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A ten year prospective clinicopathological study of cutaneous tuberculosis at a tertiary care hospital in coastal Karnataka

Teerthanath Srinivas[1,*], Banavasi S Girisha[2], Hariprasad Srinivas[3]

[1]Professor, Dept. of Pathology, [2]Professor & HOD, Dept. of Dermatology, KS Hedge Medical Academy, Mangalore, [3]Associate Professor, Dept. of Surgery, Navodaya Medical College, Raichur

***Corresponding Author:**
Email: steerthanath@yahoo.com

Abstract

Cutaneous tuberculosis (CTB) constitutes a minor part of extra pulmonary tuberculosis. It continues to be area of most difficult diagnosis for dermatologist practicing in developing countries due to wider differential diagnosis and difficulty in obtaining a microbial confirmation.

Aim: To study the prevalence, pattern of clinical presentation and their correlation with the histological type of cutaneous tuberculosis in coastal Karnataka.

Material and Method: A prospective study of all clinically suspected cases of CTB visiting the skin and STD outpatient department of a tertiary care hospital in coastal Karnataka, during the period 2005 – 2014 were included in the study. All clinically diagnosed cases of CTB cases were biopsied and further investigated by performing mantoux test, Chest X-ray and sputum culture. The diagnosis of cutaneous tuberculosis was based on the combination of clinical, histopathologic, laboratory features and response to antituberculous therapy.

Result: A total of 62 cases of CTB were identified during the ten year study period. The common age group affected was 50 years and above. Males were most commonly affected than females with M: F ratio of 1.2:1. The most common affected site were lower limb (37.10%) followed by face and neck (24.19%). Clinically majority of the cases presented as plaque lesion (46.77%) followed by sinus (22.58%), ulcer (16.13%), verrucous lesion (11.29%) and papule (3.23%). The most common type of CTB encountered were Lupus vulgaris (35.48%) followed by scrofuloderma (33.8%). Systemic involvement was seen in 29 cases. Mantoux test was positive in 80% of cases and tubercular bacillus was isolated in only 3% of cases. All the clinically diagnosed cases of CTB were confirmed on histopathology and responded well to anti-tubercular therapy.

Conclusion: Lupus vulgaris was the most common type of CTB encountered in coastal Karnataka. The common sites affected were lower limb and buttock followed by back and groin. It is important to recognize the myriad clinical presentations of CTB to prevent missed or delayed diagnoses.

Keywords: Cutaneous tuberculosis, Lupus vulgaris; Scrofuloderma; Mantoux reactivity.

Introduction

Tuberculosis is an important world health problem with an estimated 10 million new cases. Tuberculosis accounts for 17.6% of deaths from communicable diseases and for 3.5% of all-cause mortality in India.(1) Extra pulmonary form constitutes around 10% of all cases of tuberculosis. Cutaneous tuberculosis (CTB) accounts for 1.5% of all cases of extra pulmonary tuberculosis.(2) Tuberculosis of skin has worldwide distribution, more prevalent in region with cold and humid climate in the past, it now also occurs in tropics. World-wide incidence of tuberculosis varies from 0.1 to 1% of all cutaneous disorders.(3) In India CTB accounts for 0.1% to 0.5%.(4) The different clinical forms of cutaneous tuberculosis may result from a difference in the number and virulence of the bacilli, route of infection, age of the patient, presence or absence of an internal tuberculous focus and specific immunity of the host. The diagnosis of CTB is presumptively made based on the correlation of clinical history and signs, other active foci of TB, Mantoux reactivity, histopathologic findings and demonstration of the tubercule bacilli either in the tissue section or recovery in vitro. But the results of these endeavors are usually disappointing. Sometimes confirmation is not possible when a therapeutic trial is justified. The present study was undertaken with the aim of studying the prevalence of CTB and to determine the frequency of clinical presentation and histopathological type of CTB.

Materials and Methods

The patients of newly diagnosed cutaneous tuberculosis attending skin and STD outpatient department of tertiary care hospital in coastal Karnataka, during the period 2005 – 2014 were included in the study. Patients who were already on treatment and those who had completed their prescribed treatment were excluded from the study. A detailed clinical history was taken, followed by local examination of the lesion whether the lesion was papule, pustule, verrucous, non-verucous, ulcer and sinus along with regional lymphadenitis. Detailed physical and system examination was done to identify the primary focus. All the patients were subjected to routine hematological tests including ESR chest X ray, sputum culture was done in patients with positive chest symptoms, followed by Mantoux test and HIV testing by ELISA method. Biopsy was done in all clinical

suspected cases. The formalin fixed tissues were processed and stained with hematoxylin and eosin stain and Ziehl Neelsen stain.

Results

In our study most of the cases belonged to lower and middle socioeconomic status. Majority of the patients were in 50 years and above [17 cases (27.42%)]. The second most common age group affected were in 10-19 years (19.35%). The youngest age of the patient with CTB was seen in 4 year and the oldest was in 53 year. Mean age of affliction was 23-64 years. Males were more commonly affected, which were 42 cases (67.74%) and females were affected in 20 cases (32.26%), with M: F ratio of 1.2:1 [Tables 1]. There was no family history of tuberculosis in any case studied. CTB lesions commonly affected lower limbs in 23 cases (37.10%) followed by face and neck (24.19%), back and gluteal region (20.97%) and upper extremities (11.29%) [Table 2]. Least affected sites were chest and abdomen (6.45%). Clinically patterns of skin lesions found were plaque lesion in 46.77% of cases, sinus in 22.58% of cases, ulcerative lesions in 16.13% of cases, verrucous lesion in 11.29% of cases and papular lesion in 3.23% of cases [Table 3]. Lymph nodes involvement was seen in 56% of cases, of which cervical and inguinal group of lymph nodes were commonly affected. Systemic organ involvement was seen in 29 cases, which involved lymph nodes and bone (62.07%), Pulmonary TB (20.69%) and rest had cold abscess (17.24%). BCG vaccine was already received by 79% of cases and 20.97% of cases were not vaccinated due to low socioeconomic status.

Tables 1: Age and sex distribution of the CTB cases

Age group(yrs)	Male	Female	Total	Percentage (%)
0-9	3	4	7	11.29
10-19	8	4	12	19.35
20-29	8	0	8	12.90
30-39	8	2	10	16.13
40-49	6	2	8	12.90
50yrs and above	9	8	17	27.42
Total	42(67.74%)	20(32.26%)	62	100%

Table 2: Distribution of Skin lesions in CTB

Distribution of skin lesions	Number	Percentage (%)
Lower limbs	23	37.10
Face and neck	15	24.19
Back & groin	13	20.97
Upper limb	7	11.29
Chest & abdomen	4	6.45
Total	62	100

Table 3: Clinical type of lesion in CTB

Type of Lesion	Number	Percentage (%)
Plaque	29	46.77
Sinus	14	22.58
Ulcer	10	16.13
Verrucous	07	11.29
Papule	02	3.23
Total	62	100%

Table 4: Histological pattern of Cutaneous TB

Type of CTB Lesion	Number	Percentage (%)
Lupus vulgaris	22	35.48
Scrofuloderma	21	33.8
Tuberculosis Verrucosa Cutis	14	22.58
Orofacial tuberculosis	3	4.84
Tuberculid	2	3.23
Total	62	100%

In the study group, the clinical pattern of CTB encountered were Lupus vulgaris (LV) in 35.48% of cases, scrofuloderma in 33.8% of cases, tuberculosis verrucosa cutis (TVC) in 22.58% of cases and cutaneous tuberculosis in 11.29% of cases. Histology of all skin biopsies showed tuberculoid granuloma consisting of collection of epitheloid cells, a few Langhan giant cells and surrounding mantel of lymphocytes. Lupus vulgaris showed tuberculoid granuloma without caseation necrosis predominantly in upper dermis, while in tuberculosis verrucosa cutis showed epidermal hyperkeratosis, acanthosis along with necrosis in dermal tuberculoid granuloma. Scrofuloderma and orificial tuberculosis showed skin ulceration and tuberculoid granuloma with inflammation and necrosis in deeper reticular dermis. AFB stain was positive in 13 cases. Among the 62 cases, Lupus vulgaris (LV) was the commonest CTB accounting for 22 cases (35.48%), followed by scrofuloderma (33.8%), tuberculosis verrucosa cutis(22.58%), orofacial tuberculosis(4.84%) and tuberculids(3.23%) [Table 4]. There was clinicopathological correlation in 88.91% of cases, while there was no correlation in 11.29% of cases.

Cases which were clinically diagnosed as cutaneous tuberculosis showed, LV (3.22%), Orificial tuberculosis (4.84%) and tuberculids (3.22%). Isolation of the organism was possible in only 2 cases from the exudate of the ulcerative lesion of scrofuloderma following 3 weeks of inoculation in to the culture media. HIV test was positive in 4% of cases. Montoux test was positive in 80% of cases, among which 44% were LV, 20% were TVC, and 16% had scrofuloderma. All patients were referred to institutional DOTS center for anti-tubercular therapy (ATT). All patients responded well to ATT.

Table 5: Comparison of pattern of CTB with various studies

Type of CTB	Kumar et al (%)	Ranjan Agrawal et al (%)	Thakur, et al (%)	Present study (%)
Lupus vulgaris	55	40.63	42.86	35.48
Scrofuloderma	26.8	4.69	50	33.8
Tuberculosis Verrucosa Cutis	6	18.75	4.76	22.58
Orofacial tuberculosis	-	-	-	4.84
Tuberculous Gumma	5.4	29.69	-	-
Tuberculids	6.8	3.13	2.38	3.23

Discussion

Tuberculosis of skin has worldwide distribution and are more prevalent in temperate than tropical climates. The incidence has been declining in developing countries and is rare in developed countries. The overall prevalence of cutaneous TB in our study is 0.14%. The prevalence of CTB in India has hovered at 0.1 – 0.5% over the last few decades and <0.5% of all skin diseases in Europe.[5,6,7]

CTB is caused by *Mycobacterium tuberculosis* of human, and bovis type.[8] Darier in 1896 classified cutaneous tuberculosis into true tuberculosis and tuberculids, since then different workers have tried to classify the disease based on the mode of spread of the infection or on the rate of healing.[9,10,11] Although each has its own merit, they do not fulfill all the needs of the clinician.

The clinical diversity of CTB depends on the route of infection and patient's immune status. Exogenous inoculation, which may result either from the tubercular chancre or tuberculosis verrucosa cutis or Lupus vulgaris depending on the presence or absence of the hypersensitivity to tubercular protein. Other route is endogenous spread which may occur by contiguous extension leading to scrofuloderma or orificial TB (autoinoculation), by lymphatic leading to LV or by haematogenous resulting in acute miliary TB or LV.[12] CTB represents with lupus vulgaris (high degree of immunity) at one extreme and scrofuloderma & tuberculous gumma (low degree of immunity) at the other, and TVC occupying an intermediate position.[13,14] A distinction must also be made between the tuberculosis infection of skin and tuberculids. Tuberculids represents an allergic reaction to the antigen reaching highly immune skin through hematogenous spread from an internal focus.[15]

In our study LV is the frequently encountered type of cutaneous tuberculosis (35.48%), Similar to other studies by Kumar et al, Patra et al, and Ho et al where in lupus vulgaris was the commonest variant in their studies.[4,16,17] Kumar et al also reported LV more common in women and TVC was most common in men in northern India.[4] In Europe, LV and scrofuloderma are common type encountered. In tropics, LV is rare, whereas scrofuloderma and TVC predominate as it is in India and South Africa as well.[18] In western countries, it is commonly found on the face and in India and other developing nations, it commonly involves the extremities and the buttocks (Fig. 1). It presents as reddish brown plaques typically on the head and neck.[19]

Scrofuloderma is more frequent in children in India, whereas in Europe, middle-aged or elderly persons are affected more often.[20] It represents direct extension of underlying tubercular focus, most commonly tubercular lymphadenitis or skeletal tuberculosis into the skin.

They clinically presents as ulcerated lesions in the neck with discharging 'cheesy' material (Fig. 2). In our study scrofuloderma was the second commonest type (33.8%) of CTB encountered. In studies done by Thakur et al from Assam, India and Kawtar Zouhair et al in Morocco reported scrofuloderma as the commonest form of CTB.[21,22]

TVC is due to direct inoculation and clinically presents as a warty lesion often on the lower limbs and buttocks (Fig. 3). TVC was encountered in 22.58% of cases in the study. Variable incidences of TVC have reported in various studies by Patra et al (19.23%),[16] Padmavathy et al (27.3%)[23] and Archarya et al (32%).[24]

Orificial–tuberculosis was encountered in 3 cases (4.84%) and tuberculids was seen in 2 cases (3.23%) in our study. Tuberculids have recently emerged as the commonest form of cutaneous tuberculosis in Hong Kong.[25]

Concomitant extracutaneous tuberculosis has been reported in 5%-21% of patients with cutaneous tuberculosis.[26] We found a substantially higher percentage (46.77%), of active extracutaneous disease in our patients, this explains the increase in incidence of scrofuloderma in our study. BCG vaccine was already received by 49 cases (79%) and 13 cases (20.97%) were not vaccinated. HIV test was positive in 4% of cases. Montoux test was positive in 80% of cases, among which 44% were LV, 20% were TVC, and 16% were scleroderma.

The histopathological picture depends on the degree of the immunity. The pattern of CTB depends on the immunopathological spectrum. Microscopic examination may reveal a tuberculoid and tuberculous granuloma. The tuberculoid granuloma is encountered in lupus vulgaris and TVC (Fig. 4). The tuberculous granuloma in addition will have caseation necrosis (Fig. 3). It may be possible to demonstrate AFB on fite stains. These granuloma fulfills the criteria of tuberculosis and typifies scrofuloderma.[12]

The optimal diagnosis of CTB relies on the demonstration of acid – fast bacilli in skin lesions. AFB stain was positive in 13 cases (20.96%). The culture in CTB provides a small diagnostic yield, it was positive only in 2 cases following 3 weeks of media inoculation. PCR-based tests are in use with variable diagnostic accuracy, but a lack of evidence from high quality studies means they cannot be recommended for routine use currently. Several case reports indicate the usefulness of PCR in the diagnosis of scrofuloderma, LV, and tuberculids.[25,26] Despite all the advances in diagnostics, we have to rely on methods as old as the intradermal reaction purified protein derivative test and therapeutic trial, as diagnostic tools for CTB. All patients were referred to institutional DOTS center for anti-tubercular therapy. ATT constitutes 2 months of intensive phase with 4 drugs namely INH, Rifampicin, ethambutol and pyrazinamide and 4 months continuation phase with 2 drugs namely INH and Rifampicin. All the patients responded well to treatment and there was no evidence of drug reaction or resistance reported. Latest "Index TB guidelines" which includes guidelines on extrapulmonary tuberculosis for India, as a part of Revised National Tuberculosis Control Program, proposed daily treatment of cutaneous TB for 6 months with intense phase drugs being the same. However continuation phase has 3 drugs namely INH, Rifampicin and Ethambutol. Though the reason behind for this is to minimize drug resistance, for a localized cutaneous tuberculosis whether this hard hitting regimen is required is debatable.

Conclusion

The incidence of CTB has reduced in recent years in coastal Karnataka Lupus vulgaris is the most common type of CTB encountered in coastal Karnataka. The common sites affected are lower limb and buttock. It is important to recognize the varied clinical presentation in different geographical locations to prevent misdiagnoses. Histopathology, serology and identification of the bacilli is the gold standard, however at times, when the isolation of the bacilli is not possible despite use of recent diagnostics then positive Montoux test and therapeutic trial may be advocated as diagnostic tools for CTB.

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