

Frequency of Nail Clubbing in Patients with Various Presentation of Tuberculosis

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ABSTRACT

Objective: This study is designed to evaluate the frequency of TB patients presenting with digital clubbing because of different complications of TB.

Study Design: Observational study.

Place and Duration of Study: This study was conducted in the Institute of Chest diseases at Kotri, Sindh Pakistan from January 2016 to December 2016.

Materials and Methods: A total of 50 patients admitted through the outpatient department, presenting with the different complications of tuberculosis, treated and untreated both were included in the study. Patients with comorbidities like cardiovascular and diabetes were excluded. After consent detailed history was taken and complete physical examination was performed with necessary laboratory investigations and also radiological findings conformed by senior consultants. Demographic data, radiological findings and clubbing were tabulated and analyzed

Results: During study period 50 patients were enrolled in study out of which 42 (84%) males and females 08(12%) between age group 15-30 years 15(30%), 31-45 years 11(22%) and in age group of 46-60 include 24(48%). Most of the patients 35(70%) belong to rural areas while 15(30%) from urban areas. In 22(44%) patient there was family history of TB while 28(56%) had not any history of TB. Smoking habits was observed in 34(68%) while 16(32%) never smoked. Majority of patients belonged to lower economic class 43(86%) while 07(14%) belongs to middle class also.

Conclusion: The global TB community cannot afford to continue ignoring this facet of TB care and control and needs to act with urgency to address what is likely to be a huge public health burden.

Key Words: Nail Clubbing, Patients, Tuberculosis

Citation of article: Bhatti KA, Aslam S, Kumar K. Frequency of Nail Clubbing in Patients with Various Presentation of Tuberculosis. Med Forum 2017;28(3):153-156.

INTRODUCTION

Tuberculosis (TB) constitutes a major public health challenge due to worsening of the health services in developing countries like our, prompt measures with increased investment in intervention strategies may prevent this situation from worsen in future. Epidemiological data available for Pakistan is not up to mark. In Pakistan around 430,000 people diagnosed with TB with estimated death rate about 70,000 deaths every year. Based on Burden of Disease estimates, TB represents 5% of the total DALYs (disability adjusted life years) which indicates that the burden of tuberculosis in Pakistan is substantially higher than the world. Different taboos regarding tuberculosis, malpractice, poor compliance of patients due to illiteracy and unawareness, failure of DOT (direct

observation therapy), MDR (multiple drug resistance) which is major issue both in effectiveness and cost wise.

Despite of several awareness programs through several Medias still patients in our set up instead of being presenting during early onset due to ethical, economical, myths and so many hindrances make them unable to seek medical advice. By the passage of time under similar circumstance of risk factors patients not only develops complications but they also be carriers to the others. Various complications usually reflected in radiography and by digital clubbing.

Digital clubbing is one of the oldest known sign in clinical practices dates back to Hippocrates. Clubbing is defined as focal bulbous enlargement of the terminal phalanx of the fingers and/or toes due to proliferation of connective tissue in both anteroposterior and lateral diameter of the nails. In most instances it is asymptomatic/ idiopathic, but it may be best predictors of some life threatening morbidities like lung cancer, idiopathic pulmonary fibrosis.^{1,2}

Clubbing is associated with various clinical conditions, most commonly associated with lung disease like neoplastic lung disease; non-neoplastic lung diseases include bronchiectasis, lung abscess, interstitial lung disease, fibrosis and empyema. Other causes include cyanotic heart diseases, infective endocarditis,

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Received: January 24, 2017; Accepted: February 19, 2017

inflammatory bowel disease, coeliac disease and primary biliary cirrhosis. Pathophysiology suggestive of clubbing is hyper vascularization at distal phalanx. In pulmonary circulation platelet precursors fail to become fragmented into platelets and easily trapped in the peripheral vasculature, releasing platelet-derived growth factor and vascular endothelial growth factor which promote vascularity leading to clubbing.^{3,4}

Clubbing may be present in one of five stages/grades

1. **No visible clubbing.** Fluctuation and softening of the nail bed only. No visible changes of nails.
2. **Mild clubbing.** Loss of the normal $<165^\circ$ angle (Lovibond angle) between the nail bed and the nail fold. Schamorth's window is obliterated. Clubbing is not obvious at a glance.
3. **Moderate clubbing.** Increased convexity of the nail fold. Clubbing is apparent at a glance.
4. **Gross clubbing.** Thickening of the whole distal phalanx (resembling a drumstick)
5. **Hypertrophicosteoarthropathy.** Shiny aspect and striation of the nail and skin with longitudinal striations.⁵

Assessment of nail clubbing: Clubbing can be assessed by physical examination with some uncertainty in mild cases with different signs. Digital cameras and computerized analysis in modern setup is utilized with more accuracy.⁶

Different signs of clubbing:

Profile sign or Lovibond's angle: It is defined by the angle made by nail as it exists from the proximal nail fold. In normal subjects, profile angle is usually less than 180° angle more than 180° is suggestive of clubbing.

Hyponychial angle: It is measured by drawing a line from distal digital crease to the cuticle and another line from the cuticle to hyponychium which is the thickened stratum corneum of epidermis lying under the free edge of the nail. Normal hyponychial angle is less than 192° . As hyponychial angle is independent of age, sex, height, and weight of the patient so mostly acceptable criteria.^{7,8}

Phalangeal depth ratio: It is the ratio of digit's depth measured at the junction between skin and nail bed at distal interphalangeal joint usually measured at the index finger. Normally the depth at distal interphalangeal joint is more than the depth at nail bed. In clubbing fingers, connective tissue deposition expands the pulp in the terminal phalanx and the ratio becomes reversed. This ratio is also independent of age, sex, and ethnicity of population. A Phalangeal depth ratio of over 1 is indicative of clubbing. It can be measured by a caliper or a digital photograph. While performing this measurement with calipers; it should be ensured that the calipers must not compress the tissues during measurement.⁹

Digital index: It is the sum of NB: DIP ratio of circumference at nail bed with circumference at distal

interphalangeal joint for all 10 fingers. A digital index of 10.2 or higher is indicative of clubbing. Digital index is more specific for clubbing.

Schamroth sign: This sign is elicited by placing the dorsal surfaces of terminal phalanges of corresponding right and left fingers together. Normal fingers create a diamond-shaped window when the dorsal surfaces of terminal phalanges of similar fingers are opposed to each other. In patients with clubbing this diamond-shaped window gets obliterated.^{10,11,12}

This study is designed to evaluate the frequency of TB patients presenting with digital clubbing because of different complications of TB.

MATERIALS AND METHODS

This observational study was conducted in the Institute of Chest diseases at Kotri, Sindh Pakistan from January 2016 to December 2016. Patients presenting with the different complications of tuberculosis, treated and untreated both were included in the study. Patients with comorbidities like cardiovascular and diabetes were excluded. A total of 50 patients admitted through the outpatient department. After consent detailed history was taken and complete physical examination was performed with necessary laboratory investigations and also radiological findings conformed by senior consultants. Demographic data, radiological findings and clubbing were tabulated and analyzed.

In our setup diagnosis of clubbing was made by clinical signs. Clubbing was evaluated by profile angle (PA), hyponychial angle (HA) of index fingers and the ratio of distal phalangeal depth to interphalangeal depth (DPD/IPD) of index fingers and was graded accordingly.¹³

RESULTS

During study period 50 patients were enrolled in study out of which 42 (84%) males and females 08(12%) between age group 15-30 years 15(30%), 31-45 years 11(22%) and in age group of 46-60 include 24(48%). Most of the patients 35(70%) belong to rural areas while 15(30%) from urban areas. In 22(44%) patient there was family history of TB while 28(56%) had not any history of TB. Smoking habits was observed in 34(68%) while 16(32%) never smoked. Majority of patients belonged to lower economic class 43(86%) while 07(14%) belongs to middle class also. Regarding weight of patients 48(96%) had weight more 45 Kg and 02(06%) had weigh less than 45 Kg shown in table 1.

Radiological findings of all TB were confirmed by senior consultants. Unilateral lung involvement in 12 (24%) males and 02 (04%) females while bilateral lung in males 38 (76%) and 02 (04%) females. Upper lung field involved in 42(84%) males and in 02 (24%) females. Middle lung field in 42(84%) and lower lung field in 34(68%) no females had middle or lower lung field involvement. Consolidation seen in 18 (36%)

males and 01 (02%) female. Bronchiectasis found in 14(28%) males and 02(24%) females. Cavitation observed in 30 (60%) males while no female show cavitory lesion on x-ray chest. Pleural effusion seen in 17 (34%) males and pneumothorax 02(04%) males, no female shows these both changes. Fibrosis was obvious in 22 (44%) males and 04 (24%) females and empyema in 03 (06%) males only shown in table 2.

Table No.1: Demographics of TB patients n=50

Age in years	15-30	31-45	46-60
	15(30%)	24(48%)	11(22%)
Gender	Male	Females	
	42(84%)	08(10%)	
Residence	Rural	Urban	
	35(70%)	15(30%)	
Family history of TB	Yes	No	
	22(44%)	28(56%)	
Smoking Habit	Yes	No	
	34(68%)	16(32%)	
Socioeconomic status	Upper	Middle	Lower
	00	07(14%)	43(86%)
Body Weight	>45 Kg	<45 Kg	
	38(76%)	12(24%)	

Table No.2: Radiographic Findings

X- ray pattern	Number %	
	Males	Females
Unilateral lung field	12 (24%)	02 (04%)
Bilateral lung fields	38 (76%)	02 (04%)
Upper lung field	42 (84%)	02 (24%)
Middle lung field	42 (84%)
Lower lung field	34 (68%)
Consolidation	18 (36%)	01 (02%)
Bronchiectasis	14 (28%)	02 (24%)
Cavitation	30 (60%)
Pleural effusion	17 (34%)
Pneumothorax	02 (04%)
Fibrosis	22 (44%)	04 (24%)
Empyema	03 (06%)	00 (00%)

Table No.3: Digital clubbing

Nail Clubbing	Bronchiectasis 34.2%		Fibrosis 52.6%		Empyema 7.8%	
	Male	Female	Male	Female	Male	Female
Grade 1	00	00	00	00	00	00
Grade 2	00	00	00	00	00	00
Grade 3	06	01	09	01	02	00
Grade 4	04	02	08	02	01	00
Grade 5	00	00	00	00	00	00

Table 3 is showing clubbing associated with various complication of TB. Out of 50 patients 38 (76%) shows clubbing, in bronchiectasis 34.2%, 52.6% in fibrosis and 7.8% in Empyema. In Bronchiectasis total 13 cases with 06 males in grade 3 and 04 in grade 4 and females 01 in grade 3 while 02 in grade 4. In Fibrosis total 20 cases with 09 males in grade 3 and 08 in grade 4 and females 01 in grade 3 while 02 in grade 4. In empyema total 03 cases with 02 males in grade 3 and 01 in grade 4 while no female shows clubbing

DISCUSSION

TB in its various forms remains a killer disease in our part of the world which is probably due to hygienic practices and late diagnosis leading to spread of disease, development of complication may bring patients to visit the physician for the first time. Different complication of tuberculosis found associated with digital clubbing as common and significant clinical manifestation needs proper investigations for evaluation of underlying pathology.

As compared to a developed country, where TB is common among elderly, it is a disease of young in a developing country. Seventy five percent (75%) of tuberculosis cases occur in age group of 15–59 years, the most economically productive sector of society. It was true in this study, as 30% in 15-30 years age group, 48% of patients were in the age group of 31-45 years and 11% of patients were in the age group of 46-60 years.^{14, 15}

Of the 50 patients 08 patients (16%) were females and 42 patients (84%) were males which is unrelated with studies conducted by Akhtar T and Ahmed M who found the ratio of females more than males that is 57% females and 43% males, this difference may be due to change in sample size or study duration.^{16, 17}

In this study majority of patient 70% belongs to rural areas deprived of necessary facilities of healthy living like clean drinking water and sanitation, 68% were smokers and 86% belongs to lower socio economic class, these findings are more or less similar with the study of Jagdeesh and Metha who found more than half 39 (65.0%) were having rural background, (33.3%) smokers and 60% patient belong to lower socioeconomic status. Weight loss was the presenting symptom in 53.84% of patients while in this study 24% patients had weight less than 45 Kg.^{15, 18}

Pulmonary TB is associated with various long term lung complications like fibrosis, bronchiectasis, pleural effusion, and empyema. This study reveals unilateral lung involvement in (28%) while bilateral lung in(80%)while study conducted by M. Khattak shows unilateral upper lung field 46%, bilateral upper lung fields 22%. Upper lung field involved in 42(84%) males and in 02 (24%) females. Middle lung field in 42(84%) and lower lung field in 34(68%) no females had middle or lower lung field involvement. Lower lung field 7%, cavitation in 25% observed by Khattak Consolidation seen in 18 (36%) males and 01 (02%) female. Bronchiectasis found in 52% while cavitation

observed in 60% on x-ray chest. Pleural effusion seen in 34% and pneumothorax 04% shows these both changes. Fibrosis was obvious in 68% and empyema in 06%. And study conducted by Jeremiah and Bruce shows emphysematous change in (36%), bronchiectasis (40%), bronchovascular distortion (56%) cases, more or less similar findings were observed in this study with some differences in sample size and setup.^{15,19,20}

Out of 50 patients 38 (76%) shows clubbing, in bronchiectasis 34.2%, 52.6% in fibrosis and 7.8% in Empyema. In Bronchiectasis total 13 cases with 06 males in grade 3 and 04 in grade 4 and females 01 in grade 3 while 02 in grade 4. In Fibrosis total 20 cases with 09 males in grade 3 and 08 in grade 4 and females 01 in grade 3 while 02 in grade 4. In empyema total 03 cases with 02 males in grade 3 and 01 in grade 4 while no female shows clubbing.

Nicotra and Barker found the frequency of digital clubbing (28.3%), while studies from endemic areas of TB have shown a 30% frequency of clubbing amongst smear-positive TB patients even much higher frequency of digital clubbing (82%) is found in study conducted in India like this in which 76% cases present with clubbing justifying the patients from endemic areas presenting associations of clubbing with severity of disease.^{21,22,23}

CONCLUSION

Exploring mechanisms to address the long term complications that follow treatment of pulmonary TB is long overdue and will significantly contribute to the quality of care for TB patients. In many PTB patients successful completion of TB treatment or bacteriological cure is not the end of the need for care. Systematic generation of data is needed to develop approaches for the prevention, care and treatment of patients with post TB chronic lung disease. The global TB community cannot afford to continue ignoring this facet of TB care and control and needs to act with urgency to address what is likely to be a huge public health burden

Conflict of Interest: The study has no conflict of interest to declare by any author.

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