pISSN: 0976 3325 eISSN: 2229 6816

ORIGINAL ARTICLE

MEASURE TO IMPROVE DETECTION OF SMEAR POSITIVE CASES UNDER RNTCP: COMPARISON OF 2 SPUTUM EXAMINATIONS VERSUS 3 SPUTUM EXAMINATIONS

Parmar Rahul[1], Baxi Rajendra K[2]

[1]Assistant Professor, [2]Professor, Department of Preventive and Social Medicine, Baroda Medical College, Vadodara

ABSTRACT

Background: RNTCP recommends examination of three sputum smears for diagnosis of TB. This may not be practicable under all conditions, especially in difficult areas. It further adds to the laboratory workload, cost of diagnosis and causes inconvenience to patients as well as for the health system.
Objectives: The present study was undertaken to compare the efficiency of sputum examination in detecting the smear positive TB cases among the chest symptomatics with 2 sputum examinations Vs 3 sputum examinations.
Methods: A cross sectional study including sputum positive pulmonary tuberculosis patients from 2 Tuberculosis Unit (5 Designated Microscopic Centre) of Municipal corporation of Vadodara.
Results: The study conducted in the fourth quarter included 143 (23.1 percent) smear positive cases of TB. Dependence on the first specimen (spot) and third specimen (spot) could detect 88.1 percent and 89.5 percent of the sputum positive patients' respectively, while morning specimen could detect 97.3 percent of the sputum positive patients. Comparison of 1st Vs 2nd and 2nd Vs 3rd showed a significant difference at $P < 0.01$. Repeat sputum Examination in only 11 patients out of 475 TB suspects identified 9% (1/11) smear positive cases.
Conclusion: Two sputum smear examinations (one spot & one early morning specimen) are sufficient for diagnosis of tuberculosis Patients.

Keywords: Tuberculosis, Sputum examination, RNTCP

INTRODUCTION

Tuberculosis (TB) remains the number one killer infectious disease-affecting adults in developing countries. The 1990 World Health Organization (WHO) report on the Global Burden of Disease ranked TB as the seventh most morbidity-causing disease in the world, and expected it to continue in the same position up to 2020[1]. Worldwide statistics are staggering: in 2001, the WHO estimated that 1.86 billion persons were infected with tuberculosis. Each year, 8.74 million develop tuberculosis and nearly 2 million die. This means that someone somewhere contracts TB every four seconds and one of them dies every 10 seconds[2]. WHO 2006 report on Global Tuberculosis Control published on March 24th, World TB Day, once again ranks India as the world's most heavily affected country. Based on the huge volume of information gathered in India, and drawing on our long-standing collaboration with Indian colleagues, it was estimated that there were 1.8 million new TB cases in India in 2004; that is, one in five of all cases worldwide. Roughly, 330,000 people died with TB in 2004 - nearly 1000 people every day. These figures put India some way ahead of the second-ranking country, China, which had about 1.3 million new episodes of TB in 2004[3]. Around the same time, in 1993, WHO declared TB a global emergency and devised the directly Observed Treatment - Short Course (DOTS) strategy and recommended that all countries adopt this strategy. The strategy is built on five pillars, viz. political commitment and continued funding for TB control programmes, diagnosis by sputum smear examinations, uninterrupted supply of high quality anti-TB drugs, drug intake under

direct observation, and accurate recording and reporting of all registered cases[3]. While India's report card for the last 10 year has been excellent, the next 10 yr are going to be crucial for TB control, not just for India, but for Asia and the rest of the world. The change in duration of symptoms from two weeks or more under NTP to three weeks or more under RNTCP was a retrograde and untenable step, made without any indigenous research support.[4]

MATERIAL AND METHODS

A cross sectional analysis of the chest symptomatics attending the five selected DMCs was carried out in the fourth quarter in the year 2006 and all Sputum Positive cases of Pulmonary TB attending chest OPD formed the study sample (n=143). Data was collected with the help of pretested, semi-structured proforma.

Patients currently on TB treatment attending health facilities for follow-up were excluded. All new adult outpatients with cough >2 weeks were referred for sputum examination. A sputum specimen was collected on the spot from each patient; the patient was then instructed to return on the following day for examination of an overnight specimen (second sputum sample) and to provide a spot specimen on the following day (third sputum sample)[5]. Those patients found negative on all the three sputum examination were called for a repeat sputum examination after completion of full course of antibiotics.

The smears were processed and read by trained laboratory technicians. Data thus collected were compiled and analysed by appropriate statistical technique.

RESULTS AND DISUSSION

The total attendance of chest symptomatic in the outpatient department of selected DMCs was 618 (15.3%) out of total OPD of 4044. Number of smear positive cases was 143 (23.1%) and number of smear negative cases was 475 (76.9%).

The detailed results from successive three sputum smears examined for all the sputum positive in the fourth quarter of 2006 is shown in Table 1. The analysis of the data showed that reliance on the first specimen (spot) could detect 88.1% (126/143) of the sputum positive patients. In addition, if the second specimen morning was also taken into consideration then 97.9% (140) of the patients could be detected. The incremental yield of the third specimen (spot) smear was less than one % in our study.

Table 1: Distribution of Smear Positives among Symptomatics in Successive Specimens

Variables	No. (%)
New chest symptomatics	618
Total sputum positive detected	143 (23.1)
Positive by all 3 specimens	111 (77.6)
Positive by 1st specimen(spot)	126 (88.1)
2nd specimen(morning)	140 (97.9)
3rd specimen(spot)	128 (89.5)
Additional positive by	
2nd specimen(morning)	16 (11.2)
3rd specimen(spot)	01 (0.7)

Table-2 shows the comparison between first spot specimen, second early morning specimen and third spot specimen in terms of case yield. Calculated value of Chi Sq. that is 9.9 and 7.9 are greater than the table values of Chi Sq. 6.64, hence the efficiency for 1st Vs 2nd sputum smear and 2nd Vs 3rd sputum smear is significant at P<0.01.

Table 2: Comparison of early morning Specimen with Successive Spot Specimens

Characteristics	Frequency (%)
Total Smear Positives	143
Only 1st (Spot) +ve	126 (88.1)
Only 2nd (Morning) +ve	140 (97.9)
Only 3rd (Spot) +ve	128 (89.5)
Comparison	
1st Vs 2nd	Chi Sq. = 9.9, P < 0.01
2nd Vs 3rd	Chi Sq. = 7.9, P < 0.01

Of the three sputum specimens, the early morning specimen gave the best results as compared to the other two spot specimens. If only the early morning specimen were required for testing, then approximately 97.9 % of the patients could be detected. This is higher yield than the results with the two spot specimens (1st & 3rd) and the difference is statistically significant (P<0.01) (Table-2). Thus, under routine conditions, two sputum smears (one of which is early morning) can be recommended in place of three smears for screening chest symptomatics. The reduction in workload may

give more time to an overburdened laboratory for improving quality of sputum microscopy. In addition, there would be saving in the cost of laboratory consumables. It has been estimated that each smear examination costs about Rs. 7 in LRS Institute laboratory[6]. The saving at national level would be enormous if the cost of health infrastructure; technicians' time and patients' lost time are added. However, before a change in national programme strategy is considered, further studies in different situations in the country are needed.

Table 3: Presents Repeat Sputum Microscopic Examination after a course of Antibiotics

DMCs	Smear -ve TB suspects	Repeat Sputum Microscopy	Repeat Smear + ve	Repeat Smear - ve
1	229	05	00	05
2	112	00	00	00
3	29	01	00	01
4	58	05	01	04
5	47	00	00	00
Total	475 (76.9 %)	11 (2.3 %)	01 (9 %)	10

Table-3 shows that of the total 475 (76.9%) smear negative TB suspects, repeat sputum microscopy was done on only 11 (2.3%) suspects. However, from these 11 repeat sputum microscopy one suspect was positive for disease. This shows that 9% sputum positive cases can be detected after repeat sputum microscopy among smear negative TB suspects after a course of antibiotics. In addition, only 11 out of 475 smear negative TB suspects were considered for repeat sputum microscopy, which is a very less number for justifying the importance of repeat sputum microscopy.

CONCLSUSION

Dependence on the first specimen (spot) and third specimen (spot) could detect 88.1 % and 89.5 % of the sputum positive patients' respectively, while morning specimen could detect 97.3 % of the sputum positive patients. Comparison of 1st Vs 2nd and 2nd Vs 3rd shows a significant difference at $P < 0.01$. Repeat sputum Examination in only 11 patients out of 475 TB suspects identified 9% (1/11) smear positive cases.

RECOMMENDATION

The study shows that the diagnostic yield of a single sputum specimen examined is insufficient under field conditions, especially where the sputum positivity is low. However, sputum positivity of two or more sputum smears did not affect diagnostic yield. Further, of the three sputum smears examined (spot, early morning, spot), the early morning specimen had the best result. It is concluded that under field conditions, two sputum smears (one of which is early morning) is as effective as three smears for screening of chest symptomatics. Reduction in the number of smears to two is expected to reduce cost (both for patients as well as health care provider) without compromising quality. However, before changing national programme policy, more studies in different situations (rural areas, difficult areas, etc.) are recommended. Secondly, the repeat sputum microscopy needs to be strengthened in diagnostic algorithm in the RNTCP procedure.

ACKNOWEDGEMENT

We are thankful to Incharge Medical Officer of Health of Vadodara Municipal Corporation; Superintendent of Gotri TB Hospital; Medical Officer, Gotri DMC; Medical Officer, ESIS DMC and Jubelibaug TU for helping us during the study. Also we are grateful to all the patients, for their kind and affectionate attitude and cooperation.

REFERENCES

1. Murray, Christopher L., Lopez, Alan D.: The global burden of disease: a comprehensive assessment of mortality and disability from diseases, injuries and risk factors in 1990 and projected to 2020: summary – WHO Geneva, Switzerland, 1996; W 74 96GL-1/1996.
2. Dye C., Scheele S., Dolin P. Global burden of disease: estimated incidence, prevalence, and mortality by country. J Am Med Assoc 1999; 282: 677-86.
3. Editotrial: India's leading role in tuberculosis epidemiology & control. Indian J Med Res 123, April

2006, pp 481-484. Available at: http://www.icmr.nic.in/ijmr/2006/april/0401.pdf. Accessed on March 2008.

4. Nair S, Radhakrishnan S, Seetha M, Samuel G E. Behavior patterns of persons with chest symptoms in Karnataka state. Indian J Tuberc 2002; 49: 39–48.

5. Central TB Division, Directorate General of Health Services, Ministry of Health and Family Welfare, Government of India 2001. RNTCP performance report, India. New Delhi, India: Network Programme India, 2002. Available At: www.tbcindia.org Accessed on March 2008

6. V.K. Arora and R. Sarin. Review Article: Revised National Tuberculosis Control Programme: Indian Perspective, L.R.S. Institute of TB and Allied Diseases

Correspondence:
Dr. Rahul Parmar
Department of Preventive and Social Medicine,
Baroda Medical College,
Vadodara - 390001
Email: drrahulparmar@yahoo.co.in