

Roping in private pathological services for strengthening tubercular case finding in resource constrained settings

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Abstract

Background: Meticulous identification and investigation of patients presenting with extra pulmonary tubercular symptoms assume a larger challenge in hospital settings which lack pathological services. Due to lack of cytopathological services in the district level Hospital, the health providers from Medicine, Surgery, Ear, Nose and Throat, Skin, Pediatrics streams refer the suspected extra pulmonary tubercular cases to Medical College which is far away. This delay leads to many missing cases as all referred do not move to higher institute due to time and monetary constraints.

Objectives

1. To assess the cytological diagnostics for tuberculosis at the district hospital.
2. To evaluate the cytopathological tubercular investigations in the public-private mix intervention approach.

Methods: To overcome this low TB case detection, an innovative model was evolved. Experienced pathologist from private sector was roped in, a well-equipped registered private diagnostic laboratory was agreed upon and the doctors of the hospital were sensitized for further referrals to this facility. Institutional Ethics committee permission was secured.

Results: Retrospective data analysis of three years revealed 325 tubercular suspects being referred to higher institute for cytopathological examination. After public-private mix intervention for two years, 262 tubercular suspects were investigated and 39.31 per cent of these were found tubercular. 40.74, 38.04 and 25.00 per cent of the suspected lymph node aspirates, pleural and ascitic fluids respectively were found to be tubercular with cytopathological investigation. Thereafter all these were initiated on directly observed treatment, short course therapy.

Conclusion : This public- private mix strategy has not only strengthened TB care and control in Pathology

deficit resource constrained settings but also highlighted a large number which otherwise would have been the missed cases. The Government authorities were recommended for setting up Pathology services at least at district level hospitals.

Keywords: Ascitic fluid, cytopathological, laboratory, lymph node, pleural.

Introduction

Tuberculosis (TB) is an old disease which has affected mankind for thousands of years, as has also been revealed by many studies conducted on human skeletons [1]. As tuberculosis has been listed as one of the top 10 causes of death globally, the public health objectives have been framed under the United Nations Sustainable Development Goals *viz* SDG target 3.3, which aim for ending the TB epidemic by the year 2030 [2]. The specific targets endorsed by the World Health Organization (WHO) End TB Strategy include 90% reduction in the absolute number of TB deaths and an 80% reduction in TB incidence (new cases per 100 000 population per year), compared with the levels in 2015 [3].

Universal Health Coverage (UHC) has now been acknowledged as an indispensable pillar of TB control activities. It meticulously clarifies that everyone by 2030- irrespective of their living standards or their particular disease or health needs- receives the health service they need and that using these health services does not cause them the financial hardships [4]. The SDG target 3.8 encompasses the provision of the entire diagnostics mandatory for TB at important decentralized health provision facilities such as primary, secondary and tertiary public health care facilities [5]. However, the referrals of suspected TB patients from these institutes to higher public health institutes, in the lieu of unavailability of diagnostic

facility, leads to catastrophic expenditures on the part of the suspect tubercular patient. This many a times amounts to noncompliance of the referral and leads to “the missing million” burden. India, a high TB burden country, also faces this challenge of UHC for many diseases including tuberculosis. The UHC service coverage index for this lower- middle income country is 56 with about 17 % of the population facing catastrophic health expenditure [6].

Solan, a fast urbanizing and industrializing district of Himachal Pradesh, a state in the northern part of this country is one of the 28 top high TB burden districts [7]. The district hospital is an important secondary health care facility catering to the needs of people of the region. However, the hospital is lacking the cytopathological services for the diagnosis of extra pulmonary tuberculosis. Moreover, Extrapulmonary tuberculosis (EPTB) laboratory diagnosis itself has always been a big challenge for the health provision facilities. Fine needle aspiration cytology (FNAC) along with fluid cytology is an important diagnostic procedure for the confirmation of extra pulmonary tuberculosis. Out Patient Departments (OPDs) of the hospitals are the accessible and feasible settings for the screening of symptoms of TB [8, 9]. However, the doctors of this hospital working in the various streams of medicine and surgery had no choice but to refer these TB suspects to the higher institute i.e. the tertiary health care level Medical College, which was far away. This not only amounted to extra health care expenditure on the part of the patient but also many times leads to noncompliance of the referral advised by the patient. Such diagnostic delays and chances of increasing the “the missing million” was perceived as grave concern by the Public Health Official of this hospital and the present public- private intervention was ensued for such

prompt diagnostics which thereafter, aided in immediate initiation of anti-tubercular treatment.

Objectives

1. To assess the cytological diagnostics for tuberculosis at the district hospital.
2. To evaluate the cytopathological tubercular investigations in the public-private mix intervention approach.

Materials and methods: The hospital facility survey was conducted and the secondary data analysis of the previous three years record of the district hospital was undertaken for evaluating the existing cytopathological services. The registration records of the Outdoor Patient Department and the District Tuberculosis Centre were analyzed for the years 2015-17. Thereafter, an experienced pathologist from private sector was roped in for carrying out the most specific diagnostic procedures of Fine needle aspiration cytology (FNAC) and Fluid cytology on the TB suspects being referred from the district hospital. An agreement was made with a well-equipped registered private diagnostic laboratory. Thereafter, the doctors of the district hospital were sensitized to refer the suspected extrapulmonary tubercular patients to this laboratory for the cytopathological investigations. Institutional

Ethics committee permission was secured. Informed written consent was obtained from the patients and they were offered the optional cytopathological investigations at the selected laboratory.

The tuberculosis diagnostic modalities available in the hospital included tuberculin skin test, bacteriological test (sputum microscopy and culture), radiological tests and other supportive blood tests. The records of the TB suspect case, having been investigated with the diagnostic modality of cytopathological examination, were analyzed. In Cytopathology presence of granuloma with caseation and AFB was generally taken as a diagnostic sign of TB.

Results and Discussion

Table 1 elucidates the retrospective secondary data analysis of the years 2015-17 of the District Tuberculosis Centre. It is evinced that 325 patients were referred to higher institute, the medical college, for cytopathological investigation to rule out extrapulmonary tuberculosis. The age range of the patients referred was 16-76 with a mean age of 45 years and 66% of them were males. 51.38, 26.15, 16.61 and 5.84 per cent of the total referrals were the patients suspected to have tuberculosis of lymph nodes, pleural, ascitic and other body fluids respectively.

Table 1: Referrals for cytopathological investigations in district hospital Solan (2015-2017)

Year	Specimen for investigation	Referring stream	Number of patients referred			
			2015	2016	2017	Total N (%)
1	Lymph node fluid	Medicine	25	27	19	167 (51.38)
		Surgery	12	13	15	
		Ear, Nose & Throat	16	12	17	
		Pediatrics	2	5	4	
3	Pleural fluid	Medicine	36	22	27	85 (26.15)
4	Ascitic fluid	Medicine	4	2	7	54 (16.61)
		Surgery	11	17	13	

5	Other body fluids (synovial, testicular)	Surgery	7	3	9	19 (5.84)
Total			113	101	111	325

Post intervention, i.e. after the public-private mix model of investigating extra pulmonary tuberculosis by cytopathological means was accomplished in two years, the results of the Private cytopathological laboratory were analyzed. For this, the triangulation of this data of two years from the private laboratory, along with the referral register of the hospital and Tuberculosis notification register of the TB control program was undertaken. The analysis revealed that a total of 262 patients had been investigated at the private laboratory (Table 2). These were in the range of 15-65 years with mean age of 41 years and 62% were males. Overall, of the total referrals for suspected tuberculosis, statistically significant 39.31 per cent were confirmed cases to have tuberculosis (p value < 0.05). Of the total 262 patients, 61.83, 35.11 and 3.05 per cent were the patients suspected to have tuberculosis of lymph, pleural and ascitic fluid respectively. Further evaluation of the cytopathological pattern of the Fine needle aspiration cytology (FNAC) aspirate of these patients evinced 40.74 per cent of the suspected lymph fluids to have tuberculosis. 38.04 and 25.00 per cent of the suspected pleural and ascitic fluid respectively, were found positive for tuberculosis. The results obtained were observed to be statistically significant. Thereafter, all these diagnosed tubercular cases were initiated on directly observed treatment, short course therapy (DOTS).

Table 2: Cytopathological investigations in public-private mix intervention approach, Solan (2018-19)

S.N.	Fluid specimen for investigation	Number examined (%)	Found positive (%)
1	Lymph node	162 (61.83)	66 (40.74)
2	Pleural	92 (35.11)	35(38.04)
3	Ascitic	8 (3.05)	2 (25.00)
Total		262	103 (39.31)

Cytopathological examinations play a very crucial role in the prompt diagnosis of tuberculosis. Koo *et al.* in a study in hospital settings found that 64% cases (14 out of 22 lymph nodes examined) had their diagnosis confirmed through these investigations and five of them were found to be tubercular [10]. Lymph node tuberculosis is a very common entity diagnosed with the help of Fine needle aspiration cytology. In a study setting Chand *et al.* found 52% tubercular lymphadenitis (550 out of 1050 lymphadenopathies) with cytopathological examination [11]. The cytopathological investigations of this study also aided in diagnosing tuberculosis in various tissue fluid such as pleural and ascitic fluid. In this investigation, 38% (35) of pleural fluid and 25% (2) of ascitic fluid samples were also detected as tubercular. Similarly, Biswas *et al.* had documented about 60% of tubercular cases in patients presenting with pleural effusion with the aid of cytological investigation [12]. Antonangelo *et al.* had also discussed the role of cytopathological examination in the diagnosis of tuberculosis in the pleural effusion samples [13]. Gokten *et al.* had demonstrated cytopathological examination leading to

diagnosis of tuberculosis in a patient presenting with ascites [14]. Similarly, Kaya *et al.* [15] and Fillion *et al.* [16] had also demonstrated the role of cytopathological tests in eliciting abdominal tuberculosis. The secondary health facilities such as the district level hospitals cater to not only all the referrals from the adjoining peripheral health facilities but also serve as a direct health seeking point for a large population from its catchment area. Henceforth, these settings incorporating the medicine and surgical services need priority in strengthening the cytopathological services which will also boost the diagnosis of the extrapulmonary tubercular suspects. This would ensure the prompt tubercular diagnosis in extrapulmonary cases also and further initiation of anti- tubercular treatment.

The institutes lacking the cytopathological investigations indirectly land up in referring these cases to private laboratories as all the referred do not move to higher institute for the want of money and time. Similar findings have also been reported by Mota *et al.* [17] and Golden *et al.* [18] in their studies which depict that the public institutes do rely upon the facilities provided by private diagnostic laboratories. Ananthkrishnan *et al.* [19] demonstrated in a study that the diagnostics available with private facilities assist in the diagnosis of tuberculosis in resource constrained settings. Purohit *et al.* [20] had inferred from their study that the private laboratories can play a big role in the diagnosis of tuberculosis especially in the resource constrained settings, very much similar to the findings of our study.

Conclusion: The study infers the benefit of public-private mix strategy in eliciting extra pulmonary tubercular cases by cytopathological examination. This innovative model has not only strengthened TB care and control in Pathology deficit resource constrained

settings but also has highlighted a large number of extra pulmonary tubercular cases which otherwise would have been the missed cases.

Our investigation was adjudged as the second-best poster presentation in Field Epidemiology Training Programme Indian Conference 2020 held at Chennai in March 2020.

Limitations of study: The tracing of all the referrals to higher institute for cytopathological confirmation of tuberculosis was out of the scope of the study. We could not collect the exact number of these referrals which actually underwent the investigations at the said higher institute.

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