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Case Series

Pediatric cutaneous tuberculosis: insights from a case series

Nidhi, Rupinder Kaur, Rachna Verma, Usha Chhillar*

Department of Dermatology, Venereology and Leprology, BPS GMC (W) Khanpur Kalan, Sonepat, Haryana, India

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***Correspondence:**
Dr. Usha Chhillar,
E-mail: ushachillar@gmail.com

ABSTRACT

Cutaneous tuberculosis (CTB) is the rare manifestation of tuberculosis, accounting for approximately 1-2% of extrapulmonary tuberculosis cases. Cutaneous tuberculosis in pediatric patients is often misleading and very difficult to diagnose, as it can mimic various other skin diseases. Here, we present a case series of CTB in children with atypical presentation and location. This case series highlights the rare and varied clinical presentations of cutaneous tuberculosis.

Keywords: Cutaneous tuberculosis, Pediatric, Mycobacterium

INTRODUCTION

Cutaneous tuberculosis is a form of tuberculosis (TB) that affects the skin, caused by *Mycobacterium tuberculosis* or, in some cases, *Mycobacterium bovis*.[1] CTB is an uncommon extrapulmonary form of TB, occurring in approximately 1-2% of reported cases.[1] Among Indian children, the prevalence of CTB is estimated to vary between 18% and 54% in different studies.[2,3] CTB has a range of distinct clinical presentations that mimic diverse skin diseases, therefore it is very important to keep strong suspicion in appropriate clinical settings.[4,5] The clinical manifestation of CTB is largely determined by the source of infection and the individual's immune condition.[6] The two most frequently encountered forms of CTB in children include lupus vulgaris (LV) and scrofuloderma.[6] There is no significant gender predilection in pediatric patients, however, the infection occurs more frequently in the 10-14 year age group.[3] Children are at higher risk of systemic involvement than adults.[3] The burden of tuberculosis remains a significant issue in developing countries despite significant advancements in treatment strategies.[4] Neglected cases of CTB can lead to dissemination, deformity and an increase in morbidity, hence, early diagnosis and prompt management are essential.[1,2] Here, we present a series of four challenging cases of CTB in pediatric age group.

CASE SERIES

Case 1

A 11-year-old male patient came to outpatient department of dermatology with complaints of elevated skin lesion located just below the left lower eyelid since10 months. He also complained of non-foul-smelling serous discharge from the lesion. The lesion was painless and gradually increased in size. There was no history of fever, cough or weight loss. There was a positive history of pulmonary tuberculosis in the patient's uncle, who was a neighbour. General and systemic examination were normal and there was no lymphadenopathy. On dermatological examination, the patient had single, well defined erythematous plaque of size 1.5×0.5 cm with crusting present just below the lateral left lower eyelid (Figure 1). On palpation, the lesion was firm, immobile and bound down to the underlying bone. Mantoux test was positive with 12 mm induration. Routine blood tests were unremarkable, except for an elevated erythrocyte sedimentation rate (ESR). Chest X-ray was normal. Fine needle aspiration cytology (FNAC) and skin biopsy were denied by guardian. Non-contrast multidetector computed tomography (MDCT) of orbit showed a soft tissue density lesion with internal focus of calcification involving skin and subcutaneous plane at left lateral orbital wall causing

erosion of adjacent lateral orbital wall and anterior part of zygomatic process suggesting of tubercular etiology (Figure 2). On the basis of clinical presentation and computed tomography (CT) scan finding diagnosis of scrofuloderma with adjacent bone involvement was made and antitubercular therapy (ATT) was initiated according to the patient's age and weight.

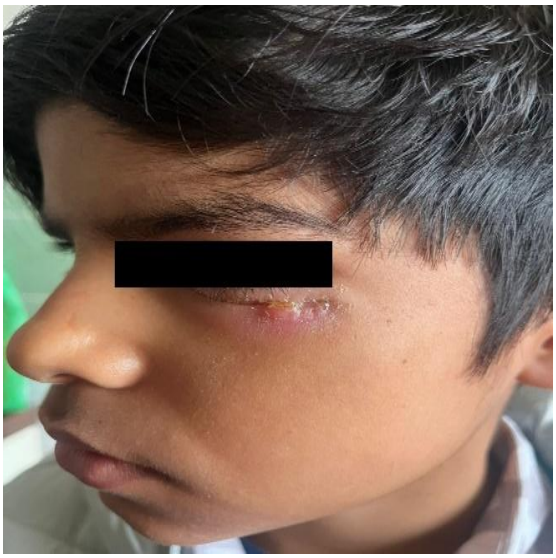

Figure 1: 11-year-old male child with a single erythematous plaque with overlying crusting present just below the lateral left lower eyelid.

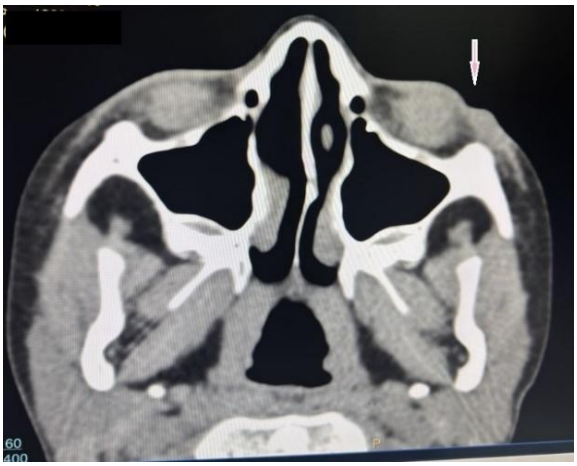

Figure 2: MDCT of orbit shows soft tissue density with calcification at the left lateral orbital wall, eroding the adjacent orbital wall and anterior zygomatic process.

Case 2

A 16-year-old male patient presented with complaints of multiple discharging sinus in centre of chest for the last 1 year. The lesion began as a single papule that gradually increased in size and number and developed into nodules, pustules and draining sinuses. The patient reported a 6-month history of an intermittent, non-productive cough and weight loss of 3 kg over the past year. General and systemic examination were unremarkable. On local examination, multiple pus discharging sinuses surrounded by hyperpigmented skin and puckered scarring present over centre of the sternal area (Figure 3). Biochemical parameters were within normal range. Mantoux test was positive and showed an induration of 18mm. The chest X-ray PA view (CXR) showed a cavitary lesion in the right upper zone with right hilar lymphadenopathy and patchy opacities in the left middle and lower zones (Figure 4). Considering differential diagnoses such as hidradenitis suppurativa, actinomycosis, deep fungal infections, and cutaneous tuberculosis, a skin biopsy was performed. Histopathological examination revealed epithelioid cell granulomas and langhans giant cells, surrounded by a dense lymphocytic infiltrate, which supported the diagnosis of scrofuloderma (Figure 5). ATT was started according to Revised National Tuberculosis Control Program (RNTCP) - directly observed treatment short-course (DOTS) strategy. The patient was lost to follow-up after two months.

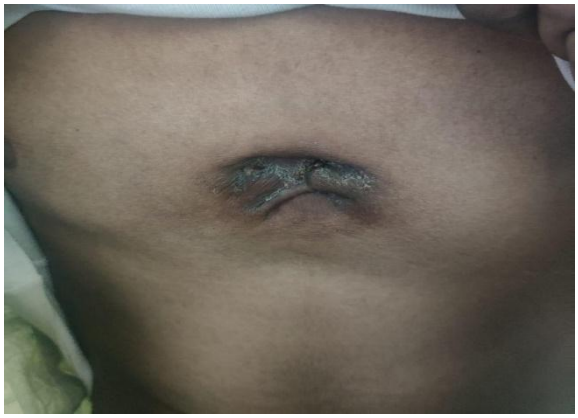

Figure 3: Multiple pus discharging sinuses surrounded by hyperpigmented skin and puckered scarring present over centre of the sternal area.

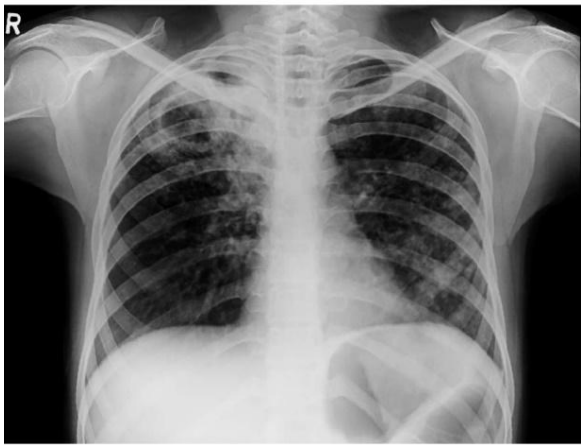

Figure 4: Chest X-ray PA view shows a cavitary lesion in the right upper zone with right hilar lymphadenopathy and patchy opacities in the left middle and lower zones.

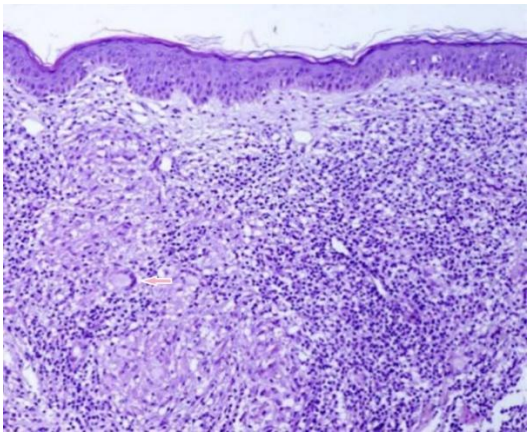

Figure 5: Histopathological examination shows epithelioid cell granulomas with langhans giant cells, surrounded by a dense lymphocytic infiltrate.

Case 3

A 3-year-old male child presented with swelling over left groin region for 6 months. Patient initially developed pea size, painless swelling which gradually increased in size and was associated with changes in overlying skin. There was no history of fever and weight loss. The child was of thin built, with no clinical signs of anaemia, icterus, cyanosis, or clubbing, and the systemic examination revealed no abnormalities. On local examination multiple matted, non-tender lymph nodes present on left inguinal region, measuring a size of 5×3 cm, round in shape with ill- defined margin with hyperpigmented, bound down overlying skin (Figure 6). The blood workup revealed no anaemia, mild lymphopenia, an elevated C-reactive protein level of 25 mg/l, and an erythrocyte sedimentation rate of 70 mm. Tuberculin test was positive (14 mm). The CXR was normal. Fine-needle aspiration cytology (FNAC) of lymph node showed epithelioid cell granuloma with langhans giant cells and also confirmed the presence of acid-fast bacilli (AFB) with Ziehl-Neelsen (ZN) staining (Figure 7). The detection of AFB and clinical presentation established the diagnosis of scrofuloderma. ATT was initiated, and a significant reduction in the lesion's size was observed after 6 months of therapy.

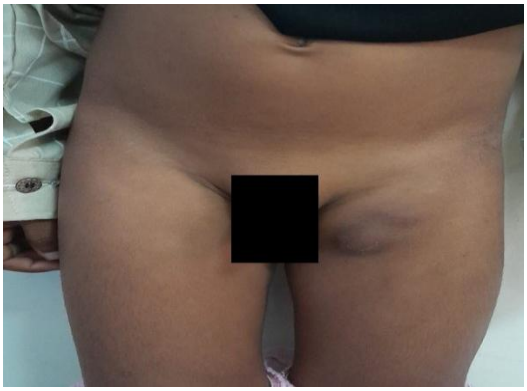

Figure 6: Multiple matted lymph nodes with hyperpigmented skin on left inguinal region.

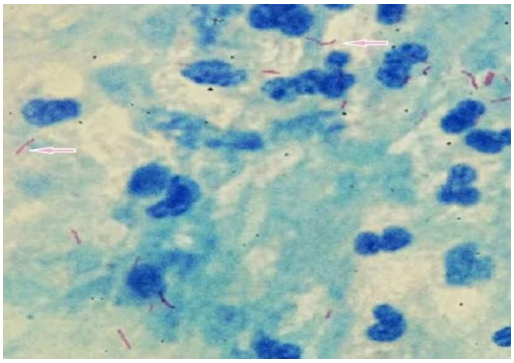

Figure 7: Ziehl-Neelsen staining shows positive acid-fast bacilli.

Case 4

A 10-year-old girl was referred from ophthalmology and ENT department to our dermatology to out-patient department for her muco-cutaneous lesions. The patient was presented with a lesion over left ear for last 1.5 years and oral mucosal lesions for 6 months. She had also complaint of recurrent epistaxis for 15 days along-with watering, pain and redness in the left eye for 3 days. A detailed history revealed that the cutaneous lesion began as a papule on the left ear 1.5 years ago, gradually enlarging over time. There was a slight improvement with treatment from a private practitioner last year (records unavailable), but the lesion has subsequently reprogressed, accompanied by ocular symptoms. There were no systemic complaints. The patient's father had a history of pulmonary tuberculosis 5-6 years ago. The general physical examination and systemic evaluation were unremarkable, with no evidence of regional lymphad-enopathy. A BCG scar was noted on left arm. On local examination, an ill-defined, erythematous to hypopigmented plaque with crusting was observed over the left pinna associated with ear deformity and multiple papular and hypopigmented patches over face (Figure 8). Mucosal examination showed diffuse ulcerative erythematous lesions over hard palate, along with gingival hyperplasia (Figure 9). Bilateral nasal mucosal crusting was also noted. Upon ophthalmic examination, conjunctival congestion, corneal erosions, and corneal vascularization were noted in the left eye. A differential diagnosis of deep fungal infection, Crohn's disease, squamous cell carcinoma and lupus vulgaris was made.

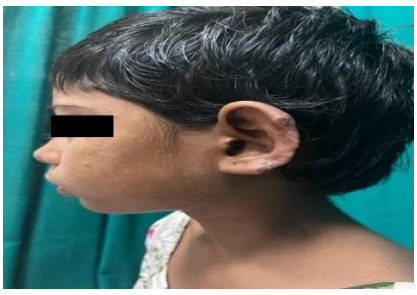

Figure 8: Erythematous to hypopigmented plaque with crusting over the left pinna associated with ear deformity.

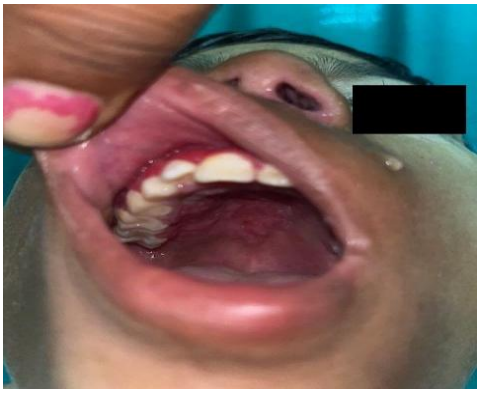

Figure 9: Multiple ulcerative lesions over hard palate with gingival hyperplasia.

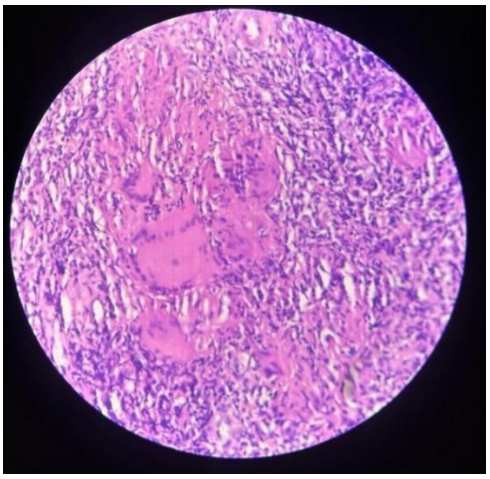

Figure 10: Histopathological examination shows multiple epithelioid granulomas with central necrosis.

Haematological investigations were within normal limits, with the exception of an elevated erythrocyte sedimentation rate of 35 mm in the first hour. Mantoux came highly positive (25 mm). Chest X-ray showed no abnormalities. CB-NAAT and sputum for AFB were negative. Biopsy was done from the lesions over hard palate which showed multiple epithelioid granulomas with central necrosis (Figure 10). The diagnosis of lupus vulgaris with multifocal involvement was made and patient was started on anti-tubercular therapy (ATT). On follow up after completion of 6 months of ATT, patient showed marked improvement in all mucocutaneous lesions as well improved eye and nasal signs and symptoms.

DISCUSSION

Tuberculosis continues to be one of India's most significant and challenging public health issues. Globally, India holds the highest TB burden, with the disease affecting individuals across all age groups, predominantly impacting the younger population.[1] Tuberculosis represents a significant obstacle to social and economic development, with hundreds of workdays lost daily due to the illness.[7] Cutaneous tuberculosis represents an extrapulmonary manifestation of tuberculosis, resulting from exogenous infection occurs via direct skin inoculation, leading to tuberculous chancre and tuberculosis verrucous cutis, endogenous infection originates from a primary focus, spreading through contiguous (orifical TB, scrofuloderma), hematogenous (miliary TB, gumma, lupus vulgaris) or due to hypersensitivity reaction (tuberculids).[8] Children are especially vulnerable, attributable to the underdevelopment of their immune responses. Studies show that the prevalence of cutaneous tuberculosis in Indian children varies between 18% and 54%.[2,3,9] Rising cases of CTB recognized as a critical indicator of active tuberculosis transmission in the community. Household contacts are a major source of infection for children with CTB.[10,11] The clinical spectrum of CTB is broad and children showing more extensive and systemic involvement than adults.[12] The accurate diagnosis of cutaneous tuberculosis is frequently overlooked due to its diverse and often confusing clinical presentations, as well as the lack of a definitive diagnostic tool. The differential diagnosis for this condition includes deep fungal infections, Hansen's disease, sarcoidosis, atypical mycobacterial infections, actinomycosis, leishmaniasis, lichen planus (hypertrophic).[4] A combination of clinical evaluation, FNAC, histopathology, and CBNAAT helps in reaching the diagnosis. Scrofuloderma and LV represent the most commonly observed types of CTB in the pediatric population.[6] The pathogenesis of scrofuloderma involves a break in the skin barrier, primarily due to the direct spread of TB infection from an underlying focus, often a lymph node or bone.[1] The predominant site of scrofuloderma is neck.[3]

In our case series, two cases were diagnosed with scrofuloderma secondary to tubercular lymphadenitis, while one case was attributed to a bone infection. In these cases, the diagnosis of CTB proved challenging due to its presentation at atypical sites, including the face, chest, and inguinal areas, uncommon for scrofuloderma. We reached the diagnosis based on the clinical presentation and diagnostic tests, including histopathology, FNAC, chest X-ray and CT scan. Our fourth case describes a paediatric patient with cutaneous tuberculosis that was initially neglected, leading to the involvement of the ocular, oral, and nasal mucosa. The involvement of mucosa may be due to exogenous spread from the lesion over left pinna or by endogenous lymphatic or hematogenous spread. Based on clinical features, highly positive Mantoux test with positive tuberculosis contact history raised the suspicion of tuberculosis which was further confirmed by oral palate biopsy that showed typical epithelioid granuloma with central necrosis. On the basis of investigations, a diagnosis of lupus vulgaris with multifocal involvement was formed. Lupus vulgaris with eye and oral involvement are rarely reported.[13]

Most patients in our series were from low socio-economic backgrounds, living in poor conditions. Various studies

suggest that malnutrition, prevalent in such environments, significantly impairs immune function, making children more prone to cutaneous tuberculosis.[14] The diagnosis of cutaneous tuberculosis is challenging due to its varied clinical manifestations, the resemblance of its early lesions to other skin conditions, and the rarity of CTB, leading to limited clinical experience.[15]

A high index of clinical suspicion, with systemic workup enable early diagnosis and improves treatment outcomes, essential to avoid significant morbidity and disability in affected children.[9] Children with CTB must also be screened for tuberculosis in other organs and systems. The management of cutaneous tuberculosis in children requires a strictly supervised antitubercular therapy to ensure adherence and successful treatment. Beyond medical care, addressing other crucial areas such as nutrition, education, and social support is essential for a comprehensive recovery and long-term well-being.

CONCLUSION

Paediatric cases of CTB are often neglected due to unusual signs and symptoms and present later in life with complications. Accurate diagnosis depends on a combination of thorough medical history, clinical assessment, FNAC, histopathological studies and CBNAAT. It is essential for clinicians, particularly in regions with high TB prevalence, to have a comprehensive understanding of the disease's varied presentations to facilitate timely identification and management. Hence, CTB needs to be managed promptly by a multidisciplinary approach to prevent the complications.

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