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RADIOLOGICAL EVIDENCE SUGGESTIVE OF TUBERCULOSIS IN CHEST X-RAYS TAKEN FOR COVID CARE IN TAMIL NADU

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Abstract

Background : The number of new TB cases notified has decreased in the country since the beginning of the COVID pandemic due to various reasons. India has a high burden of TB cases and latent TB infection. Chest X ray (CXR) taken at COVID care centres can serve as an important source to look for radiological evidence of TB in these patients. About 10570 CXR were collected from Mobile X ray units deployed in COVID care centre during the second wave of the pandemic. We used artificial intelligence (AI) to read these CXR. A total of 969 (9.2%) and 168 (1.6%) were suggestive of COVID-19 and Pulmonary TB respectively. This serves as an evidence to look for TB in CXR at any given opportunity even if the CXR are taken for other purposes enabling picking up of TB cases at every given opportunity as we move towards TB elimination.

Keywords: Tuberculosis, COVID-19, Chest X- ray, Artificial Intelligence.

MAIN CONTENT

Lung infection secondary to SARS- CoV2 can result in severe pneumonia leading to aggressive acute respiratory distress syndrome (ARDS).[1,2] The recent COVID-19 radiological literature focuses primarily on computed tomography (CT) findings, which is more sensitive and specific than chest X-ray (CXR).[2,3] Nonetheless, CXR have been proposed as a potentially useful tool for assessing COVID-19 patients, especially in overwhelmed emergency departments, urgent care centres and developing countries.[2-4] COVID triage centres in Tamil Nadu employed CXR as the first-line of radiological screening to categorise the patients for further treatment and management.[5] An important setback of the COVID-19 pandemic was the worsening of the tuberculosis (TB) epidemic in the country for a variety of reasons, such as delay in diagnosis, delay in treatment initiation, rerouting the human resources from TB services for pandemic activities in addition to the excess pressure on health systems by the pandemic resulting in weakening of the National TB Elimination Programme (NTEP). The number of new TB cases notified has decreased in the country since the beginning of the pandemic.[6] Since India has a high burden of TB cases and latent TB infection, CXR taken at COVID care centres can serve as an important source to look for radiological evidence of TB in these patients. We undertook an exercise of reading around 10570 CXR using artificial intelligence (AI) from various mobile X ray units deployed in COVID care centres across various districts of Tamil Nadu during the months of April 2021 to June 2021. Among these X -rays, a total of 969 (9.2%) CXR were suggestive of COVID-19 while 168 (1.6%)

CXR were suggestive of pulmonary TB. This helped to pick up radiological evidence for TB and further investigate these individuals. These cases represent old/ treated and new cases. A high proportion of CXR abnormality (for TB) was noticed in Madurai district paralleling the high notification in Madurai district. This exercise served as an eye-opener that one has to look for evidence of TB in CXR taken for any other purpose (Table 1). These cases would have been missed if not looked for. Though doctors are trained to read the X ray holistically and not look for any particular disease, in situation like COVID pandemic when the health system is under tremendous pressure, the chances of picking out TB and referring them for further management is unlikely especially in COVID care centres. Even in normal situations TB diagnosis by X ray is mostly in tertiary care settings where pulmonologists are available. Doctors in the periphery needs periodic training on X ray reading and also neds to be sensitized that X ray is an important tool for TB diagnosis. The recently conducted National TB prevalence study in India has found that nearly 46% of the TB cases had only X abnormality and had no symptoms emphasising on the importance of X rays in TB.7 In this study the co-existence of TB and COVID-19 abnormality in CXR is only 0.2% which warrants further

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studies to prove or generate evidence for the hypothesis that TB patients are more vulnerable for COVID-19 and vice versa. Studies specifically looking into these aspects must be planned.

Table 1 : District wise reported CXR

#Proportion among the total CXR expressed as percentage

District	Overall CXR		CXR suggestive of COVID		CXR suggestive of TB	
	n	(%)ª	*n*	(%)ª	*n*	(%)ª
Chennai	2050	(19.4)	33	(0.31)	34	(0.32)
Dharmapuri	242	(2.3)	3	(0.02)	0	(0.0)
Dindigul	213	(2.0)	32	(0.3)	0	(0.0)
Kancheepuram	1428	(13.5)	272	(2.57)	9	(0.08)
Madurai	3193	(30.2)	78	(0.73)	101	(0.95)
Nagapattinam	2416	(22.8)	381	(3.60)	19	(0.17)
Namakkal	14	(0.1)	1	(0.009)	0	(0.0)
Nilgiris	946	(8.9)	152	(1.43)	3	(0.02)
Salem	56	(0.5)	13	(0.12)	2	(0.01)
Thoothukudi	12	(0.1)	4	(0.03)	0	(0.0)

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