Journal of
Medical Case Reports

CASE REPORT Open Access

Cutaneous tuberculosis and its pleomorphic presentations in human immunodeficiency virus-negative patients: a case report

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Abstract

Background Cutaneous tuberculosis is reported to be rare, especially in human immunodeficiency virus-negative patients but probably also underdiagnosed. This is because it presents with pictorial and anatomoclinical polymorphism. In Africa, despite tuberculosis being endemic, isolating the germ and/or obtaining histopathological confirmation constitutes a significant challenge. Literature on the clinical presentations and outcomes of patients with cutaneous tuberculosis is sparse in Cameroon and sub-Saharan Africa. This prompted us to report on the cases of cutaneous tuberculosis we encountered.

Case presentation We report ten cases of cutaneous tuberculosis diagnosed in human immunodeficiency virus-negative patients from 2018 to 2022 in Cameroon. All cases included were confirmed by histology and/or laboratory test. The average age of our patients was 35.7 ± 20.3 years, with age ranges between 8 and 72 years. The sex ratio (M/F) was 1.5. The clinical forms identified were scrofuloderma (three cases), papulonecrotic tuberculid (two cases), and tuberculosis verrucosa cutis (two cases). Tubercular gumma, lupus vulgaris, and disseminated tuberculosis accounted for one case each. Under antituberculosis drugs, the clinical progress was favorable for all cases.

Conclusion Cutaneous tuberculosis can present in various forms. Though rare in our setting, physicians should consider this diagnosis when faced with any chronic skin lesion that does not respond to conventional treatment.

Keywords Cutaneous tuberculosis, Scrofuloderma, Cameroon, Sub-Saharan Africa

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Introduction

Tuberculosis is a chronic and contagious bacterial infection caused by *Mycobacterium tuberculosis* (Mtb). It is endemic in Cameroon, and Africa in general, where it represents a major public health concern [1, 2]. Although skin involvement is rare, it accounts for 1.5–4% of extrapulmonary localizations of tuberculosis [3–5]. Cutaneous tuberculosis can be acquired from haematogenous or lymphatic dissemination of a pulmonary focus or by direct inoculation [6].

Through lipid metabolism (nutrition), cell envelope and secretory system proteins (environmental resistance and drug efflux), proteins related to signal transduction,

and the production of macrophage effector inhibitors, Mtb exerts its pathogenic effects in the human body [7]. Two major forms of cutaneous tuberculosis variants have been reported on the basis of bacterial load on the skin. Multibacillary forms, which include tuberculous chancre, scrofuloderma, orificial tuberculosis, acute miliary tuberculosis, and tuberculous gumma, are those in which bacilli are easily detected in cutaneous tissue or isolated in exudate; whereas in paucibacillary forms, which include TB verrucosa cutis and lupus vulgaris, represent forms in which it is difficult to isolate the organisms, with bacilli being sparse or not even visualized in histology [8–10]. Another form of cutaneous tuberculosis (Tbc) has been described and termed tuberculids (papulonecrotic tuberculid, lichen scrofulosorum, and erythema induratum of Bazin), a category of skin disorders associated with tuberculosis (TB) that probably results from immune hypersensitivity reactions to Mtb antigens [11, 12]. The diagnosis of Tbc remains difficult due to the polymorphism of the anatomoclinical pictures [4] and the difficulty of isolating the pathogenic agent, as the sensitivity and specificity of the usual diagnostic workup for tuberculosis are poor in these patients [5, 13]. Conventional antituberculosis drugs are effective in treating Tbc and drug-resistance have only been reported rarely [13]. In individuals who are immunocompetent, the prognosis of Tbc is favorable. Yet, even vigorous therapy may be ineffective in immunocompromised individuals with multidrug resistant pathogens [14]. As literature on the clinical presentations and outcomes of patients with Tbc is sparse in Cameroon and sub-Saharan Africa, we set out to describe the epidemiological, clinical, paraclinical, therapeutic and evolutionary aspects of Tbc in Cameroon.

Case presentation

We recruited patients who were diagnosed clinically by a dermatologist from January 2018 to June 2022 in five dermatology departments in the cities of Douala and Yaoundé, Cameroon. A total of ten patients with cutaneous tuberculosis were seen. The mean age of the patients was 35.7 ± 20.3 years with extremes of 8 and 72 years. The sex ratio (M/F) was 1.5. Most patients (n = 6, 60%) lived in urban areas. Five patients were exposed to tuberculosis contacts and bacillus Calmette–Guérin (BCG) vaccination was evident in eight patients. There was no personal history of tuberculosis. The duration of disease progression varied between 2 and 180 months with a median of 29.9 months.

The clinical forms encountered were scrofuloderma (n = 3, 30%), followed by papulonecrotic tuberculid (n = 2, 20%) and tuberculosis verrucosa cutis (n = 2, 20%), as shown in Figures 1 and 2. Tubercular gumma and lupus vulgaris were associated with secondary syphilis and each represented one case as shown in Figure 3. We also noted an exceptional case of disseminated tuberculosis associating tubercular gumma, scrofuloderma, and pulmonary involvement a shown in Figure 2. All patients were HIV negative.

Patient 1: 60-year-old male presenting with papulonodules intermittently painful at the level of the scrotum and groin of 2 months duration.

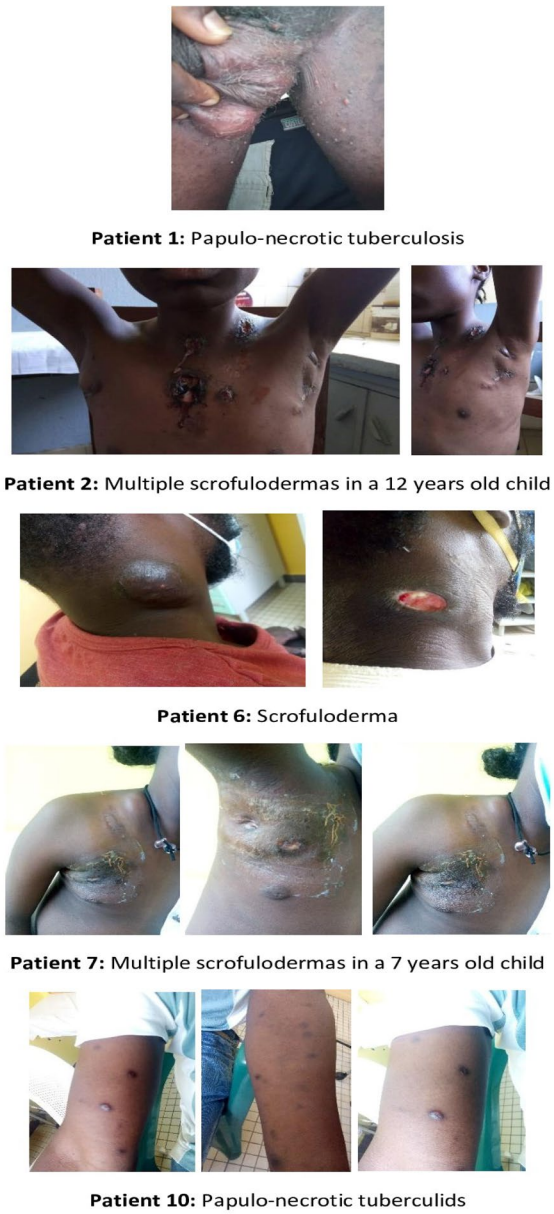
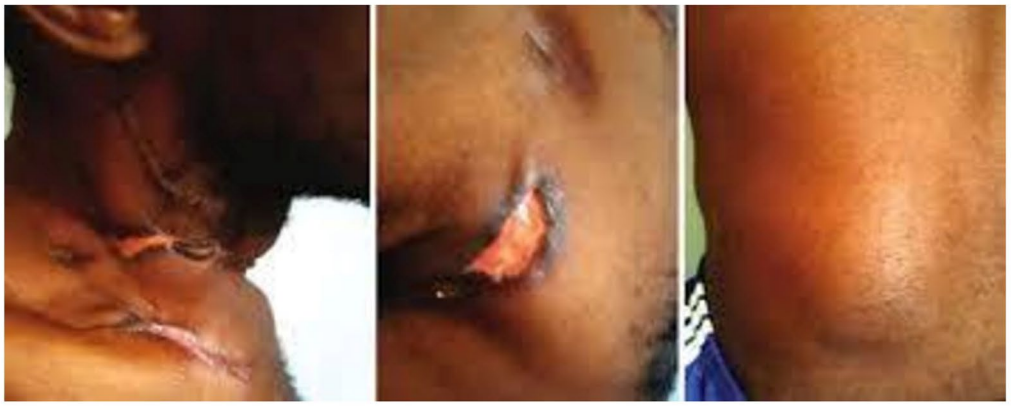
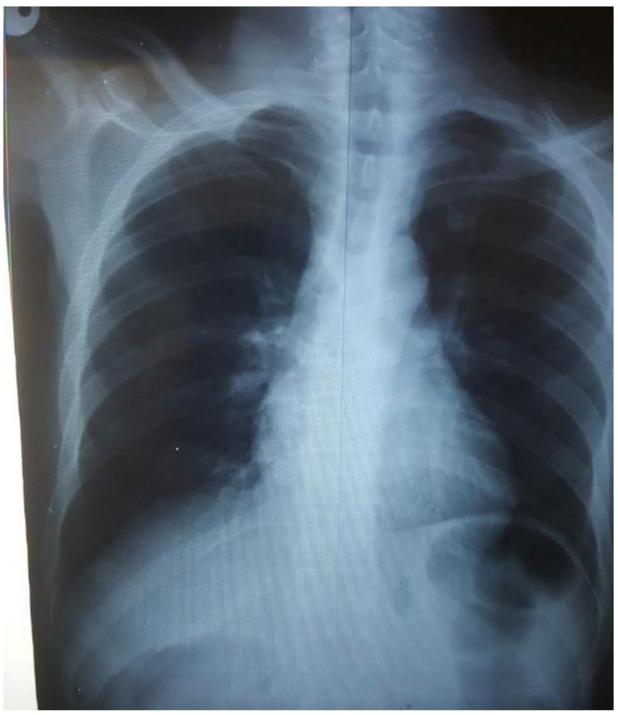


Fig. 1 Some clinical presentations of cutaneous tuberculosis in our series



Scrofuloderma, hypertrophic and atrophic scars, retractile flanges, chronic ulceration and tubercular gum at the patient's left cervical, pectoral and paralumbar region (**patient 3**)



Left retroclavicular apical excavation (cavern) suspected of pulmonary tuberculosis in a patient with scrofuloderma and gum (**patient 3**)

Fig. 2 Disseminated tuberculosis in an HIV-negative patient

Patient 2: 12-year-old female presenting with inflammatory nodules that progressed to abscess and scrofula scars on the neck, thorax, and armpits of 18 months duration.

Patient 3: 39-year-old male presented with gumma, ulcerated nodules, scars at the cervical, pectoral and lumbar regions of 9 months duration, associated with a cough and a notion of tuberculosis contagion.

Patient 4: 36-year-old female consulted for warty plaques on the right cheek and back

Patient 5: 27-year-old female consulted for gumma of 2 years duration on the inter-mammary region and involving the left breast

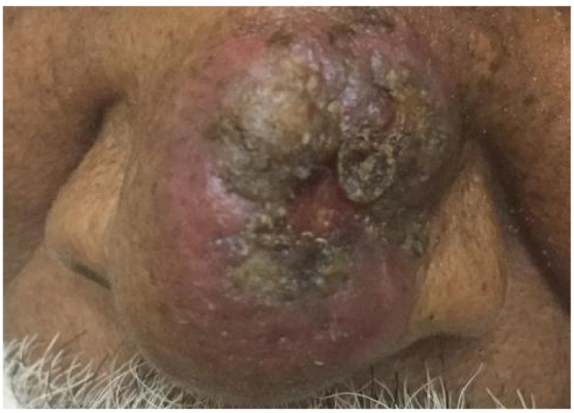


Fig. 3 Lupus vulgaris in a 72-year-old patient, associated with secondary syphilis

Patient 6: A 35-year-old man consulted for inflammatory nodules with sinus tracts exudating pus at the level of the neck and lumbar region for 12 months

Patient 7: 8-year-old female consulted for inflammatory nodules, ulcerated and discharging purulent secretions at some places, with the presence of retractile scars for 12 months

Patient 8: 20-year-old man presented with a verrucous lesion at the right thigh for 2 years

Patient 9: 72-year-old man presented with crusty ulcerations at the level of the nose for 8 months

Patient 10: 48-year-old man presented with intermittently painful hyperpigmented papulonodular lesions, on the limbs for approximately 20 years.

Diagnostic assessment

The diagnosis was retained on the basis of a bundle of clinical and histological arguments. All patients benefited from histopathological diagnostic confirmation of Tbc (as shown in Table 1) except patients 6 and 7, for whom polymerase chain reaction (PCR) was used to detect acid-fast bacilli in secretions oozing from ulcerated lesions were confirmatory. Patients 3 and 9 also benefited from PCR test confirmation. Sputum microscopy was used for diagnosis in patient 5. Chest x-ray was performed in all patients but was only abnormal in patient 3 and showed left retroclavicular apical excavation as shown in Fig. 2. Neither the tuberculin TST nor the Quantiferon test were performed. Based on diagnostic assessment, as most patients did not report extracutaneous localizations of tuberculosis, prognosis was good in our series.

Therapeutic intervention

Antituberculosis treatment was given free of charge to all patients according to the protocol of the National Program for the Fight against Tuberculosis (PNLT): 2 months of quadruple therapy comprising of "rifampicin, isoniazid, ethambutol and pyrazinamide" (RHEZ) followed by 4 months of dual therapy at base of "rifampicin and isoniazid" (RH).

Follow-up and outcomes

All patients were followed for at least 6 months. Under conventional antituberculosis drugs, the clinical progress was favorable for all cases as shown in Fig. 4.

Discussion

Our study describes epidemioclinical, diagnostic, therapeutic, and evolutionary data about Tbc in patients consulted in five dermatology units in the cities of Yaoundé and Douala. The mean age of the patients was 35.7 ± 20.3 years with extremes of 8 and 72 years, as reported similarly in other studies [8, 15]. The median duration of symptom development before diagnosis was 29.9 months and this delay may reflect the patient's wandering and may result from the clinical polymorphism of Tbc, thus delaying the diagnosis. It may also be due to late care seeking as Tbc does not affect the vital prognosis [16, 17]. Scrofuloderma-type Tbc represented the majority of cases ($n = 3$, 30%) as similarly reported in other studies [18, 19]. Scrofuloderma corresponds to the skin extension of an underlying tuberculous focus (ganglionic, bony or more rarely epididymal) and which most often give way to a retractile scar or a keloid [8].

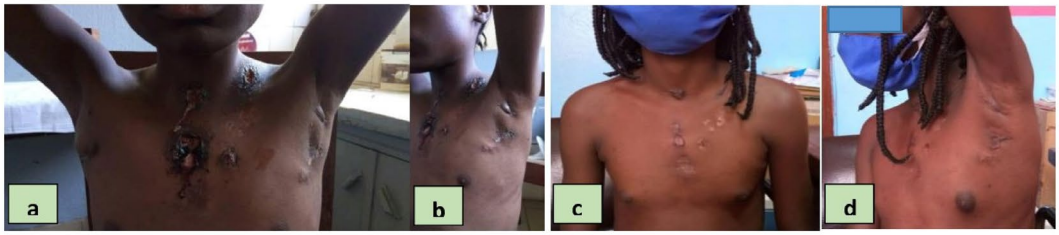
In our series, we found an original case of lupus vulgaris associated with secondary syphilis in an HIV-negative patient. Lupus vulgaris is a form of paucibacillary Tbc of chronic evolution, with varying deep focus and can originate from endogenous, hematogenous, or exogenous dissemination [20]. To our knowledge, the association of lupus vulgaris and syphilis has been described rarely in literature [21]. We have also described an exceptional case associating Tbc and lung disease in an HIV-negative patient, with a notion of tuberculosis contact. The concomitant association of Tbc with one or more localizations of visceral tuberculosis has already been reported [15, 22, 23]. In 2010, a study carried out in Dakar showed that, out of 151 cases of Tbc, 26.5% had a pleuropulmonary involvement, 8.6% had an osteoarticular involvement, 2% had a urogenital involvement, and 0.7% presented with neurological impairment [24]. In our series, as in many others, patients tested negative for HIV [8, 19, 25, 26]. The difficulty in isolating the pathogen can be an obstacle to diagnosis [25]. In two of our patients, no germ was isolated from exudates or sputum, but clinical and histological evidence was suggestive of Tbc and they had a favorable progress on antituberculosis treatment.

Table 1 Sociodemographic, clinical, and paraclinical characteristics of the patients

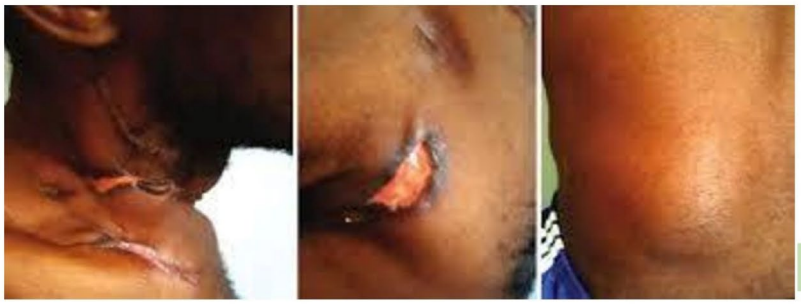
Patient number	Age (years)	Sex	Clinical forms	Direct microscopy	Histology (HE and/or Ziehl–Nielsen)	PCR	CXR	HIV serology
1	60	M	Papulonecrotic tuberculosis	–	Dermis: numerous tuberculomas made of epithelioid and giant cells in large quantities without caseous necrosis	–	–	Negative
2	12	F	Scrofuloderma	–	Dermis: lymphocytes, plasma cells, epithelioid cells with extensive caseous necrosis	Negative	Normal	Negative
3	39	M	Scrofuloderma + tubercular Gumma		Lymphocytes, plasma cells, polymorphonuclear, epithelioid		Apical	
				Positive	Cells with extensive caseous necrosis Presence of AFB	Positive	Excavation (cavern) left	Negative
4	36	F	Tuberculosis verrucosa cutis Tubercular gumma	–	Dermis: lymphocytes, plasma cells, epithelioid cells, polymorphonuclear neutrophils with vasculo-exudative foci, foci of occasional partial necrosis Dermis: Lymphocytes, plasma cells, sometimes epithelioid macrophages centering necrosis	–	–	Negative
5	27	F		Positive		–	–	Negative
6	35	M	Scrofuloderma	–	–	Positive	Normal	Negative
7	08	F	Scrofuloderma	–	–	Positive	Normal	Negative
8	20	M	Tuberculosis verrucosa cutis	–	Hyperacanthotic, hyperkeratotic, papillomatous, and ulcerated epidermis. Dermis: lymphocytes, plasma cells, epithelioid cells, polymorphonuclear neutrophils with vasculo-exudative foci; necrosis in ulcerated areas Presence of AFB in moderate quantity	Negative	Normal	Negative
9	72	M	Lupus vulgaris	–	Dermis: numerous tuberculomas made up of epithelioid and giant cells in large quantities, traces of necrosis Dermis: lymphocytes, plasma	Positive	–	Negative
10	48	M	Papulonecrotic tuberculosis					
				–	Cells, sometimes epithelioid macrophages centering necrosis	–	–	Negative

AFB acid-fast bacili, *PCR* polymerase chain reaction, *HE* hematoxylin and eosin stain, *CXR* chest x-ray, *HIV* human immunodeficiency virus, *M* male, *F* female

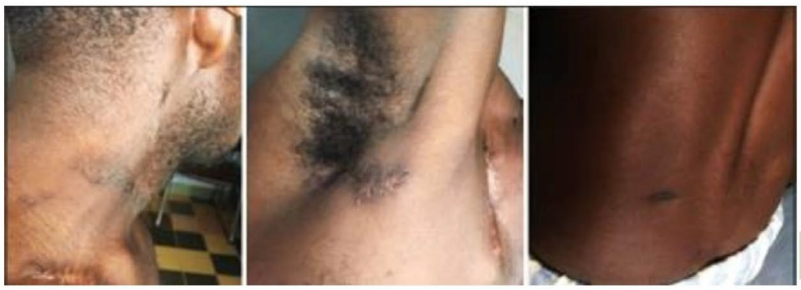
In Cameroon, the supply of free antituberculosis drugs has been implemented since 1 October 2004 through the National Tuberculosis Control Program (PNLT) of the Ministry of Public Health [2, 27]. Primary prevention of tuberculosis involves vaccination with the BCG vaccine (part of the Extended



Patient 2: Multiple scrofulodermas in a 12 years old child ***[(a, b): before; (c, d): after treatment]***

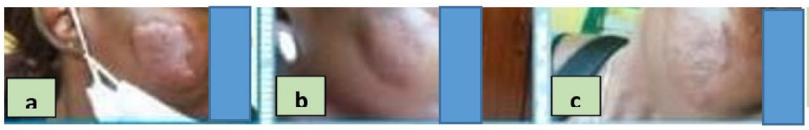


Patient 3: before treatment



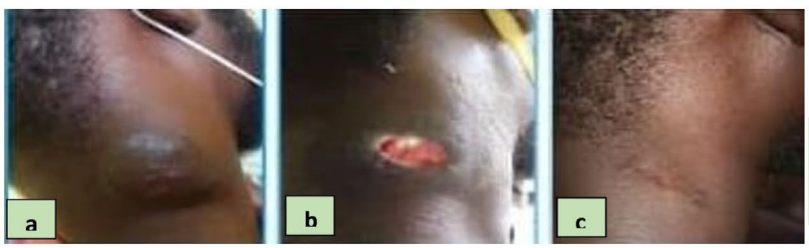
Patient 3: after treatment

Patient 3: disseminated tuberculosis



Patient 4: (a)- Before treatment; (b, c)- at 3 and 6 months of treatment

Patient 4: Tuberculosis verrucosa



Patient 6: (a)- Before treatment; (b, c)- at 2 and 6 months of treatment

Patient 6: Scrofuloderma

Fig. 4 Evolution of patients under antituberculosis treatment

Vaccination Programme in Cameroon), as well as fighting poverty and promiscuity. The BCG vaccine contributes in reducing by 50%, the risk of both pulmonary and extrapulmonary tuberculosis, with a higher protection rate against severe forms, in particular tuberculous meningitis [8]. In our series, 80% of patients were vaccinated with BCG. According to the national protocol, the treatment of Tbc alone or associated with another location includes an initial phase of RHEZ for the first 2 months, then the RH for the following 4 months.

All our patients had a good response under this antituberculosis treatment. This favorable evolution was also reported in other studies [14, 28].

Conclusion

Tbc remains rare. In our context of endemic tuberculosis, it is a diagnosis to be evoked when faced with any rebellious chronic skin lesion. The duration of progress of the disease is relatively long prior to definitive diagnosis because of the anatomoclinical polymorphism and/or the difficulty of isolating the pathogenic agent. The clinical forms encountered in our environment were multiple, but were dominated by scrofuloderma. Taking epidemioclinical factors into account, interdisciplinary collaboration and strengthening the technical platform of specialized services would contribute to early diagnosis and management of this condition.

Abbreviations

AFB	Acid-fast bacilli
BCG	Bacillus Calmette–Guérin
BK	Koch's bacillus
DNA	Desoxyribonucleic acid
F	Female
HIV	Human immunodeficiency virus
IDR	Intradermal reaction
M	Male
Mtb	*Mycobacterium tuberculosis*
PCR	Polymerase chain reaction
Tbc	Cutaneous tuberculosis

Acknowledgements

We are grateful to all who participated in this article

Author contributions

All authors contributed to the design, analysis and interpretation of data, writing the article or critically reviewing its intellectual content. All authors have read and approved the final version of the manuscript.

Funding

Not applicable.

Data availability

Data generated for this research is available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate

Research authorizations were obtained from the competent hospital authorities. We conducted our study in strict accordance with the fundamental principles of the Declaration of Helsinki on research involving human subjects. Patients and their parents or guardians for minors were informed about the various aspects the study, the objective and the benefit. Their signed informed consent was obtained. Data were collected in a confidential manner. Patient's anonymity was ensured during data handling. Our study presented no risk to the participants. As this was a case series report, ethical clearance was not applicable.

Consent for publication

Written informed consent was obtained from the patients for publication of this case report and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal.

Informed consent

Written informed consent was obtained from the patients to publish this report in accordance with the journal7s patient consent policy

Competing interests

The authors declare no competing interests.

Received: 29 June 2023 Accepted: 22 September 2024
Published online: 03 March 2025

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