Pediatric Infectious Disease Society of the Philippines Journal
Vol 19 No 2 pp. 60-65 July-December 2018
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CASE REPORT

Tuberculosis Verrucosa Cutis in an 11-year-old girl A Case Report

Maria Vinna N. Crisostomo, MD*
Karen Lee P. Alabado, MD*
Maricarr Pamela M. Lacuesta-Gutierrez, MD*

*Southern Philippines Medical Center

Correspondence:
Dr. Maria Vinna N. Crisostomo
Email:
docmavie_crisostomo@yahoo.com

The authors declare that the data presented are original material and has not been previously published, accepted or considered for publication elsewhere; that the manuscript has been approved by all authors, and all authors have met the requirements for authorship.

ABSTRACT

We report a case of an 11-year-old girl who presented with a gradually enlarging verrucous plaque on the left knee for 3 years. Physical examination showed a solitary, slightly erythematous, scaly, verrucous plaque on the left knee measuring about 1.5 cm x 2 cm. Biopsy revealed granulomatous dermatitis consistent with cutaneous tuberculosis. A diagnosis of tuberculosis verrucosa cutis (TBVC) was made and anti-tuberculous therapy was initiated consisting of rifampicin, isoniazid, pyrazinamide and ethambutol for 2 months followed by rifampicin and isoniazid for 4 months. Upon completion of therapy, only a slightly atrophic scar remained, supporting our diagnosis. This report highlights TBVC must be considered in patients with chronic skin lesions in countries with high prevalence of tuberculosis.

KEYWORDS: *tuberculosis verrucosa cutis, cutaneous tuberculosis, anti-tuberculosis therapy*

INTRODUCTION

Tuberculosis is a global problem. There is an estimated 10.4 million new cases of tuberculosis worldwide, extrapulmonary cases accounting for 15% of the global burden.[1]

Cutaneous tuberculosis is an uncommon manifestation of *Mycobacterium tuberculosis* infection. In the absence of high degree of suspicion, it often poses a diagnostic dilemma to an unsuspecting clinician and may result in delayed diagnosis and treatment.[2,3]

CASE REPORT

This is a case of an 11 year-old girl who presented with a gradually enlarging verrucous plaque on the left knee. The lesion started as a solitary, slightly erythematous papule that was noted few days after sustaining a minor injury. She noted gradual peripheral expansion of the lesion associated with occasional mild pruritus in the span of three years. She denies cough, night sweats, weight loss and other constitutional signs and symptoms. No consults were done, nor medications applied or taken.

Her past medical history was unremarkable and there were no previous hospitalizations. The patient's grandfather was previously treated for pulmonary tuberculosis. The patient had completed her vaccination including BCG vaccine at a local health center. She is the second in a family composed of 4 children and is a student with good academic standing. She lives in a rural community in Davao del Sur.

Physical examination upon consult in our center revealed a solitary, slightly erythematous, scaly, verrucous plaque on the left knee measuring about 1.5 cm x 2 cm (Figure 1a). Diascopy of the lesion did not show an apple-jelly color. There was neither regional lymphadenopathy nor other significant systemic abnormalities noted.

Our initial impression at the dermatology clinic was tuberculosis verrucosa cutis (TBVC) and we immediately requested for laboratory workup to support our diagnosis. The patient was given mild emollients while awaiting the results of the tests done.

Complete blood count and urinalysis were normal. Chest radiography revealed hazy infiltrates in the lower and middle lung fields and retrocardiac spaces. Sputum examination was negative for acid-fast bacilli. Tuberculin skin test was positive (20mm) after 48hrs.

Hematoxylin and eosin stained sections prepared from the punch biopsy of the lesion showed orthokeratosis with focal parakeratosis; focal hyperplasia and spongiosis of the epidermis; presence of dense inflammatory infiltrates in the upper dermis; and granulomatous foci with rare multinucleated giant cells in the mid-dermis. The histopathological diagnosis was granulomatous and suppurative dermatitis.

We were unable to confirm the presence of M. tuberculosis through mycobacterial culture because of unavailability of this test in our institution or through polymerase chain reaction (PCR) because of its high cost.

In view of the clinical presentation and histopathologic findings, the patient was classified as extrapulmonary tuberculosis, clinically-diagnosed based on country guidelines on the diagnosis and treatment of tuberculosis.[4] Standard anti-tuberculosis therapy was initiated under directly observed short course therapy (DOTS). She was given fixed-dose combination of isoniazid, pyrazinamide, rifampicin and ethambutol for two months during the intensive phase; followed by isoniazid and rifampicin for 4 months during the maintenance phase. No adverse events were observed during the course of treatment. Complete regression of the lesion was noted after completion of therapy leaving a slightly atrophic scar (Figure 1b and 1c).

DISCUSSION

Cutaneous tuberculosis is uncommon and makes up a very small proportion of extrapulmonary

tuberculosis cases.[5] According to the World Health Organization (WHO), there are 10.4 million people infected with tuberculosis worldwide, 10% of which are seen in children.[1] Local data shows that there are 70 cases of tuberculosis involving skin and subcutaneous tissue out of the 2,100 cases of tuberculosis among pediatric population as reported by the accredited hospitals of the Philippine Pediatric Society.[6] In our institution, there were 4 cases of cutaneous tuberculosis both in adults and pediatric patients reported in the past 3 years.

The causative agent of cutaneous tuberculosis is *Mycobacterium tuberculosis*. Its clinical presentation is varied and may mimic other skin infections. Lesions may vary from papules to plaques, nodules and ulcers. Therefore, cutaneous tuberculosis should be considered in patients with chronic skin lesions that do not improve with adequate management for other eczematous lesions.[2-3,7-10]

There are 4 major categories of cutaneous tuberculosis based on the route of infection: (1) direct inoculation from an exogenous source such as in tuberculous chancre and tuberculosis verrucosa cutis; (2) direct extension from a preexisting primary focus such as in orificial tuberculosis and scrofuloderma; (3) hematogenous spread such as in miliary tuberculosis, tuberculous gumma and lupus vulgaris; and (4) lymphatic spread such as in lupus vulgaris.[3,9]

TBVC is a paucibacillary tuberculosis that is acquired through direct inoculation following a minor skin injury in a patient with moderate to strong immunity.[3,5,7-9] Presence of moderate to strong immunity evidenced by positive tuberculin skin test and history of BCG vaccination contributed to disease presentation in our patient. In a study by Kumar and colleagues, positivity to tuberculin skin test and a history of BCG vaccination is more common in patients with localized disease which denotes sensitization to the organism either due to the presence of the disease, exposure to other related environmental mycobacteria, from exposure to infected close contact with M. tuberculosis or BCG vaccination.[11]

However, a negative tuberculin skin test demonstrating low immunity does not exclude the diagnosis of TBVC. [8]

In children, the sites of predilection are the knee, thighs, buttocks and hands.[2,3,8,9,12] Lesions of TBVC usually starts as an asymptomatic papule which gradually enlarges to become a verrucous plaque.[2,7-9] The same was observed in our patient's lesion that started as an asymptomatic papule and slowly enlarged in the span of three years. It may be mistaken for psoriasis, lichen simplex chronicus, atypical mycobacterial infections, and other chronic skin conditions. [7] The positive tuberculin skin test in this patient demonstrates the presence of immunity to the bacilli. In endemic areas like our country, the Philippines, the bacilli may be present in the environment and children may acquire the infection while playing in contaminated ground. [7-8]

Diagnosis of cutaneous tuberculosis is based on clinical features, tuberculin skin test, interferon-gamma release assays, histopathology, culture, and polymerase chain reaction.[10] The gold standard for diagnosis remains to be mycobacterial culture, however, the yield is low especially for paucibacillary variants such as TBVC. [10] Polymerase chain reaction is useful in confirming the presence of AFB but has positivity rate of only 55% in TBVC.[2] These methods complement the clinico-histopathologic diagnosis and increases diagnostic accuracy, but are often unavailable and expensive in high burden areas of tuberculosis.[2,10,13] As in this patient's case, PCR was not done due to its high cost while culture was unavailable at our institution.

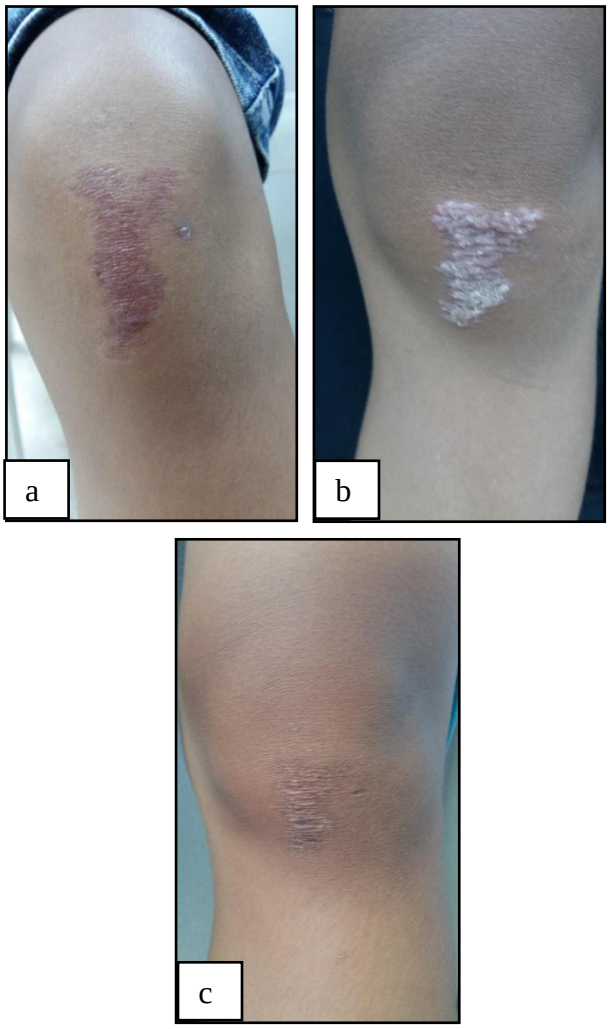

***Figure 1**. A solitary, erythematous, scaly, verrucous plaque on the left knee measuring 1.5 x 2cm prior to initiation of anti-tuberculous therapy (a). Follow-up after 2 months of therapy with noted flattening of the plaque (b). Follow-up after 6 months with noted complete resolution leaving an atrophic scar (c).*

Verrucous plaques with horny surface and deep clefts affecting the lower limbs were the characteristic features seen in our patient. Histologically, cutaneous tuberculosis has predominance of lymphocytes and presence of epithelioid granulomas and multinucleated giant cells.[2,10] Specifically, in TBVC, there is the presence of hyperkeratosis and acanthosis of the epidermis.[2,10] These changes were consistent with the histological findings in our patient. With a strong clinical suspicion and histological findings consistent with TBVC our patient was started on anti-tuberculosis regimen.

The recommendation of the National Tuberculosis Control Program in the treatment of newly-diagnosed tuberculosis involving the skin whether bacteriologically confirmed or clinically-diagnosed is 2 months of isoniazid (10 mkd), rifampicin (15 mkd), pyrazinamide (30 mkd) and ethambutol (20 mkd) followed by 4 months of isoniazid and rifampicin.[4] In this patient, significant regression of the lesion was seen after 2 months of intensive therapy and complete regression by the end of 6 months was noted. There were no untoward side effects reported throughout the course of therapy.

Therapeutic response has been used as a diagnostic criterion in the diagnosis of cutaneous tuberculosis.[2,3,10,13] Ramam et al recommends 4 weeks (with extension of 2 weeks) of therapeutic trial with anti-tuberculosis therapy to prove the diagnosis of cutaneous tuberculosis.[13] In non-responsive patients, other diagnosis such as atypical mycobacterial infections, deep fungal infections, cutaneous leishmaniasis and other granulomatous conditions should be considered. But with the increasing number of multi-drug resistant tuberculosis (MDR-TB), even in children, MDR-TB should also be considered in patients with inadequate response to first-line anti-tuberculosis drugs.[14] In this case, there was noted flattening of the lesions within four weeks of first-line anti-tuberculosis therapy, supporting our diagnosis.

Although we were unable to demonstrate the presence of AFB in the lesion, our clinical findings, positive tuberculin test, histopathological findings and excellent response to anti-tuberculosis treatment support our diagnosis of TBVC.

The clinical presentation, management and response to treatment of our case are similar to those reported in literature. Janjua and colleagues reported a case of TBVC presenting as an annular plaque on the knee in a 15-year-old girl who showed

good response with daily anti-tuberculosis therapy within 3 months and was treated until 6 months.[7] Similarly, Casimiro and colleagues reported a case of verrucous plaque on the thigh which also showed excellent response with therapy. In contrast to this case, both were able to perform culture studies and document the presence of *Mycobacterium tuberculosis* in the lesion.

Aside from anti-tuberculosis therapy, surgical management maybe an option for some cases of TBVC not responsive to conventional medical therapy.[15] There are no topical regimens available for TBVC and other forms of cutaneous tuberculosis.[16]

Majority of children with cutaneous tuberculosis belong to a low socioeconomic status.[3] Lesions of cutaneous tuberculosis including TBVC are often unsightly and poses a cosmetic concern for patients. Such is the case of our patient who was significantly bothered by the presence of verrucous lesions on her knees. Although spontaneous regression can occur in cases of TBVC, delay in treatment may result to persistence and progression of lesion leading to deformities. Systemic organ involvement may occur in other forms of cutaneous tuberculosis such as lupus vulgaris and scrofuloderma.[11]

Awareness and early diagnosis of TBVC and other forms of cutaneous tuberculosis is critical in early management and treatment. Every physician should have a high degree of suspicion in diagnosing cutaneous tuberculosis, especially in highly endemic areas.

ACKNOWLEDGMENTS

We would like to thank the TB-DOTS Clinic of Southern Philippines Medical Center.

An informed consent/assent was obtained from the patient for the publication of this case.

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