Cutaneous Tuberculosis Presenting as a Chronic Non-healing Ulcer in a Child: Diagnostic Challenges in a Resource-Limited Setting – A Case Report and Literature Review

De-kaa NLP[1], FWACP, **Atabo A**[2], FWACP, **Akwaras NA**[2], FMCFM, **Ornguga OB**[2], FWACP, **Daniel AD**[2], FMCFM, **Ocheifa MN**[2], FWACP, **Swende LT**[2], FWACP, **Shaahu VN**[3], FWACP, **Fikin A**[4], FWACP.

[1]Department of Family Medicine, Federal University of Health Sciences, Otukpo, Benue State, Nigeria
[2]Department of Family Medicine, Federal Medical Centre, Makurdi, Benue State, Nigeria
[3]Department of Community Medicine, Moses Orshio Adasu University, Makurdi. Benue State
[4]Department of Internal Medicine, Modibo Adamawa University, Yola. Adamawa State, Nigeria

Corresponding author: Dr De-kaa, Niongun Lawrence Paul. Consultant Family Physician & Senior Lecturer. Federal University of Health Sciences, Otukpo. Benue State. Nigeria. ***Email:*** niongundekaa@yahoo.com.

Abstract

Cutaneous tuberculosis (CTB) is a rare manifestation of extrapulmonary tuberculosis. It commonly presents as a chronic, non-healing skin ulcer among individuals in tuberculosis-endemic, resource-limited settings where access to confirmatory diagnostics such as histopathology or molecular testing is frequently unavailable.

We present an 8-year-old girl from a rural community in Northcentral Nigeria who presented with a 12-month history of a painless, non-healing ulcer on the anterior chest wall. The lesion began as a furuncle and evolved into ulcers with serous discharge, elevated erythematous margins, and a fibrinous base. Investigations done included chest X-ray, HIV test, Mantoux (4 mm induration), full blood count, erythrocyte sedimentation rate, and wound culture, which were within normal limits. Facilities for Histopathology, AFB and PCR were unavailable.

After excluding differentials such as Buruli ulcer, deep fungal infection, and leishmaniasis, a presumptive diagnosis of scrofuloderma was made based on clinical history. She was enrolled in the national DOTS program and commenced on standard antituberculosis therapy: 2 months of rifampicin, isoniazid, pyrazinamide, and ethambutol, followed by 4 months of rifampicin and isoniazid. Cessation of discharge, >50% reduction in ulcer size, and granulation tissue formation were evident at 1 and 3 months. Complete epithelialization with minimal scarring occurred by 6 months.

This case highlights the critical need for clinical vigilance and for considering CTB as a differential diagnosis for chronic paediatric ulcers unresponsive to conventional antibiotic therapy in high-burden, resource-constrained regions. While a therapeutic trial may support a presumptive diagnosis when guided by national guidelines, it must not be equated with microbiological and histologic confirmation.

Keywords: Cutaneous tuberculosis, scrofuloderma, chronic skin ulcer, resource-limited setting.

Tuberculose cutanée révélée par un ulcère chronique non cicatrisant chez une enfant : difficultés diagnostiques en contexte de ressources limitées – Étude de cas et revue de la littérature

Résumé

La tuberculose cutanée (TC) est une forme rare de tuberculose extrapulmonaire. Elle se présente généralement sous la forme d'un ulcère cutané chronique ne cicatrisant pas chez des personnes vivant dans des zones d'endémie tuberculeuse à ressources limitées, où l'accès aux examens paracliniques de confirmation, tels que l'histopathologie ou les tests moléculaires, sont souvent impossibles.

Nous présentons le cas d'une fillette de 8 ans, originaire d'une communauté rurale du Centre-nord du Nigéria, qui consultait pour un ulcère indolore chronique de la paroi thoracique antérieure évoluant depuis

12 mois, sans tendance à la cicatrisation. La lésion a débuté par un furoncle puis évolué vers un ulcère aux bordures érythémateuses surélevées, la base fibrineuse avec un écoulement séreux. Les examens complémentaires réalisés (radiographie thoracique, test de dépistage du VIH, test de Mantoux [induration de 4 mm], numération formule sanguine, vitesse de sédimentation et culture de la plaie) étaient normaux. L'histopathologie, la recherche de BAAR et la PCR n'étaient pas disponibles.

Après avoir exclu des diagnostics différentiels tels qu'un ulcère de Buruli, une mycose profonde et une leishmaniose, le diagnostic présomptif de tuberculose scrofuloderme a été retenu sur la base des arguments anamnestiques et cliniques. La patiente a été prise en charge dans le cadre du programme national DOTS et a débuté un traitement antituberculeux standard fait de deux mois de rifampicine, d'isoniazide, de pyrazinamide et d'éthambutol, suivis de quatre mois de rifampicine et d'isoniazide. L'arrêt de l'écoulement, la réduction de plus de 50 % de la taille de l'ulcère et la formation d'un tissu de granulation étaient manifestes à un et trois mois de traitement. Une épithélialisation complète, avec une cicatrice minime, ont été observées à six mois de traitement.

Ce cas souligne l'importance cruciale d'une vigilance clinique accrue et de la prise en compte de la tuberculose cutanée comme diagnostic différentiel des ulcères pédiatriques chroniques réfractaires aux traitements antibiotiques conventionnels dans les régions à forte prévalence tuberculeuse et aux ressources limitées. Bien qu'un traitement d'épreuve puisse étayer un diagnostic présomptif lorsqu'il est mené conformément aux recommandations nationales, il ne saurait se substituer à une confirmation microbiologique et histologique.

Mots-clés : Tuberculose cutanée, scrofuloderme, ulcère cutané chronique, plateau technique peu étoffée.

Background

Tuberculosis (TB) is one of the oldest diseases known to humanity, in 2015 Zyl and colleagues reported an incidence of 8-9 million cases per year. It was responsible for most deaths in persons with coexisting human immunodeficiency virus (HIV) infection. Despite TB being such a widespread disease, especially in low-income countries, it manifests only as an extrapulmonary disease in 8.4–13.7% of cases.[1] Cutaneous tuberculosis (CTB) is uncommon, accounting for 1-1.5% of all extrapulmonary manifestations.[1] The etiological agent is *Mycobacterium tuberculosis*.[1]

By 2019, the World Health Organisation (WHO) reports that TB results in more than 4000 deaths daily worldwide, with 10.4 million affected annually and 1.5 million deaths from tuberculosis.[1,2] In 2021, the WHO reported that about 10.6 million people were infected with *M. tuberculosis* globally, with the majority of incidences in South East Asia (45%), Africa (23%) and Western Pacific (18%). This report is a reversal of the declining trend over the past 20 years, which was attributable to COVID-19 in 2019. Nigeria ranks first in Africa and sixth globally among 30 countries with the highest burden of TB, which is attributable to HIV endemicity and drug-resistant TB.[3]

Cutaneous tuberculosis continues to pose a diagnostic challenge for dermatologists, especially in the developing world, due to the difficulty of obtaining microbiological confirmation and the need to consider a broader differential diagnosis, including leishmaniasis, actinomycosis, leprosy, and deep fungal infections.[2,4]

It is important to recognize the varying clinical presentation of cutaneous tuberculosis to avoid missed or delayed diagnosis.[2,4] Scrofuloderma and lupus vulgaris are the oldest forms of cutaneous tuberculosis described in literature and were known as the King's evil.[2] Scrofuloderma is the most common form in children, usually seen after consumption of milk contaminated with *Mycobacterium bovis* and contiguous spread of *Mycobacterium tuberculosis* from an underlying focus of infection. It presents as firm, painless subcutaneous red-brown nodules overlying an infected focus, which enlarge and suppurate, forming ulcers that drain serous, purulent, or caseous material.[4,5] Cutaneous TB is still rare despite the increasing prevalence of TB worldwide. *Mycobacterium tuberculosis,*

Mycobacterium bovis and the Bacille Calmette-Guérin vaccine can cause cutaneous tuberculosis.[4,5] The authors report this case to demonstrate the challenges they faced arriving at the presumptive diagnosis in a resource-limited setting. The rarity of CTB may have lowered the index of suspicion, contributing to diagnostic delay.

Case report

We report an eight-year-old female who presented to the clinic with a one-year history of an ulcer on the anterior chest wall that started as a furuncle that ruptured and continued to spread to contiguous areas, forming other ulcers. These ulcers coalesced to form a large, painless, purulent ulcer that discharged serous fluid, staining her clothing. There was no history of cough or contact with a person with a chronic cough. There was no history of ingestion of unpasteurized milk. The mother had taken her to different chemists and clinics, but the ulcers had been recurrent and worsening. She resided in a remote area with no access to specialist dermatologic care or advanced diagnostic laboratory services, a common reality in many resource-limited regions of Nigeria, where health infrastructure remains limited.

She had BCG and other vaccines at birth; the BCG scar was seen on her left arm (shoulder), and there was no adverse reaction during the vaccinations. She was the fourth child of her parents in a family of eight; she lived with her mother but had to relocate to stay with her sister due to financial constraints in accessing health and displacement from herders. The father had died when she was four years old.

On general examination, we saw a young girl who was not pale, anicteric, and not febrile. There was no peripheral lymphadenopathy. She weighed 21 kg, corresponding to approximately the 10th percentile for her age.

Skin examination revealed ulceration over the mid-anterior sternal skin measuring 3 cm x 3 cm and 5.5 cm by 4.0 cm. The ulcers were sharply demarcated, slightly elevated, and had erythematous margins. The base contained fibrinous slough with serous (non-purulent) exudate, and the surrounding skin showed mild crusting without satellite lesions or evidence of regional spread (*fig 1*).

The chest was clinically clear with a normal respiratory rate and vesicular breath sounds. Based on the history, clinical picture and lack of response to empirical treatment, a presumptive diagnosis of CTB was made. The diagnosis was explained to the mother, who was in doubt, but she was counselled and told that this could be a manifestation of CTB. She was requested to do a chest X-ray (Posterior-anterior view), full blood count, erythrocyte sedimentation rate, retroviral screening (HIV), Mantoux test and wound swab for microscopy, culture and sensitivity. All the results were normal. We requested a polymerase chain reaction (PCR) test and a punch biopsy of the wound edge for histology, but these facilities were not available.

She was referred to the directly observed treatment short (DOTS) course clinic to commence on therapeutic antituberculosis treatment. She was commenced on WHO-recommended 6-month antituberculosis regimen a week after presentation: an intensive phase of 2 months with rifampicin (10 mg/kg/day), isoniazid (10 mg/kg/day), pyrazinamide (25 mg/kg/day), and ethambutol (15 mg/kg/day), followed by a 4-month continuation phase with rifampicin and isoniazid. She was to come for follow-up visits at 1, 3 and 6months to monitor response to therapy.

Clinical reassessment at 1 month revealed cessation of discharge, greater than 50% reduction in ulcer surface area, and the appearance of healthy granulation tissue. By 3 months, the ulcer had fully epithelialized, leaving only mild hypopigmentation. At the 6-month follow-up, the lesion had resolved completely, leaving a small, atrophic, hypopigmented scar (*Fig. 2*).

Discussion

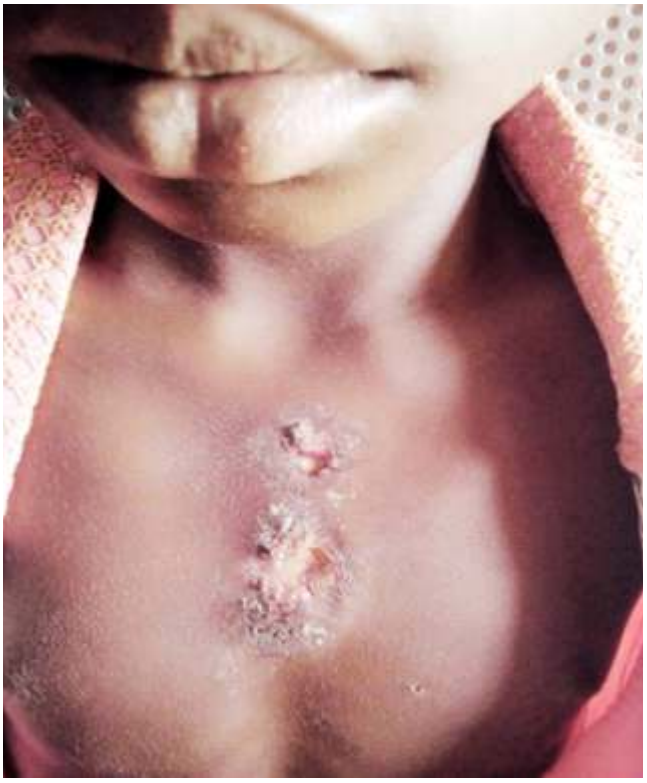

Figure 1: At presentation. Two non-tender ulcers measuring 3 cm x 3 cm and 5.5 cm by 4.0 cm, located on the mid-sternal anterior chest wall, with sharply demarcated, slightly elevated erythematous margins, a fibrinous base with serous exudate, and mild crusting of the surrounding skin.

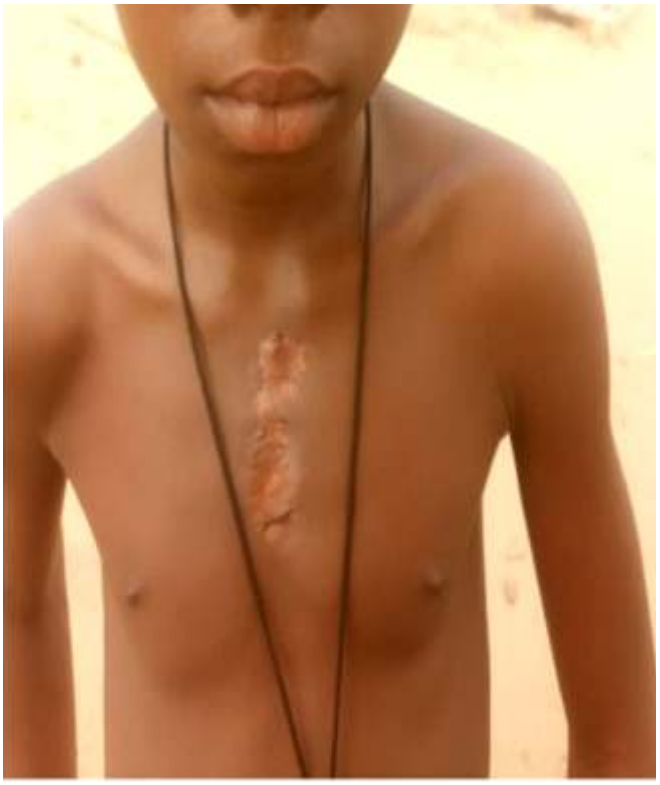

Figure 2. After six months of anti-TB treatment: Healed ulcer with full epithelialization, leaving only a small, atrophic, hypopigmented scar

Tuberculosis remains a global health challenge, causing significant morbidity and mortality. TB continues to prevail, especially in resource-limited settings, despite advances in healthcare. Cutaneous TB remains one of the least studied and underreported variants of extrapulmonary tuberculosis due to its wide range of presentation. The diagnosis is challenging due to the lack of sensitive and specific investigations, the low sensitivity of some traditional tests because paucibacillary mycobacteria are present in the lesions, and the difficulty in distinguishing Mycobacterium tuberculosis from other Mycobacterium species based on skin biopsy morphology.[6] This patient had difficulty accessing adequate diagnostic care in the facility

The epidemiology of CTB is not well studied, but it occurs in regions with endemic *M. tuberculosis.* With the increasing incidence of TB, the emergence of new cases of CTB has also increased.[7] The paediatric population is particularly vulnerable to TB and the extrapulmonary manifestation, including CTB.[8] Our patient was in the paediatric age group

Extrapulmonary TB accounts for 20% of all cases of the disease, including pleural TB, osteoarticular TB, genitourinary TB, ocular TB, abdominal TB, breast TB, tuberculous meningitis, pericarditis, and cutaneous tuberculosis, which together represent 1-2%. The first case of CTB was described in 1826 by Theophile Laennec (1781-1826).[2]

Cutaneous TB is rare and often overlooked due to its wide range of possible morphologies; therefore, diagnosis requires a high index of suspicion.[7] This is why this patient had chest ulcers for over one year and was managed as a chronic wound. Cutaneous TB is characterized by invasion by Mycobacterium tuberculosis, less commonly by Mycobacterium bovis, and by the bacilli Calmette-Guérin vaccine. Clinical subtypes are based on

route of transmission, environmental factors and individual immunity.[9]

Therefore, the exogenous (or primary form) is due to traumatic direct inoculation of *M. tuberculosis* into the skin or mucous membranes, leading to primary CTB, TB verrucosa cutis, or, rarely, lupus vulgaris. The endogenous (or secondary) form occurs due to haematogenous or lymphatic spread of *M. tuberculosis* from an internal focus to contiguous areas, leading to lupus vulgaris, scrofuloderma, TB cutis orificialis, miliary TB, and metastatic TB abscesses.[9,10] For this patient, it was difficult to determine the source of infection.

The incidence is highest in low- and middle-income countries. Cutaneous TB is one of the most subtle and most difficult diagnoses for dermatologists practising in the low and middle-income countries due to its varied presentation. The diagnosis is based on clinical presentation, tuberculin reaction, histopathology and response to antitubercular therapy.[11] This difficulty was encountered by the first-contact clinicians due to a lack of diagnostic facilities.

Therefore, a high index of suspicion, along with proper and meticulous clinical evaluation and relevant investigations, aids early diagnosis and successful therapy. All cases respond well to directly observed treatment short course (DOTS) antitubercular treatment, as is the case with TB in general.[12] Diagnosis requires correlation of clinical findings with diagnostic testing, such as acid-fast bacilli (AFB) smears and cultures; the use of polymerase chain reaction (PCR) has increased because of its rapidity, specificity, and sensitivity.[13] All cases of CTB should be confirmed with histopathology and culture with or without molecular testing; however, this may fail to reveal *M. tuberculosis*; thus, in each case, a thorough evaluation for systemic involvement is necessary.[10,14] Though lupus vulgaris and tuberculosis verrucosa cutis are the two variants shown to occur in previously sensitized patients who had BCG in childhood, her diagnosis was only presumed to be CTB.[5] Based on the history, we made a presumptive diagnosis of scrofuloderma. There was no systemic involvement in this patient.

Polymorphous lesions, including ulcers, plaques, papules, nodules, gummas, and verrucous lesions, are usually associated with extrapulmonary manifestations. Cutaneous TB is commoner in low-income settings, HIV, and immunosuppressed populations.[7] This patient presented with ulcers on the anterior chest wall from a low-income setting.

Current treatment options include oral antibiotics such as rifampicin, ethambutol, isoniazid, and pyrazinamide, and intramuscular streptomycin, which may be combined with surgical intervention. As with TB, treatment requires 4 drugs which consist of rifampicin, isoniazid, pyrazinamide and ethambutol for 2 months followed by a 2-drug regimen (rifampicin and isoniazid) for 4 months.[7,10,14] Mycobacteria may not be isolated in CTB lesions, a therapeutic trial of antituberculosis treatment for 6weeks may be required to confirm or refute the presumptive diagnosis.[15,16] These were the antituberculosis treatments given to the patient.

Early diagnosis and treatment are required for better outcomes; if left untreated, it can result in complications like squamous cell carcinoma and basal cell carcinoma, especially in lupus vulgaris.[17] Long-term complications of untreated CTB include contractures, scarring, and the onset of carcinomas and sarcomas.[18] She did not present with any of these complications except for the scar.

Management of CTB requires a multimodal approach combining clinical suspicion, tuberculin skin testing, histopathological examination, acid-fast bacilli (AFB) staining or culture, and molecular methods such as PCR. However, in resource-limited settings such as rural Nigeria, access to even basic dermatopathology or mycobacteriology services is often unavailable. Coupled with financial constraints, patients are forced to seek alternative treatments, resulting in delays in accessing care. Also, prompt treatment of pulmonary TB, early identification and treatment

of HIV infection could prevent the sequelae.[13]

Conclusion

The diagnosis of CTB can be challenging, and the diagnosis is often missed as it presents as a chronic ulcer, which may be managed similarly. Cutaneous TB can present across all ages with or without a systemic disease; therefore, there should be a high index of suspicion in patients who present with chronic skin ulcers. A combination of clinical history, examination, microbiologic, immunologic and histopathologic skin investigation is essential for diagnosis.

A therapeutic trial with anti-tuberculous therapy may be helpful in presumptive diagnosis of CTB. Counselling for caregivers will help them support patients when investigations cannot reveal the diagnosis. This case report aimed to increase clinicians' suspicion and awareness of CTB to prevent delays in accessing treatment.

Ethical consideration: Written informed consent was obtained from the parent/guardian to use the patient's photograph, with her identity concealed. Case reports are exempt from institutional ethical approval at our centre.

Acknowledgement: The authors wish to thank the patient and her parent for allowing us to write this case whose identity was concealed

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