

ORIGINAL ARTICLE

PATTERN OF CUTANEOUS TUBERCULOSIS AS IDENTIFIED BY MORPHOLOGICAL STUDY OF SKIN LESIONS AT JINNAH POSTGRADUATE MEDICAL CENTER, KARACHI

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ABSTRACT

Background: Cutaneous tuberculosis is a relatively rare clinical entity in western countries but is still prevalent in the developing world. This study was conducted to identify cases of cutaneous tuberculosis in skin lesions, study its morphology, analyse its frequency and the relative frequencies of its clinico-pathological types.

Material & Methods: All specimens of skin biopsy for histopathology received over a period of 5 years at the Department of Pathology, Basic Medical Sciences Institute, JPMC, Karachi were included. Morphological study was done using Ziehl Neelsen stain for acid fast bacilli and H&E stain for tissue histological assessment.

Results: Out of 2682 skin biopsies, 97(3.69%) were cutaneous tuberculosis. The ages ranged from 6-70 years with a mean of 28.32. Maximum number of cases (39) were in second decade. There were 37(38.14%) males and 60(61.85%) females. Out of 97 cases of tuberculosis 50 were not typified. The remaining 47 cases were typified as, 18 were lupus vulgaris, 9 verrucosa cutis, 7 each of tuberculosis cutis oroficialis and scrofuloderma and 6 were tuberculous gummas. Acid fast bacilli were seen in 20 out of 77 caseating and 1 in 20 non-caseating granulomas of tuberculosis.

Conclusion: The frequency of cutaneous tuberculosis is 3.69%. It is more prevalent in the females. Lupus vulgaris is the most common sub type of all cutaneous tuberculosis.

Key words: Tuberculosis, Acid fast bacilli, Cutaneous tuberculosis.

INTRODUCTION

Hippocrates (460-376 BC) gave tuberculosis (TB) the first intelligent description "phthisis" (to waste away).¹ Nearly 8 million new cases of tuberculosis occur in the world each year.² The World Health Organization estimates that there are almost 15 million people living with TB. In 2004, out of an estimated 8.9 million new TB cases worldwide, 3.9 million were diagnosed by laboratory testing and 741,000 also were HIV-positive. One-third of the number of new TB cases occur in South-east Asia, but the estimated incidence per capita is highest in sub-Saharan Africa.³

Infection with *M. tuberculosis* has traditionally been classified into primary, and secondary tuberculosis.⁴ Infection of the skin and sub-cutis by *M. tuberculosis* occurs either by direct inoculation into the skin causing a primary chancre or tuberculosis verrucosa cutis (TVC) or tuberculosis cutis oroficialis (TCO) lesion or by haematogenous

spread from an internal lesion causing lupus vulgaris (LV), miliary tuberculosis and tuberculous gumma lesions or from an underlying tuberculous lymph node by direct extension causing scrofuloderma (SFD).⁵ Weedon classified tuberculosis of skin into primary tuberculosis, lupus vulgaris (LV), tuberculosis verrucosa cutis (TVC), tuberculosis cutis oroficialis (TCO), scrofuloderma (SFD), disseminated cutaneous tuberculosis and tuberculous gummas.⁶

Cutaneous tuberculosis is a relatively rare clinical entity in western countries but is still prevalent in the developing world such as in Far East it accounts for 0.4% of patients with skin disease.⁷ In developing countries like India, the incidence has fallen from 2% to 0.15%.⁸

This study was conducted to identify cases of cutaneous tuberculosis in skin lesions, study its morphology, analyse its frequency and the relative frequencies of its clinico-pathological types.

MATERIAL AND METHODS

This cross-sectional study with a period prevalence of specified 5 years to identify granulomatous reaction in skin biopsies, was carried out in the BMSI, Jinnah Postgraduate Medical Centre from 01-01-2001 to 31-12-05. For detailed study, cases of cutaneous tuberculosis were selected from all the skin biopsies registered. Clinical information of the patient was taken from the request slips. Representative sections were taken and embedded in paraffin. 5-6 micron thick sections were cut on a microtome. H&E staining (haematoxylin and eosin stain) was performed. The preserved paraffin embedded blocks of these cases were taken out from the record and fresh sections were cut and stained with H&E. Relevant special stains like PAS, ZN, Grocott, gram, giemsa, alcian blue and Gomori's stain for reticular fibres were performed to help in reaching a specific diagnosis. All the slides were studied under the light microscope using scanner (4x10), low power (10x10), and high power (40x10). Various parameters were recorded as location of granuloma, constituent cells, necrosis and etiological agent.

Keeping in view of the ethical issues the identity of the subjects is not disclosed and secondary data from laboratory was utilized

RESULTS

Out of 2682 skin biopsies during the study period, 97 cases of cutaneous tuberculosis were

identified. Ages ranged from 6-70 years with a mean of 28.32. Maximum number of cases (39) were in the second decade. There were 37 (38.14%) males and 60 (61.85%) females. Mean age of male patients was 31.22 years and female patients was 26.63 years. It indicates that females are more susceptible for cutaneous tuberculosis and they develop the illness at an earlier stage than males. (Figure 1).

Depending upon the various morphological features and provided clinical history 47 cases were typified. 18 cases out of them were diagnosed as lupus vulgaris, 9 TVC, 7 each of TCO and Scofuloderma and 6 were tuberculous gummas. (Table 1).

Caseation was found in 77 cases which was marked in 6 cases showing lymphocytes, few epithelioid cells & occasional langhan's type of giant cells in two cases & well formed epithelioid granulomas in rest of four cases found at the margins of caseation necrosis. These cases were consistent with Tuberculous Gummas . The ages ranged from 13-23 years. The mean age was 18.2 years. There were 5 females and 1 male.

In 18 cases, the granulomas were found in upper and mid dermis. The granulomas were caseating in nature in 9 of them. Epidermis was flattened in 12 cases. Histological findings and clinical data were correlated which were consistent with Lupus vulgaris (Fig 1). The ages ranged from 6-70 years with a mean age of 28.266 years. There were

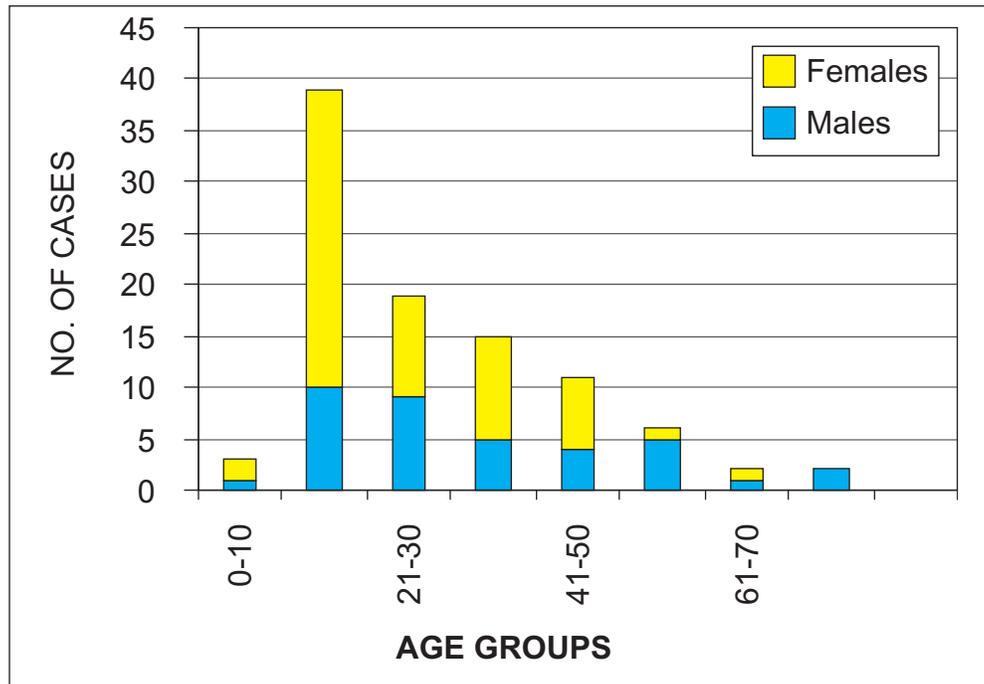


Fig. 1: Age groups according to gender of 97 cases of cutaneous tuberculosis.

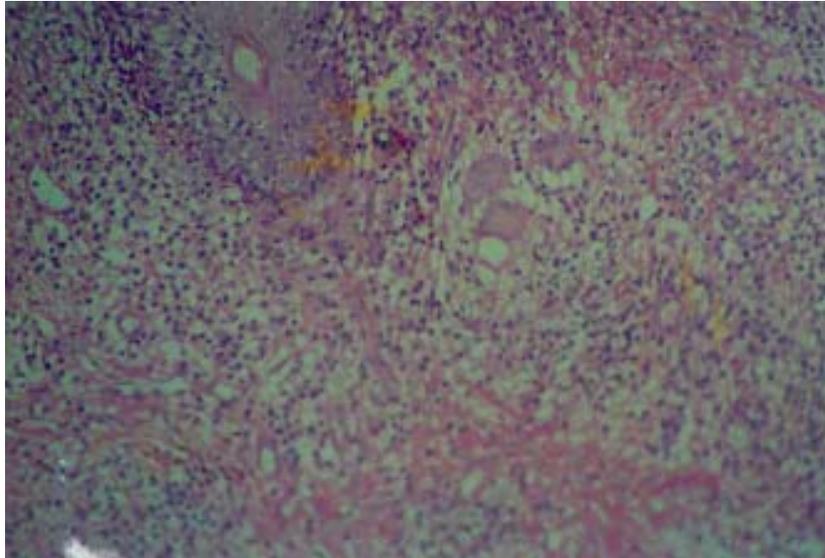


Fig 1: Photomicrograph of a case of lupus vulgaris showing granulomas in upper dermis. H&Ex100

Fig. 2: Photomicrograph of a case of tuberculous verrucosa cutis showing granulomas in upper dermis, hyperkeratosis & abscess. H&Ex100

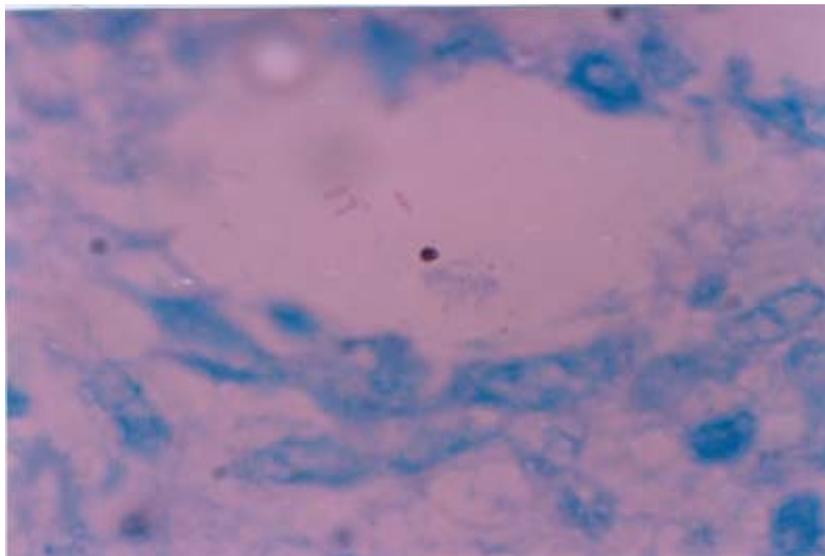
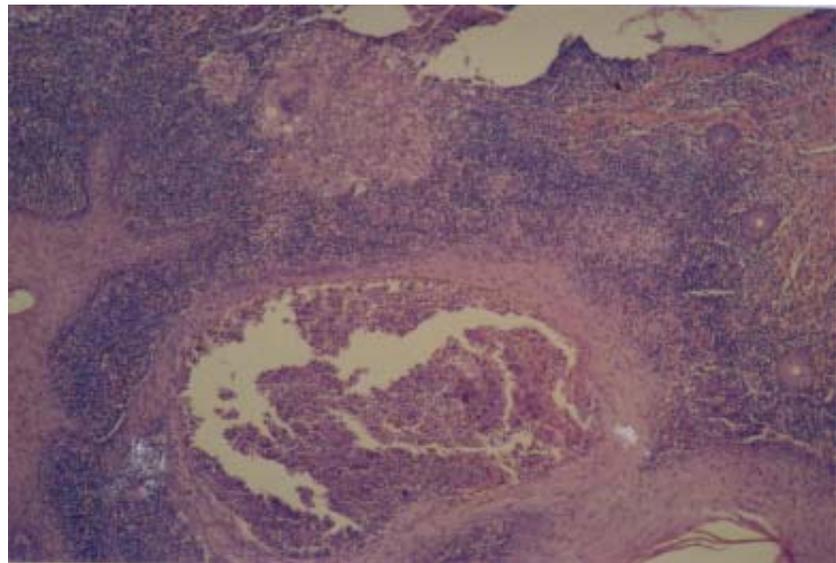


Fig. 2: Photomicrograph of a case of tuberculosis showing acid fast bacilli. ZNx100

Table 1: Frequency of various clinico-pathological types of cutaneous tuberculosis.

Subtype	Number of cases (n=47)	Percentage	95% C.I
Lupus vulgaris	18	38.29	25.9-52.7
Scrofuloderma	7	14.89	6.7-27.
TVC	9	19.14	9.7-32.2
TCO	7	14.89	6.7-27.2
Gumma	6	12.76	5.3-24.6

C.I: Confidence Interval.

Table 2: Ziehl Neelsen stain in caseating and non-caseating granulomas.

Type of Granuloma	Number of cases	ZN Stain	
		Positive (%)	Negative (%)
Caseating granuloma	77	20 (25.316%)	57(74.68%)
Non-caseating granuloma	20	1(5%)	19(95%)
Total	97	21(18.42%)	76(81.57%)

4 males and 14 females. In males ages ranged from 6-50 years with a mean age of 29.75 years and in females ages ranged from 7-70 years with a mean age of 27. 71 years.

Twenty-two biopsies were received with a clinical history of discharging sinuses from different parts of the body. A sinus tract was seen on microscopy in only 7 cases, lined by granulation tissue and epithelioid cells forming granulomas through out the dermis. Caseation was found in 4 cases. These 7 cases were consistent with Scrofuloderma. Ages ranged from 14-60 years. The mean age was 27 years. There were 2 males and 5 females. M: F ratio was 1:2.5.

Epidermis showed marked hyperplasia with papillomatosis and interdigitation of rete ridges in 14 cases. In 9 of them the dermis showed epithelioid granulomas. Neutrophils were seen in epidermis and/or upper dermis. Caseation was found in 3 of them. These 9 cases were consistent with tuberculosis verrucosa cutis (Fig 2). Ages ranged from 13-45 years with a mean age of 24.66 years. There were 4 males and 5 females. M: F ratio was 1:1.25

7 biopsies were sent from perianal region and showed tuberculoid granulomas through out the dermis. 4 out of these showed a tract lined by granulation tissue. 5 cases showed caseation. These 7 cases were consistent with tuberculosis cutis orificialis. Ages ranged from 20-55 years. The mean age was 40.28 years.

There were 5 males and 2 females. M: F ratio was 1: 0.4.

In 50 cases, tuberculoid granulomas were found showing focal to large areas of caseation. Epidermal changes were not specific and clinical data was not available or supportive. So these were reported as consistent with tuberculosis . Ages ranged from 12-55 years with a mean age of 28.55 years. There were 21 males and 29 females. M: F ratio was 1: 1.38. The mean age of the male patients was 30.45 years and of females was 27.24 years.

Ziehl-Neelsen (ZN) stain was performed on all cases to see the AFB. Out of 97 cases 21 showed AFB (18.42%) (Fig 3). 13 were females (61.90%) and 8 were males (38.09%). Male to female ratio was 1:1.6. AFB was seen in 20 out of 77 caseating, and 1 out of 20 non-caseating granulomas. The ratio being 8.8:1. The difference is statistically significant. (Table 2)

DISCUSSION

Tuberculosis can involve any organ or tissue of the body including skin. Worldwide incidence of tuberculosis is from 0.1 to 1% of all cutaneous disorders. Farina et al in his study in 1995 found cutaneous tuberculosis 0.14% of all skin biopsies. They found cutaneous tuberculosis representing 2.4% of all types of tuberculosis seen.⁹ Many researchers found less than 1% incidence of cutaneous tuberculosis in India. Bannerjee¹⁰ found 0.5%,

monest form, seen in 38.29% of patients, followed by TVC in 19.14%, scrofuloderma in 14.89%, TCO in 14.89% and gummas in 12.76%. These results are consistent with Khan et al¹⁷ who also found Lupus vulgaris the commonest 50% followed by TVC 30% and Scrofuloderma 20%. Similar results were also seen by Satyanarayan.¹¹ Singh¹² and Kumar et al¹⁵ who found Lupus vulgaris the commonest. Dhar and Dhar²² also found LV the commonest 75% followed by TVC 25%. But the results were not in accordance with Beyt et al⁵, Sehgal et al¹⁴, Yates and Ormerod,²³ Gopinathan et al⁸ and Yasmeen and Kanjee²⁰ who found scrofuloderma, the commonest being 40%, 54.8%, 55.3%, 62.75% and 65% respectively. While Wong et al found TVC the commonest 46% followed by LV 22%.²⁴

In our study the mean age of LV was 28.16 years and the majority of cases occurred in first 3 decades of life. These results are in accordance with Singh,¹² Sehgal et al,¹⁴ Pandhi et al¹³ and Kumar et al.¹⁵ Majority of our cases of LV were from face which is the commonest site for LV found by almost all of the researchers.

Scrofuloderma (SFD) was seen in 14.89% cases of typified cutaneous tuberculosis in our study. This was in accordance with Khan et al¹⁷ and Kumar and Muralidhar¹⁵ who found SFD to be <15%, 20% and 26.8% respectively. In spite of the fact that many of the researchers found SFD to be the commonest varying from 40-65%. The decrease in number of SFD in our study is due to lacking of clinical correlation which if provided may lead to change the diagnosis of many untypified cases of tuberculosis into SFD.

Neck is the commonest site of SFD. Other common sites reported in literature are chest and groin. Lesions of SFD in our study were on neck (57.14%) or chest (43.85%).

TVC was seen in 19.14% cases of typified cutaneous tuberculosis in our study. These findings are slightly higher than Yasmeen and Kanjee,²⁰ Gopinathan et al⁸ and Ramesh et al²⁵ who found it to be 8%, 13.17% and 14% respectively. The most common sites are hands and fingers in western countries (Wolff).²⁶ While the lower extremities are affected most frequently in the Eastern countries.¹⁴

TCO is the tuberculosis of the mucous membrane and the skin of the orifices resulting from autoinoculation of tubercle bacilli in patients with advanced visceral tuberculosis.²⁷ It affects men more often than women and is most prevalent in the middle-aged or older individuals.^{26, 27} In our patients 71.4% were males and the mean age of our patients was 40.28 years that is consistent with findings of other researchers.^{14, 15}

In our study AFB were found by the staining method in pathologic sections in 18.42% of all tuberculoid granulomatous lesions. Results were not in accordance with Mahaisavariya et al who found AFB in 30.77% cases.²⁹

CONCLUSION

This study identifies 3.69% lesions of cutaneous tuberculosis. Lupus vulgaris being the commonest type, with a female predominance.

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