had resulted in complete loss of light perception in the right eye and had left only hand motion perception in the left eye, thus limiting her physical activity. Around three months prior to her current presentation, she began experiencing general malaise, and her activities of daily living (ADL) gradually declined. One week before presentation, she lost her ability to move independently, prompting her son to call the emergency service. Upon arrival at our hospital, the patient was almost entirely dependent on assistance in all ADL.

At presentation, the patient's vital signs were stable, and she had no apparent disturbance of consciousness status. She was markedly emaciated, and her body was soiled with dirt and faeces. A physical examination revealed pallor of the palpebral conjunctiva. A rectal examination found no palpable mass, haemorrhoids or evidence of bleeding. Upon closer inspection, numerous bed bugs *(Cimex lectularius)* were found on her body *(Fig. 1)*, including inside her clothing. There was no skin rash *(Fig. 2)*, and the patient denied pruritus and other subjective symptoms. Laboratory tests revealed microcytic anaemia (haemoglobin 2.7 g/dl, mean corpuscular volume 55 fl) and low serum iron (7 µg/dl) and ferritin (5.6 µg/dl). There was no leucocytosis, elevated inflammatory response (white blood cell count 7,400/µl, C-reactive protein 2.17 mg/dl) or significant abnormalities of the liver, kidneys or electrolytes. Based on these findings, iron deficiency anaemia was diagnosed. An enhanced computed tomography scan found no tumours or signs of active bleeding.

The patient was admitted for treatment and further evaluation of the anaemia. She was managed in an isolation room during hospitalization. Six red blood cell units were transfused shortly after admission and were followed by iron supplementation therapy. Her haemoglobin level improved to 10.6 g/dl by hospital day 42 and to 11.3 g/dl by day 77. The bed bugs were completely eliminated through

| Case/study | Age and sex | Rash | Hemoglobin (g/dl) | Background disease |
|---|---|---|---|---|
| Pritchard et al.[3] | 60, M | (+) | 8.0 | Alcoholism, depression |
| Paulke-Korinek et al.[4] | 67, M | (+) | 5.2 | Lower limb amputation |
| | 60, F | Not listed | 5.4 | Epilepsy |
| Sabou et al.[5] | 82, F | (+) | 5.4 | Alzheimer's disease |
| Kessler et al.[6] | 61, M | (+) | 6.2 | Ankle fracture |
| Izri et al.[7] | 71, M | (+) | 3.1 | Alcoholism, Dementia |
| Bhandari et al.[8] | 65, M | (+) | 6.3 | None |
| (This case) | 82, F | (-) | 2.7 | Cataracts, Glaucoma |

**Notes:** (+), rash present; (-), no rash; "Not listed", not described in the article.

*Table 1. Summary of previously reported cases of bed bug-associated anaemia. The table includes patient age, sex, presence of rash, haemoglobin level at presentation, and relevant background diseases.*



*Figure 2. A full-body photograph taken the day after admission. No obvious skin rash was noted on the trunk or limbs.*

repeated bathing and wiping, and isolation was discontinued on hospital day 45.

A faecal occult blood test performed on hospital days 8, 11, and 42 yielded a positive result only on day 42. Given the possibility of gastrointestinal bleeding, upper gastrointestinal endoscopy and lower gastrointestinal endoscopy was performed on day 58 and 59, respectively. Although adenomas were found in the lower gastrointestinal tract, no definitive bleeding source was identified. A gynaecological evaluation found no abnormal genital bleeding. A more detailed interview with the patient's family revealed that the bed bug infestation in the home had been going on for the past three to four years.

Taken together, the discovery of numerous bed bugs on the patient's body and clothing along with the resolution of anaemia following their eradication indicated that her severe iron deficiency anaemia had been caused by chronic blood loss due to repeated bed bug bites.

After her general condition improved, she was transferred to a special nursing home on hospital day 109 because of the difficulty of eradicating the infestation in her home.

## DISCUSSION

The present case illustrates that a bed bug infestation, while rare, can have a serious impact on the health of patients, especially if they are elderly.

Although most bed bug infestations are associated with dermatological symptoms, chronic parasitisation can, in rare instances, lead to anaemia[1]. Indeed, a study in 2021 found that 6.3% of patients visiting the emergency department (332 of 5,284 patients) had experienced bed bug bites, and that they had a significantly lower haemoglobin level and a higher prevalence of anaemia than those who had never been bitten[2].

A search of PubMed using the keywords "bed bugs" and "anaemia" identified seven case reports *(Table 1)*[3-8].

Among the cases discussed, six involved an underlying condition that led to reduced ADL, such as lower limb amputation, or conditions that caused social isolation, such as dementia. In the present case, the patient had decreased ADL due to visual impairment. Importantly, the previous reports suggested that decreased ADL and social isolation may have contributed to the development of anaemia associated with bed bug infestations.

In the present case, no skin rash was observed despite confirmation of the bed bug infestation. One study reported that about 30% of individuals bitten by bed bugs did not experience any skin irritation, the proportion being higher among older adults[9]. Other studies suggested that repeated exposure to bites may lead to desensitization, making skin reactions less likely to occur[10].

Taken together, the findings of the previous reports suggested that bed bug infestations can contribute to the development of anaemia in elderly individuals with decreased ADL or social isolation. Additionally, bed bug bites do not always manifest skin symptoms, especially in older adults. In the present case, no rash was observed, but the confirmation of bed bug infestation was key to the diagnosis.

Given the expected increase in bed bug infestations and the aging trend in the nation, cases like the present one are likely to become more common. In elderly patients presenting

with unexplained iron-deficiency anaemia, the possibility of chronic blood loss due to bed bug bites should be considered even in the absence of obvious skin findings, and careful history-taking and a physical examination, including an inspection of the patient's clothing and living environment, should be performed.

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