



Pulmonary Medicine

HAS TB CHANGED? A COMPARATIVE CROSS SECTIONAL STUDY BETWEEN THE RADIOLOGICAL PRESENTATIONS OF TUBERCULOSIS IN PRE AND POST COVID ERA.

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ABSTRACT **Introduction:** Tuberculosis has been a major cause of suffering and death worldwide and major efforts have been taken to eradicate TB. These efforts have been fruitful up until the pandemic of COVID-19. The pandemic has caused long lasting effects on people and other infections like tuberculosis. The hyper-inflammatory milieu and immunosuppressed state induced by COVID-19 could accelerate TB disease progression. **Aim:** To study and compare the radiological presentations of TB from pre and post COVID era to determine if TB has changed. **Methodology:** A comparative cross-sectional study conducted, where we compared the chest Xray's of 50 TB sputum positive patients in 2019 (pre covid) to 50 TB positive patients in 2022 (post covid). **Results & Conclusion:** The median age in pre covid era 48.8 (range 17-81) and more than half were males (88%). The post covid era shared the same demographics. Median age in post covid era 47.46 (range 18-77) and (82%) were males. Based on lesions, consolidation shared greater proportion when compared to cavity, effusion and air fluid level in post covid era (68%) with p value 0.2937. Consolidation was more in bilateral lungs in post covid era (55%). Zonal distribution of consolidation when compared revealed consolidation became more extensive involving all three zones (upper mid and lower zones) in post covid era (74.4%) which was statistically significant (p value 0.0010). Tuberculosis has transformed into a diffuse disease with extensive lesions.

KEYWORDS : tuberculosis, post covid, radiology.

INTRODUCTION:

Tuberculosis has been a major cause of suffering and death worldwide and major efforts have been taken to eradicate TB. These efforts have been fruitful up until the pandemic of COVID-19. Coronavirus disease 19 (COVID-19) is a highly contagious viral respiratory and vascular illness caused by SARS-CoV-2. The pandemic it caused has had long lasting effects on people and other infections like tuberculosis (TB) through lockdown and it's action on the lungs. COVID-19 is primarily a respiratory illness that can be transmitted in the air, eliciting hyper-inflammatory state in the lung. Furthermore, the steroids used for treatment of COVID-19 may have a direct role in immunosuppression. It is thus reasonable to speculate that the hyper-inflammatory milieu and immunosuppressed state induced by COVID-19 could accelerate TB disease progression.

AIM OF THE STUDY:

To study and compare the radiological presentations of TB from pre and post COVID era to determine if TB has changed.

MATERIALS AND METHODS:

Study Design: Comparative cross-sectional study.

We studied the chest X-rays of 50 TB positive patients from January 2019 to December 2019 (pre covid) and 50 TB positive patients from January 2022 to December 2022 (post covid).

Inclusion Criteria: All sputum positive patients in the years 2019 and 2022.

Exclusion Criteria: Recurrent and drug resistant TB cases were excluded

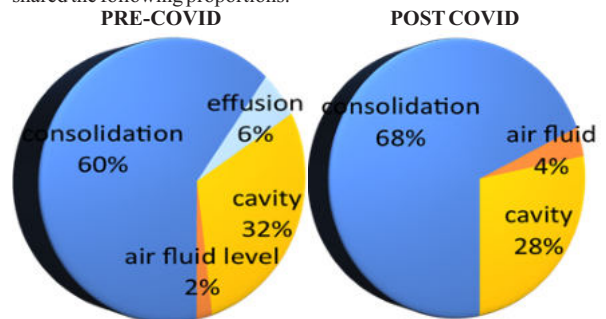
50 cases were selected at random from each era (2019 and 2022) and the chest X-rays were studied and reported base on the lung involved zone and lesion. The most common radiological features from each era was compared. Data regarding the comorbidities was also compared among the two groups.

RESULTS

Lesions	Number (50) Pre-covid	Number (50) Post-covid
CONSOLIDATION	30	34

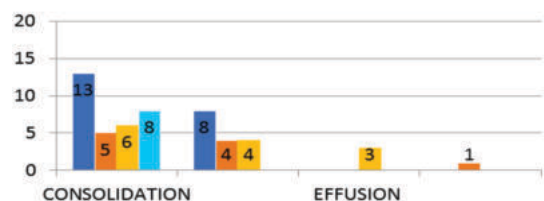
CAVITY	16	14
EFFUSION	3	0
AIR FLUID LEVEL	1	2

Table set I - The lesions when compared within the eras between shared the following proportions.



BAR GRAPH 1 – ZONAL DISTRIBUTION OF LESIONS PRE COVID

■ UZ ■ MZ ■ LZ ■ DIFFUSE



POST COVID

■ UZ ■ MZ ■ LZ ■ DIFFUSE

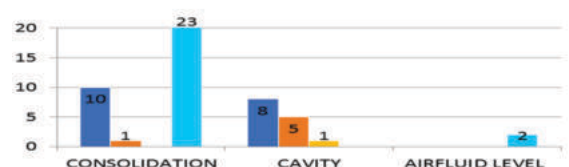


Table Set II – Comparison of study population based on lesion, zone involved and lung involved.**PRE-COVID**

Zone	Lung	Consolidation	Cavity	Parapneumonic effusion	Air fluid Level
	Right	7	5	—	—
Upper	Left	2	3	—	—
Zone	B/L	2	—	—	—
	Right	3	3	—	—
Middle	Left	1	1	—	1
Zone	B/L	1	—	—	—
	Right	2	1	2	—
Lower	Left	2	3	1	—
Zone	B/L	2	—	—	—
	Right	3	—	—	—
Diffuse	Left	1	—	—	—
	B/L	4	—	—	—

POST COVID

Zone	Lung	Consolidation	Cavity	Parapneumonic effusion	Air fluid Level
	Right	5	2	—	—
Upper	Left	3	6	—	—
Zone	B/L	2	—	—	—
	Right	—	2	—	—
Middle	Left	1	3	—	—
Zone	B/L	—	—	—	—
	Right	—	1	—	—
Lower	Left	—	—	—	—
Zone	B/L	—	—	—	—
	Right	1	—	—	1
Diffuse	Left	5	—	—	1
	B/L	17	—	—	—

DISCUSSION:

A total of 100 patients were recruited for this study of which 50 were from the pre covid era -2019 and 50 were from post covid era - 2022. Among 50, 44 were males, 6 were females in pre covid era with mean age of 48.8 (Range 17-81) and standard deviation of 15.21. The post covid era shared the same demographics. In post covid era 41 were males and 9 were females with mean age of 47.46 (Range 18-77) and standard deviation of 15.98. Data analysis done using Chi square testing.

In table set I, the two eras were compared based on lesions and it was found that consolidation was the predominant lesion in both the eras but, consolidation shared a greater proportion in the post covid era (68%) when compare to pre covid (60%) which is statistically significant with p value of 0.0010, chi-square- 16.2. Cavities were more in pre covid era (32%) than in post covid (28%) with p value 0.40 and chi square 1.78. Effusions were seen only in pre covid era (6%) and air fluid levels were observed to be more in post covid era (4%) than in pre covid (2%). In bar graph I, zonal distribution of lesions were compared and it was found that in pre covid era upper zone consolidations (47.67%) were more common (p value- 0.78, chi square – 0.48) where as in post covid era, diffuse consolidations dominated the graph (74.4%) with p value of 0.05 and chi square 5.8. Upper zone cavity was the common finding in both eras [2019(50%) & 2022 (57%)].

In table set II the lesions, zones and lungs involved were compared and right upper zone consolidations (14%) were found to be the common finding in pre covid era where as bilateral diffuse consolidations (34%) were the predominant radiological feature. In our study, comorbidities were compared and diabetes (34) was more predominant in the post covid era (58.8%). In diabetics, upper and lower zone consolidations (p value 0.04, chi square 9.64) were the most common radiological feature (21%) in the pre covid era and upper zone cavities and unilateral diffuse consolidation were the most common radiological findings in the post covid era (25%). HIV was seen only in 1 patient in the post covid era and had bilateral diffuse consolidations.³

These disseminated presentation may be due to the similarities that tuberculosis and covid-19 share, such as their entry pattern, the host immune response, the fibrosis caused etc.⁶

Past and present research demonstrate that IL-10, TNF- α , IFN class I-III, TGF- β , IL-35, and Regulatory T cells (T-regs) are all important contributors of the characteristics of host response to mycobacterium tuberculosis containing the infecting and effectively eliminating it.⁵

Recent research has concluded that majority of these also contribute to the host response of covid -19. Thus there is T cell exhaustion and loss of cytokine production causing disseminated disease.⁵

Additional mechanisms that have been postulated include reactivation due to lung inflammation due to the virus, flaring of tubercular lesions triggering Type I interferon signalling that is also important for mycobacterial growth, and activation of the mesenchymal stem cell mediated defense mechanism.⁵

The use of corticosteroids, monoclonal antibody targeting the inflammatory cytokine, tumor necrotic factor alpha (TNF-alpha) has been associated with dissemination.¹

CONCLUSION:

According to the data obtained in this study, tuberculosis has changed significantly in the post covid era. The usual radiological findings of right upper zone consolidations are lost and have been replaced with bilateral diffuse consolidations. Tuberculosis has into a highly fatal disease with extensive lesions than previously known. There is an immediate need for recovering what has been lost in the pandemic, major improvements in detection and notification and treatment is of utmost importance.

LIMITATIONS:

Due to limited sample size, the results cannot be generalized. A bigger sample size would ensure the precision of the results.

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