

TITLE: Evaluation of High Resolution Computed Tomography (HRCT) Findings in Jute Mill workers and its correlation with Pulmonary Function Tests (PFT)

INTRODUCTION

The occurrence of byssinosis in Indian jute mill workers has been documented previously based on clinical symptomatology and abnormalities on pulmonary function tests (PFT). The prevalence of byssinosis like symptoms and PFT changes in both pre-shift and post-shift period in Indian jute mill workers have also been evaluated in previous studies. The similarity of symptomatology in jute mill workers with that in cotton textile mill workers led to the hypothesis that probably the underlying cause could be similar i.e gram-negative bacterial endotoxin in jute mill dust. It was found in subsequent studies that exposure to jute dust can lead to byssinosis similar to that of cotton dusts depending upon the dust concentration and endotoxin content of jute dust.

Most of the existing literature documenting the occurrence of byssinosis in Indian jute mill workers have studied the clinical symptomatology and PFT abnormalities. However, there is sparse description of their imaging findings including HRCT changes. One study conducted among jute mill workers in Bangladesh performed HRCT on subjects who had restrictive or obstructive pattern of lung disease on spirometry. They reported fibrosis in those with restrictive pattern, but, mild to moderate obstruction had no findings on HRCT. Only severe obstruction presented with overinflation. Moreover, majority of the studies on Indian jute mill workers were performed in late 1990's and early 2000 dealing predominantly with the clinical symptoms and PFT changes.

Majority of the jute mills in India are located in West Bengal along the banks of river Hooghly. Most of the previous studies dealing with pulmonary and other health concerns of jute mill workers have been conducted at the industrial units of jute mills. However, our study differs from the previous ones in being a hospital-based study wherein jute-mill workers (presently /previously employed) who visit our pulmonary medicine OPD with respiratory complaints and are advised to undergo HRCT as a part of their diagnostic work-up shall be included in the study.

This prospective observational study aims to investigate the HRCT imaging findings in symptomatic jute mill workers, which has not been previously described in literature. These HRCT imaging findings would then be correlated with their PFT results.

Study Design:

Study type: Observational

Time perspective: Prospective

Intervention: No intervention

Aims and Objectives:

The aim of the study is assess the high resolution computed tomography (HRCT) findings of symptomatic jute mill workers and its correlation with pulmonary function Tests (PFT)

Anticipated Outcome

Primary outcome measures:

1. Evaluation of HRCT imaging findings in symptomatic jute mill workers and description of predominant patterns of pulmonary involvement

Secondary outcome measures:

1. Assessment of patterns of HRCT findings in symptomatic jute mill workers.
2. Assessment of ventilator pulmonary function test changes in symptomatic jute mill workers
3. Correlation of the imaging findings with ventilator pulmonary function test changes.
4. Description of associated imaging findings on HRCT chest.

METHODOLOGY

Inclusion criteria

1. Age >18 years
2. Symptomatic patients visiting Pulmonary Medicine OPD with respiratory complaints who are advised HRCT.
3. Patients who are presently employed or have previously worked in jute mill for at least 5 years duration.

Exclusion criteria

1. Patients who refuse to give consent.
2. Pediatric age-group

After obtaining written informed consent, all symptomatic patients who are presently or were previously employed in jute mill industry visiting pulmonary medicine OPD and are advised HRCT for their diagnostic work-up would be included in the study.

Detailed medical history, demographic characteristics, clinical symptoms and occupational history including duration of exposure to jute fibre dust (duration of work in jute mill), history of smoking shall be recorded in patient case sheet.

All the patients shall undergo non-contrast HRCT at 256-slice CT scanner (Siemens Somatom Drive) in supine position at full inspiration. In cases of suspected mosaic attenuation, expiratory scans shall be acquired. Prone scans shall be acquired wherever deemed necessary.

All the patients shall undergo PFT following HRCT. The findings of PFT shall be recorded in patient case sheet.

The HRCT images shall be reviewed by three radiologists with 8, 9 and 7 years of experience in consensus on grey scale monitor. The imaging findings shall be evaluated qualitatively for the predominant pattern of pulmonary involvement, distribution of abnormalities, symmetry/asymmetry of

involvement and ancillary findings such as presence of mediastinal/ hilar lymphadenopathy, pulmonary artery hypertension, pleural or pericardial effusion etc. which shall be recorded in each case.

The predominant HRCT pattern of pulmonary involvement shall be finally correlated with the results of pulmonary function tests.

Sample size and statistical analysis

The estimated prevalence of pulmonary changes in jute mill workers was found to be about 40 % by Nafees AA et al in their systematic review on prevalence of byssinosis in low- and middle-income countries. With an alpha value of 0.05 and power of the study as 80%, the calculated sample size stands at 96 with a relative precision of 25%. We shall adopt non-probability convenient sampling technique.

Timelines

Mile stone	Targets
Recruitment of patients	3 months
Performance of HRCT and PFT	6 months
Data collection and analysis	2 months
Compilation of results	1 month

References

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