CASE REPORT

Lupus vulgaris presenting as solitary nodule on the finger in an elderly female with no known exposure

Nasser Bader Alrumaidhi, MD, Bayoumy El Essa, MD

Department of Dermatology, Farwaniya Hospital, Kuwait

ABSTRACT

Tuberculosis may involve most organs, and is still a major health problem in developing countries. It is caused by *Mycobacterium tuberculosis*. Despite a high and increasing frequency of tuberculosis, cutaneous tuberculosis (CT) is an uncommon form. Lupus vulgaris is a chronic, progressive, paucibacillary form of cutaneous tuberculosis, occurring in a previously sensitized individual with a moderate to high degree of immunity to tuberculin. The characteristic lesion is a plaque composed of soft, reddish brown papules, the appearance on diascopy resembles "apple jelly". It is the commonest form of cutaneous tuberculosis and has many clinical forms. Usually, it occurs on the face and neck except in India. Here, we report a case of 77 years old female with lupus vulgaris on the left index finger for 2 years. Early diagnosis and treatment of patients with antitubercular drugs is extremely important in order to prevent complications and to treat other hidden focus if present.

INTRODUCTION

Mycobacterial infection are slender, non-motile, aerobic, non-sporing rods with a waxy coating that makes them resistant to most stains. Once stained, however, they are not easily decoloured (acid-fast). Following infection, only 5-10% of individuals develop progressive disease, but some bacteria remain viable in the tissues of subclinically infected individuals. *M. tuberculosis* DNA can be identified not only in macrophages, but also in cells such as fibroblasts and type II pneumocytes, located in lung tissue devoid of lymphocyte infiltration in healthy individuals living in tuberculosis endemic countries. Neutralization of TNF for the treatment of inflammatory disorders such as rheumatoid arthritis or psoriasis can lead to reactivation and progressive disease.[1] The cell wall of the mycobacterium is resistant to damage mediated by antibodies and complement, and immunity depends on an intact T-lymphocyte response. Initial host resistance to *M. tuberculosis* is led by the innate immune systems pattern recognition receptors (PRRs) such as Toll-like receptor (TLR) 2, which recognizes a wide variety of mycobacterial ligands, and TLR9, which senses mycobacterial DNA and C-type lectins. The transmission of *M. tuberculosis* is via aerosol and once inhaled the organism is recognized and phagocytosed by a range of cells including macrophages, dendritic cells, monocytes and neutrophils.[2]

The wide clinical spectrum of cutaneous tuberculosis is dependent on the route of infection (endogenous or exogenous), the immune status of the patient and whether or not there has been previous sensitization with tuberculosis. Primary

Correspondence: *Dr. Nasser Bader Alrumaidhi, Department of Dermatology, Farwaniya Hospital, Kuwait*

inoculation of the skin, usually following trauma, produces a tuberculous chancre in the non-immune host. Whereas, the so-called 'prosector's wart' or tuberculosis verrucose cutis, occurs as primary infection in the immune host. Lupus vulgaris occurs mainly through haematogenous, lymphatic or contiguous spread, but can occur following inoculation. Scrofuloderma results from contiguous involvement of the skin overlying tuberculosis in a deeper structure, most commonly lymphadenitis, bone or joint disease, or epididymitis. Metastatic tuberculous abscesses (tuberculous gumma) can occur due to haematogenous spread from a primary focus. This usually occurs when host resistance is suppressed, it can be part of miliary tuberculosis, and results in single or multiple lesions. Orificial, perioral or perianal tuberculosis can occur following ingestion of mycobacteria from either swallowed respiratory secretions or from milk contaminated with *M. bovis.* The tuberculids are thought to be the result of immunological reactions to haematogenously spread antigenic components of *M. tuberculosis,* usually occurring in individuals with high levels of immunity, with an extracutaneous source of *M. tuberculosis*.[3]

Lupus Vulgaris clinically is characterized by brownish red papules or nodules that gradually expand by involution in one area with expansion in other and central scarring. It can present in different clinical pattern which includes papular, nodular, plaque, ulcerative, vegetative, hypertrophic, atrophic, tumor like and mutilating type.[4] We report here a case of nodular type of lupus vulgaris on the hand.

CASE REPORT

A 77-year-old female presented to skin outpatient department of our hospital with an erythematous slightly scaly, non itchy nodule on the left index for 2 years. It started as small papule and increased in size progressively. She received multiple courses of systemic and topical antibiotics with no response. Cutaneous examination showed a well defined erythematous scaly nodule around 1.5 cm X 1.5 cm on the basal phalanx of the left index finger. The lesion was not painful but slightly tender on pressure (Fig. 1,2). The patient is known to have type 2 Diabetes on oral

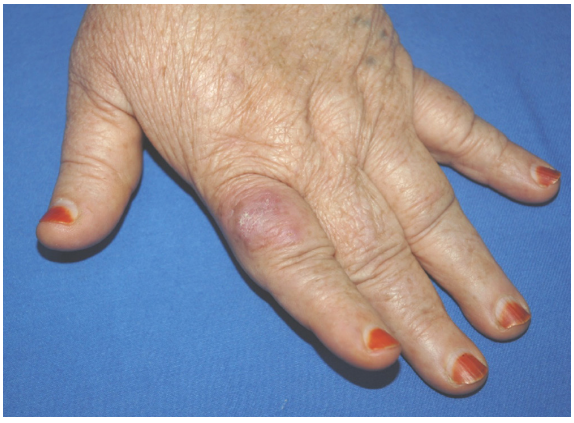

Fig. 1 Red erythematous scaly plaque on the left index.

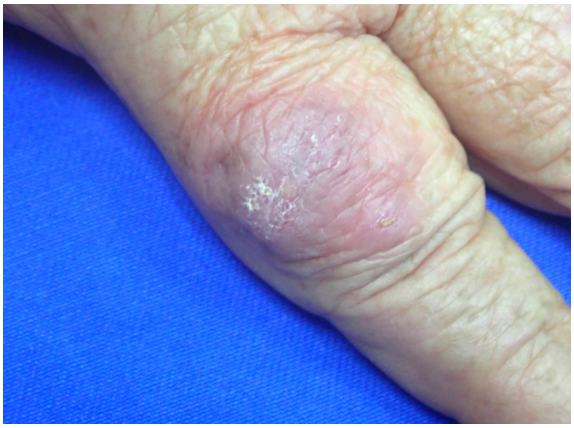

Fig. 2 Close up view 1.5 cm X 1.5 cm plaque.

hypoglycemic, and also has hypertension controlled on beta blockers and diuretics. We kept a differential diagnoses of psoriasis, lymphocytoma cutis, sarcoidosis, deep mycosis, Bowen disease and leishmaniasis. Punch biopsy was taken and it showed epidermal acanthosis with elonga-

tion of rete ridges. Dermis showed granuloma in its upper half hugging the epidermis and formed of epithelioid histiocytes, giant cells and lymphocytes. In addition, dense infiltrate of lymphocytes were located around the granuloma (Fig. 3,4). Ziehl Neelsen stain was negative. T-spot test was reactive and tuberculin test was positive. X-ray chest showed no abnormal finding. Tissue culture and PCR showed positive results for TB. Our final diagnosis in view of the above clincopathological and laboratory findings was lupus vulgaris.

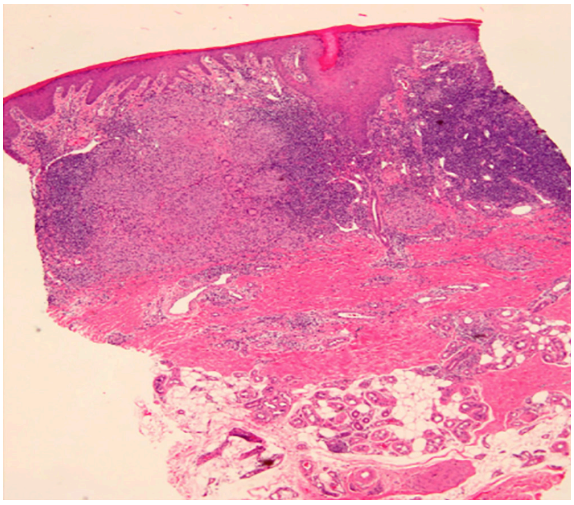

Fig. 3 Epidermal hyperplasia with upper dermal granulomatous infiltrate.

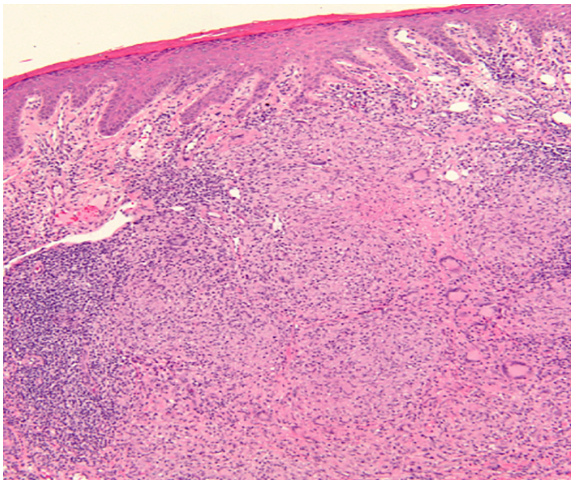

Fig. 4 Granuloma formed of epithelioid histiocytes, giant cells admixed with lymphocytes. Prominent peripheral lymphocytic infilterate around the granuloma.

DISCUSSION

World Health Organization (WHO) has reported more than 90% TB cases occurring in developing countries. Tuberculosis poses a major health problem in those countries. Tubercular infection varies from pulmonary to extra-pulmonary TB. Cutaneous type accounts for 1.5% cases of extrapulmonary TB.[5] The modes of spread of infection in cutaneous tuberclosis are direct inoculation, local invasion, or hematogenous dissemination, and these infections are classified as multibacillary and paucibacillary.[6] Following infection, only 5-10% of individuals develop progressive disease, but some bacteria remain viable in the tissues of subclinically infected individuals. In patients with tuberculosis, most of the organisms are killed rapidly by antimicrobial chemotherapy. However, there are 'persisters' that may be biologically distinct from the bacteria that are associated with latency and these are not eliminated by the drugs or by the immune response. The failure of the immune response to eliminate persisters is attributable to the fact that the immunopathological response does not quickly switch to the non necrotic protective mechanism characterized by the responses seen in individuals successfully vaccinated with BCG. The result is that treatment must continue for at least 6 months or relapse will occur.[7] The cell wall of the mycobacterium is resistant to damage mediated by antibodies and complement, and immunity depends on an intact T-lymphocyte response. The collection of phagocytes leads to granuloma formation.[8]

The wide clinical spectrum of cutaneous tuberculosis is dependent on the route of infection (endogenous or exogenous), the immune status of the patient and whether or not there has been

previous sensitization with tuberculosis.

LV is a chronic progressive and commonest form of secondary cutaneous TB. It is a post primary paucibacillary cutaneous TB, that occurs in previously sensitized individual with moderate or high immunity. Usually, the pathogenic mechanism is contiguous, lymphatic or haematogenous spread from a tuberculous lesion. In rare situations it can appear at the site of primary inoculation or at the site of a BCG vaccination.[10] Lupus vulgaris (LV) is the most common form of cutaneous reinfection with *M. tuberculosis*. It occurs predominantly in young adults. LV is commonly seen on the face, ears and neck, and may heal with scarring. Facial involvement may typically involve the nose and may result in destruction of the nasal and septal cartilage. This mutilating variant of lupus vulgaris is also known as lupus vorax.[11] In India, the common sites of involvement are buttocks, extremities, thighs, and legs.[12] In our case, we considered it rare as it occurred on an atypical site in an elderly female.

The disease may have different forms of presentation including plaque, ulcer, mutilating lesions, vegetative, tumour like lesion, and papulonodular lesion. The ulcerative and the mutilating form have the highest tendency for scarring together with deep tissue involvement.[13] Our case can be considered as plaque type. When blanched by diascopic pressure, the lesions reveal a pale brownish-yellow or "apple jelly" color.[14] That was compatible with clinical presentation of our patient.

The differential diagnosis for an early nodule or early plaque type should include lupus erythematosus, lymphocytoma, Spitz naevus, syphilis, psoriasis and Bowen's disease. For the more mutinodular or vegetative type, the differential diagnosis will include leishmaniasis, leprosy, sarcoidosis, acne rosacea and Wegener's granulomatosis.[11] In fact, these were not our differential diagnosis. We kept sarcoidosis, leishmaniasis, leprosy, lymphocytoma, syphilis, psoriasis and Bowen's disease in mind. Diagnosis of cutaneous tuberculosis is at times difficult because the clinical appearance of the lesion may not always be characteristic and will require multiple Investigations (Chest radiograph, Mantoux test, Incisional biopsy, Acid fast bacilli culture, Polymerase chain reaction). At times culture for the bacilli may not yield positive results and demonstration of acid-fast bacilli may be difficult especially in patients with chronic lesions and with a high degree of immunity against the infection.[15] In our case, normal chest X ray and chracteristic biopsy findings were enough to confirm the diagnosis. The histological features are variable. Normally, tubercles with scanty or absent central caseation, surrounded by epithelioid histiocytes and multinucleate giant cells are present in the superficial dermis. Peripheral lymphocytes are often prominent. Occasionally, tubercle bacilli may be numerous; more often, they are hard to demonstrate or are absent.[16] We took a deep punch biopsy to avoid nonspecific inflammatory changes, and it revealed tuberculoid granuloma hugging acanthotic epdermis (Fig 3,4). That was typical picture of histopathology of LV.

The nasal lesion of LV may spread either directly or through lymphatic vessels to the buccal mucosa, palate, gingiva, conjunctiva or oropharynx, giving rise to ulcers or vegetation in these areas.[17] Further complications including secondary infection of the ulcerative lesion, scarring deformities and malignant changes are well known to arise in longstanding lupus vulgaris. *In situ* or

invasive squamous cell carcinomas are the most common tumors, and may occur insidiously in between 0.5% and 10% of the patients.[18]

The initial treatment should be three or four drug combinations including isoniazid, rifampicin, pyrazinamide or/and ethambutol, and the visible clinical healing is seen in 4-6 weeks. Five weeks of therapy may be tried in cases with strong suspicion of CT.[19] In our case, we referred her to infectious disease center for further management.

CONCLUSION

In conclusion, the diagnosis of CT is based on clinical features, demonstration of acid-fast bacilli on smear, tissue culture, skin biopsy, and PCR in recent years. However, the diagnostic value of culture and PCR is less and diagnosis may be dependent on clinical features, histopathological findings. In our case, as it had a rare presentation, old age and atypical location, we have to always keep in our minds the uncommon site and age for any disease.

REFERENCES

1. Health Protection Agency. Tuberculosis in the UK: Annual Report on Tuberculosis Surveillance in the UK, 2012. London: Health Protection Agency, 2012.
2. Marcoval J, Alcaide F. Evolution of cutaneous tuberculosis over the past 30 years in a tertiary hospital on the European Mediterranean coast. Clin Exp Dermatol 2012; 38:131-36.
3. Semaan R, Traboulsi R, Kanji S. Primary Mycobacterium tuberculosis complex cutaneous infection: report of two cases and literature review. Int J Infect Dis 2008; 12:472-77.
4. Sethuraman G, Ramesh V, Ramam M, Sharma VK. Skin tuberculosis in children: Learning from India. Dermatol Clin 2008; 26:285-94.
5. WHO Global tuberculosis control: A short update to the 2009, report. Geneva: World Health Organization; 2009. p. 4-5. (WHO/HTM/TB/2009. 426).
6. Gulisano G, Mariani L. Cutaneous tuberculosis: a rare presentation in an immigrant. J Travel Med 1998; 5:131-34.
7. Guirado E, Schlesinger LS. Modelling the Mycobacterium tuberculosis granuloma the critical battlefield in host immunity and disease. Front Immunol 2013; 22:98.
8. Lucas S. Bacterial disease. In: Elder DE, ed. Lever's Histopathology of the Skin, 10th edn. Philadelphia: Lippincott Williams & Wilkins, 2009:550-55.
9. Semaan R, Traboulsi R, Kanji S. Primary Mycobacterium tuberculosis complex cutaneous infection: report of two cases and literature review. Int J Infect Dis 2008; 12:472-77.
10. Marcoval J, Servitje O, Moreno A, et al. Lupus vulgaris. Clinical, histopathologic, and bacteriologic study of 10 cases. J Am Acad Dermatol 1992; 26:404-407.
11. Freitag D S, Chin R. Facial granuloma with nasal destruction. Chest 1998; 92-3:422-23.
12. Singh G. Lupus vulgaris in India. Ind J Dermatol Venereol Leprol 1974; 40:257-60.
13. Sehgal VN, Waugh SA. Cutaneous tuberculosis. Current concepts. Int J Dermatol 1990; 29:237-52.
14. Khandur S and B. S. N. Reddy. Lupus Vulgaris: unusual presentation over the face. J Euro Acad Dermatol Venereol. 2003; 17:706.
15. Serfling U, Penneys N S, Leonardi C L. Identification of Mycobacterium tuberculosis DNA in case of lupus vulgaris. J Am Acad Dermatol 1993; 28:318-22.
16. Yates VM. Mycobacterial infections. In: Burns T, Breathnach S, Cox N, Griffiths C, editors. Rook's Textbook of Dermatology. 8 th ed., Vol. 2. Oxford: Wiley-Blackwell Publishing; 2010. p. 31.1-31.41.
17. Kounis N G, Constantinidis K. Lupus vulgaris: a rare dermal involvement. Practice of medicine 1980; 224:1284-85.
18. Forstrum L. Carcinomatous change in lupus vulgaris. Ann Clin Res 1969; 1:213.
19. Vashisht P, Sahoo B, Khurana N, Reddy BS. Cutaneous tuberculosis in children and adolescents: A clinicohistological study. J Eur Acad Dermatol Venereol 2007; 21:40-47.