

Study of Determinant Profiles of Cutaneous Tuberculosis in Bangladesh

* Rahman MH¹, Ansari NP², Ahmed KGS³, Hadiuzzaman M⁴, Nipa NI⁵, Islam MS⁶, Bhuyan MKJ⁷, Mumu SA⁸, Chowdhury IJ⁹

ABSTRACT:

The determinant spectra coupled with laboratory parameters of cutaneous tuberculosis in patients attending the Department of Dermatology and VD of the Community Based Medical College, Mymensingh, Bangladesh were studied for a period of over four years. A total of 110 patients (males, 75 and females, 35) having ages between 1 to 60 years were detected to be infected. The result evidenced that skin tuberculosis is becoming mostly a disease of young patients between the ages of 16 to 30 years (44.55%). There was a trend of appearance of Lupus vulgaris as the most common variant (49.09%) followed by Tuberculosis verrucosa cutis (29.09%). Skin tuberculosis was found more frequently in males than females (ratio 15: 7) and all patients belonged to lower socio-economic class. In 64 cases (58.18. %) BCG vaccination coverage could not yield protection against cutaneous tuberculosis. Abnormal chest x-ray reports were available in 12 patients. It is interesting to note that enlargement of hilar lymph nodes, pleural effusion, ascites and generalized lymphadenopathy were not detected. Mantoux test revealed positive reactors in 100 patients (90.90%). Raised ESR (>20) was found in all patients. The validity of histopathology associated with FNAC was confirmed in 95 cases of patients (86.36%). There was evidence of Scrofuloderma in 20 patients and ICT indicated 74 positive cases. Bacteriological examination generated negative results in all cases. The response to antitubercular therapy was excellent except in 3 cases which required further monitoring of using additional drug and took much more time. The coexistence of pulmonary tuberculosis was determined in 2 patients.

CBMJ 2012 Jan:Vol 01 No 01 P: 3-7

Key words: Skin tuberculosis, Mantoux test, BCG vaccination, Histological confirmation, Bangladesh

Introduction

Tuberculosis is still a world-wide public health problem, despite the fact that the causative organism *Mycobacterium tuberculosis* was discovered by Robert Koch about 125 years ago. The disease primarily affects lungs causing pulmonary tuberculosis, but it can also affect intestine, kidney, meningis, bone and joints, lymph nodes, skin and other tissues of the body. Recently along with systemic tuberculosis the cutaneous variants having variable clinical manifestation, significance and prognosis are appearing¹. Although improvement in hygiene, living standard and quality of life together with application of available technical knowledge, awareness and health resources and the introduction of effective therapeutic tools achieved spectacular success in reducing mortality and morbidity rates in developed countries, but the disease still remains a great public health concern to focus on some important factors that lead to the impediment to cure rates of national control programs. The factors recognized are chronic nature of the disease, the ability of tubercle bacilli to remain alive in the human body for years, the emergence of drug resistant strains association with other infections. However the high prevalence infection rates and the perpetuation of nonspecific determinants of the disease, such as unusual manifestations as well as failure in diagnosing even the typical manifestations, lack of experience of physicians and patients' awareness are thought to be health concern factors of prevalence of tuberculosis in Bangladesh.

Histopathology is also varied, viz necrotizing granuloma, poorly formed granuloma, nonspecific inflammatory infiltrate etc². In the HIV era the impact of HIV on tuberculosis has gained importance³.

1. * Dr. Muhammad Hasibur Rahman
Associate Professor & Head of the Department of Dermatology & VD, Community Based Medical College, Bangladesh
2. Dr. Nazma Parvin Ansari
Assistant Professor of Pathology, Community Based Medical College, Bangladesh
3. Professor Dr. Khondoker Golam Sabbir Ahmed
Professor & Head of the Department of Microbiology, Community Based Medical College, Bangladesh
3. Dr. Md. Hadiuzzaman
Assistant Professor of Dermatology & VD, Community Based Medical College, Bangladesh
4. Dr. Nahida Islam Nipa
Assistant Professor of Dermatology & VD, Community Based Medical College, Bangladesh
5. Dr. Md. Shahidul Islam
Assistant Professor of Dermatology & VD, Community Based Medical College, Bangladesh
6. Mohammad Kamruj Jaman Bhuyan
Department of Agricultural Statistics
Bangladesh Agriculture University
7. Dr. Sabrina Alam Mumu
Medical Officer of Dermatology & VD, Community Based Medical College, Bangladesh
8. Dr. Ishrat Jahan Chowdhury
Honorary Medical Officer of Dermatology & VD, Community Based Medical College, Bangladesh

* Address of correspondence:
B&G, Nimalebas, Sheora, Mymensingh, Bangladesh
e-mail: dr_cosmoderma@yahoo.com
mobile: 008801711318709

In recent years due to the increasing use of immuno-suppressants (anticancer and cortocosteroid) and emergence of immunocompromised host, the manifestation of cutaneous tuberculosis is altered, as a result there occurs a wide range of variations in morphology, histopathology, immunology and treatment response. The present study has therefore been undertaken to study case finding of cutaneous tuberculosis and find out the determinant profile to indicate the overall risk of infection in the community as a whole.



Fig. 1: Showing TVC in left lateral leg



Fig. 2: Showing Lupus Vulgaris over right cheek



Fig. 3: Scrofuloderma on right chest & neck

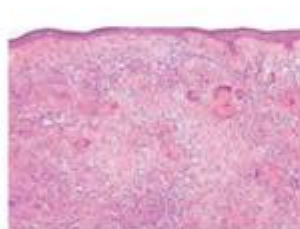


Fig. 4: Showing Tubercular granuloma in middermis

Methods

New patients who attended the Dermatology OPD of the Community Based Medical College from July 2006 to June 2010 were subjected to this study program. These patients were examined thoroughly as per determinant profile schedule. The demographic details, patient's history, clinical features, investigation reports of routine blood and stool tests, Mantoux test, chest x-ray, biopsy for histopathology, ICT for tuberculosis, FNAC, smear for AFB of all suspected patients with skin tuberculosis were attempted to record in the profile schedule laid down in a prescribed proforma.

Results

The overall incidence of cutaneous tuberculosis found was 0.81 % (110 positive cases out of 13520 outpatients). In table 1 the result evidenced detection of a total of 110 cutaneous tuberculosis patients of which 75 were males and 35 females. The male: female ratio obtained is 15:7. Although the ages of the patients under study were between 1 and 60 years, but cutaneous tuberculosis struck mostly the economically productive age group of 16 to 30 years (44.55 %).

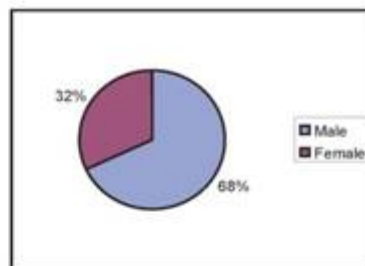


Figure-1: Sex wise distribution of patients

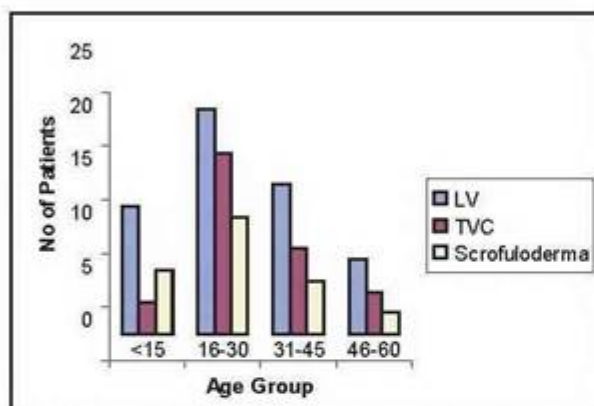
There were only 3 morphological variants of skin tuberculosis of which Lupus vulgaris was presented in table 2 as the commonest infection (49.09%) followed by Tuberculosis verrucosa cutis (29.09%). Lupus vulgaris infection was distributed more or less uniformly among all age groups, but it was recorded as the commonest in 16 to 30 year age group (21 cases, 38.89%). Most of the patients affected with single lesion, but multiple lesions were also found to acquire by 30 cases (27.27%). The demographic study revealed that the vast majority of patients were from poor socio-economic background. The history evidenced that the infection of cutaneous tuberculosis patients was not usually associated with an open case of pulmonary tuberculosis. Since tuberculosis is already an opportunistic infection, therefore the result revealed that lymphadenopathy was found more consistently in cases of scrofuloderma than in other cases. Like generalized tuberculosis the signs of weight loss, prolonged fever or diarrhea were not found in any of the cases under study. No patient was on corticosteroid or anticancer therapy. X-ray of chest revealed no abnormality in any of cases excepting in one case.

The case study profile indicated that hemoglobin was lower than 10 mg/dl in 82 patients (74.55%) and ESR was higher than 20 mm in the first hour in all cases. Mantoux test was noticeably positive (Table 3) as more than 15 mm induration was observed in 58 cases (58%) and 10 to 15 mm in 40 cases (40%) but negative in 2 cases. There was no morphological abnormality except multiple lesions in 30 cases (27.27%). Histopathological investigation revealed granuloma in all cases excepting 15 cases of TVC. Tissue smears could not detect AFB (*Mycobacterium tuberculosis*). Cultures employed for AFB revealed negative growth in all cases.

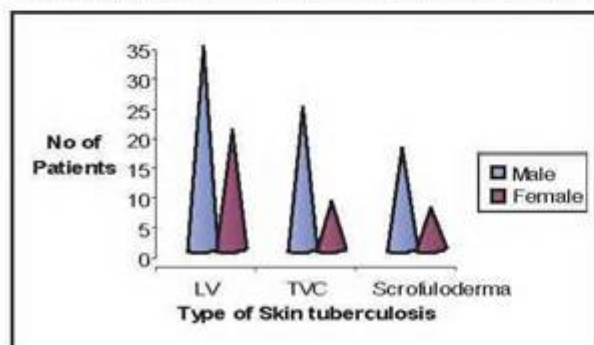
The use of standard drugs rifampicin, isoniazid (INH), ethambutol, pyrazinamide for the first two months and rifampicin for the next four months was found effective and all cases responded very well except 3 cases of LV where ciprofloxacin was needed for supplementation with rifampicin INH for additional 3 months course to achieve a cure. Response to therapy was found after 4 weeks in most cases and lesions healed within 1 to 3 months before the completion of the course of antitubercular therapy. Residual scarring was evidenced in all cases.

Table 1 : Age-wise distribution of various forms of cutaneous tuberculosis

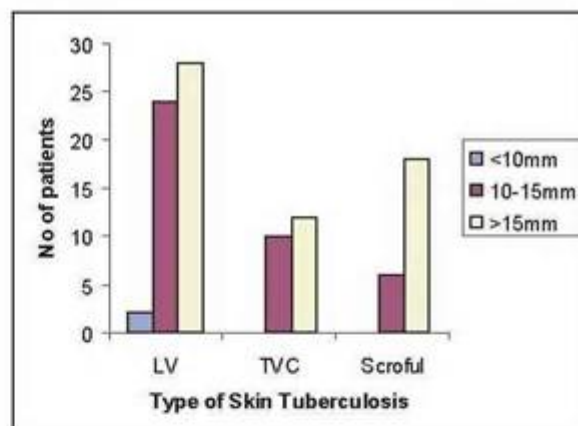
Age group (Years)	Number of cases affected with			Total n (%)
	<i>Lupus vulgaris</i> n (%)	<i>Tuberculosis verrucosa cutis</i> n (%)	<i>Scrofuloderma</i> n (%)	
1-15	12 (22.22)	08 (9.38)	06 (25)	21 (19.09)
16-30	21 (38.89)	17 (33.13)	11 (45.83)	49 (44.55)
31-45	14 (25.93)	08 (25)	05 (20.83)	27 (24.55)
46-60	07 (12.96)	04 (12.50)	02 (8.33)	13 (11.82)
Total	54 (49.09)	32 (29.09)	24 (21.82)	110 (100)

**Figure 2: Age distribution of various form of skin tuberculosis****Table 2 : Magnitude of types of cutaneous tuberculosis by sex**

Types of cutaneous tuberculosis	Number of patients affected		Total n(%)
	Male n (%)	Female n (%)	
<i>Lupus vulgaris</i>	34 (45.33)	20 (57.14)	54 (49.09)
<i>Tuberculosis verrucosa cutis</i>	24 (32)	08 (22.86)	32 (29.09)
<i>Scrofuloderma</i>	17 (22.67)	07 (20)	24 (21.82)
Total number of cases	75 (68.18)	35 (31.82)	110 (100)

**Table 3 Interrelatedness of Mantoux reaction in numbers of patients affected with different types of cutaneous tuberculosis**

Induration	<i>Lupus vulgaris</i> n (%)	<i>Tuberculosis verrucosa cutis</i> n (%)	<i>Scrofuloderma</i> n (%)	Total n(%)
<10 mm	2 (3.70)	0 (00)	0 (00)	2 (2)
10-15 mm	24 (44.44)	10 (45.45)	06 (25)	40 (40)
>15 mm	28 (51.85)	12 (54.55)	18 (75)	58 (58)
Total	54 (54)	22 (22)	24 (24)	100 (100)

**Figure 4: Distribution of Mantoux test results in skin tuberculosis**

Discussion:

The incidence of both pulmonary and extra-pulmonary tuberculosis reflects attention that the magnitude of infection is apprehending and rising constantly in communities all over the world. Bangladesh like other developing countries has not been able to achieve a considerable cure rate over a long period of time, even after the introduction of anti-tuberculosis drugs. The present study clearly demonstrates that the nonspecific determinants, such as poverty, economic recession, low standard of living, lack of awareness, poor health resources have made the populations of the country more vulnerable to tuberculosis. Many research workers pinpointed various other factors to be implicated with this increasing incidence of tuberculosis. These factors are principally ease of migration of people across the globe, increasing use of immunosuppressive therapy, the decline in TB-control efforts and the emergent of resistant strains of *Mycobacterium tuberculosis*. Nevertheless to make the global situation worse tuberculosis has now formed a lethal partnership with HIV. In the US the emergence of HIV virus infection has led to a 20% increase in extra-pulmonary tuberculosis⁴.

The present study revealed that in Bangladesh in addition to pulmonary form there are incidences of extra-pulmonary tuberculosis. According to the estimate the overall incidence recorded was (0.81%). In India the problem of cutaneous tuberculosis is similarly rising. There are reports of prevalence of 0.59% by Singh⁵, 0.50% by Banerjee⁶, 0.28% by Pandhi et al⁷, 0.24% by Satyanarayan⁸ and 0.26% by Patra et al⁹.

In the present study the commonest type of cutaneous tuberculosis found was Lupus vulgaris 49.09%. Analogous finding was noticed by Singh⁵ as 74% and Kumar et al¹⁰ 81.8%. While the next common type evidenced was Tuberculosis verrucosa cutis (29.09%) the type then followed was represented by Scrofuloderma (21.82%). However Pandhi et al⁷ recorded LV as the commonest type (44%) and Wong et al¹¹ found TVC as the commonest. Tuberculide (Lichen scrofulosorum) was not detected in this study (0%). Singh⁵ and Satyanarayan⁸ also indicated similar findings.

In majority cases the age and sex trend of tuberculosis indicated that the infection is becoming a disease of young population below the age of 25 years (61.52%) and the males are affected more than females. The investigations of Satyanarayan⁸ and Wong et al¹¹ reported similar result.

According to leading dermatologists the sites of skin tuberculosis vary widely. Our study noticed skin tuberculosis to infect most commonly on the limbs, while Satyanarayan⁸ and Kumar et al¹⁰ demonstrated such infection on face. It is remarkably shown from the present study that all patients examined belonged to low socioeconomic status. In these patients single lesions were mostly found to develop without immunocompromise. It is known that tuberculosis patients are infective as long as they remain untreated. Our study was limited for 4 years. However the duration of the disease is found to be variable. More than 5 years duration was noticed by Pandhi et al⁷. In our investigation we failed to record any association of tuberculosis infection with seropositivity to HIV.

The development of effective treatment for tuberculosis has been one of the most significant advances of medical science. The x-ray of chest in this study showed that hilar lymphadenopathy completely disappeared following anti-tuberculosis treatment. The result indicated that the patients took correct drugs at the correct dosage for the correct length of time.

It has been further observed that most of the tuberculosis patients were strong reactors to Mantoux test indicating greater chances of developing tuberculosis than showing negative reactors. Similar result was obtained by

Kumar et al¹⁰ who recorded 27.7% negative reactors. The development of scar due to BCG vaccination in 64 cases (58.18%) reflected the incapability of the vaccine to protect population against tuberculosis. Experts are of opinions that although BCG vaccination of uninfected individuals can prevent tuberculosis, but it can only have a relatively small epidemiological effect in that it will not contribute significantly to the reduction in the overall risk of infection in the community as a whole.

Histopathological findings were found mostly related with clinical features and accordingly the therapeutic response confirmed the diagnosis of the disease. Although Lever¹² detected numerous AFB in histological section of scrofuloderma and are demonstrable in tuberculosis verrucosa cutis, but we failed to find out any AFB in our study. Treatment response was considerably good in almost all cases excepting 4 cases, where addition of rifampicin and INH for extra three months was needed to cure the patients. This achievement is unknown and difficult to explain. The phenomenon of response to therapy was observed and noticeable after 1st month in most cases and the lesions healed with scarring in 2 to 3 months before completion of the course.

Conclusion:

Skin tuberculosis remains as one of the least studied and reported variants of tuberculosis. The diagnosis of the disease in a developing country like Bangladesh still depends on tests like Mantoux test, chest x-ray report, histopathological findings, sputum smear examination etc. None of these tests are absolutely reliable for a complete diagnosis. In recent years polymerase chain reaction (PCR) is a rapid, reliable and recognized as one of the significant powerful tools to detect the presence of infection in tissues and diagnosis of diseases, but requires expertise and technical set up. Therefore technical skills and the use of PCR need to be incorporated for the exploration of biological phenomena in the investigation of tuberculosis in our country. As this method is prone to contamination and may present false positive cases, particular attention must be paid for its appropriate application. At present tissue culture remains to be the gold standard for diagnosis and for monitoring the emergence of drug resistant strains, but it is time consuming.

References

1. Grange JM. *Mycobacteria and the skin*. *Int Dermatol* 1982; 21:497-503.
2. Moschella SL, Cropley TG. *Disease of the mononuclear phagocytic system (the so called reticulo endothelial system) in Dermatology*. Moschella SL, Hurley HJ (editors), Vol 1, 3rd ed, W.B. Saunders Co: Philadelphia; 1992. p. 1081-90.
3. Darbyshire JH. *Tuberculosis; Old reasons for a new increase*. *Br Med J* 1995; 310:954-5.
4. Barnes PF, Bloch AB, Davidson PT, Snider DE. *Tuberculosis in patients with human immunodeficiency virus infection*. *N Engl J Med* 1991; 324:1644-50.
5. Singh G. *Lupus vulgaris in India*. *Indian J Dermatol Venereol Leprol* 1974; 40:257-60.
6. Banerjee BN. *tuberculosis of the skin and its relation with pulmonary tuberculosis*. *Indian J Dermatol* 1957; 2:69.
7. Pandhi RK, Bedi TR, Kanwar AJ, Bhutani LK. *A clinical and investigative study of cutaneous tuberculosis*. *Indian J Dermatol* 1977; 22:63-6.
8. Satyanarayan BV. *Tuberculoderma - A brief review together with statistical analysis and observations*. *Int J Dermatol* 1963; 29:25-3026-32.
9. Patra AC, Gharami RC, Banerjee PK. *A profile of cutaneous tuberculosis*. *Indian J Dermatol* 2006; 51:105-7.
10. Kumar BK, Kaur S. *Pattern of cutaneous tuberculosis in north India*. *Indian J Dermatol* 1986; 52:203-7.
11. Wong K, Lee KP, Chiu SF. *Tuberculosis of the skin in Hong Kong - A review of 160 cases*. *Br J Dermatol* 1968; 80:424-9.
12. Lever WF, Schaumberg LG. *Histopathology of skin*. 7th ed. JB Lippincott: Philadelphia; 1990. p. 326-32.