

CORRELATION OF PERCEIVED DYSPNEA WITH RADIOLOGICAL FINDINGS IN PATIENTS WITH DIFFUSE PARENCHYMAL LUNG DISEASE IN A TERTIARY CARE HOSPITAL

Respiratory Medicine

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ABSTRACT

DYSPNEA 12 score is a reliable method of grading patient perceived dyspnea. After taking detailed history and clinical examination HRCT thorax carried out in all patients with DPLD. Dyspnea 12 score calculated in all patients. Correlation of dyspnea 12 score is made with the radiological findings. Study conducted among 50 patients showed 56% patients had mild, 20% had moderate and 24% had severe on dyspnea 12 score. in our study 15(30.0%) patients had ground glass appearance on HRCT. 33(66.0%) patients had reticular pattern in HRCT. 10(20.0%) patients had consolidation in HRCT. 25(50.0%) patients had honeycombing on HRCT. 14(28.0%) patients had nodular pattern HRCT. 29(58.0%) patients had traction bronchiectasis on HRCT. In our study Association between Reticular pattern, Ground glass appearance, Consolidation in HRCT with dyspnea 12 score was not statistically significant. Dyspnea 12 score has positive correlation with honeycombing and traction bronchiectasis on HRCT

KEYWORDS

Diffuse parenchymal lung diseases, high resolution computed tomographic scan

INTRODUCTION

Diffuse Parenchymal Lung Disease (DPLD) are a group of lung disorders affecting the interstitium (the tissue and space around the alveoli (air sacs of the lungs))¹. It concerns alveolar epithelium, pulmonary capillary endothelium, basement membrane, and perivascular and perilymphatic tissues.

Perceived dyspnea or patient reported measure of dyspnea severity is graded on the basis of dyspnea 12 score. In patients with DPLD, the D-12, a patient-reported measure of dyspnea severity is a reliable and valid² instrument. It is short, simple to complete, and easy to score.

Diffuse Parenchymal Lung Diseases can be classified according to radiologic Patterns based on HRCT thorax.³

Pattern of opacities Consolidation

Diffuse hemorrhage syndromes, eosinophilic pneumonias, acute interstitial pneumonia, cryptogenic organizing pneumonia, lymph proliferative disorders, pulmonary alveolar proteinosis, and sarcoidosis.

Linear or reticular opacities acute pulmonary edema

Chronic: Idiopathic pulmonary fibrosis, connective tissue associated Diffuse Parenchymal Lung Diseases, asbestosis, sarcoidosis, hypersensitivity pneumonitis, drug-induced lung disease

Nodular Patterns

Hypersensitivity pneumonitis, sarcoidosis, silicosis, coal workers pneumoconiosis, respiratory bronchiolitis, alveolar microlithiasis

Cystic airspaces

Pulmonary langerhans cell histiocytosis, pulmonary lymphangi leiomyomatosis, honeycomb lung caused by IPF or other diseases

Ground glass opacities

Acute: diffuse hemorrhage syndromes, nonspecific interstitial pneumonias hypersensitivity pneumonitis, acute inhalational exposures, drug-induced lung diseases, acute interstitial pneumonia

Chronic: Nonspecific interstitial pneumonia, respiratory bronchiolitis associated Diffuse Parenchymal Lung Disease, desquamative interstitial pneumonia, drug induced lung diseases, pulmonary alveolar proteinosis.

MATERIALS AND METHOD

Study Design: The prospective study was conducted on the patients of DPLD, diagnosed by HRCT THORAX and clinical features, of more than 12 yrs age. The study was conducted in the dept. of respiratory

medicine in a tertiary care hospital of Kolkata during the period of June 2018 to June 2019. Patients diagnosed as DPLD from OPD and IPD were included in the study, after excluding few patients remaining 50 patients were taken for the study.

Inclusion Criteria:

All patients diagnosed as DPLD based on clinical and radiological parameters.

Exclusion Criteria:

Patients with any other patients of dyspnea apart from diffuse parenchymal lung disease

Study Protocol

This study was done after getting approval from the Ethical Committee of the institution and it was conducted in the dept of respiratory medicine in a tertiary care hospital of Kolkata. 1. At first meticulous history taken for all the patients 2. HRCT THORAX done. 3. dyspnea 12 score is calculated, 4. Correlation is made between Dyspnea 12 Score and HRCT findings.

Statistical Analysis:

For statistical analysis data were entered into a Microsoft excel spread sheet and then analyzed by SPSS (version 24.0; SPSS Inc., Chicago, IL, USA) and GraphPad Prism version 5. Data had been summarized as mean and standard deviation for numerical variables and count and percentages for categorical variables. Two-sample t-tests for a difference in mean involved independent samples or unpaired samples. Paired t-tests were a form of blocking and had greater power than unpaired tests. One-way analysis of variance (one-way ANOVA) was a technique used to compare means of three or more samples for numerical data (using the F distribution). A chi-squared test (χ^2 test) was any statistical hypothesis test wherein the sampling distribution of the test statistic is a chi-squared distribution when the null hypothesis is true. Without other qualification, 'chi-squared test' often is used as short for Pearson's chi-squared test. Unpaired proportions were compared by Chi-square test or Fischer's exact test, as appropriate. Explicit expressions that can be used to carry out various t-tests are given below. In each case, the formula for a test statistic that either exactly follows or closely approximates a t-distribution under the null hypothesis is given. Also, the appropriate degrees of freedom are given in each case. Each of these statistics can be used to carry out either a one-tailed test or a two-tailed test. Once a t value is determined, a p-value can be found using a table of values from Student's t-distribution. If the calculated p-value is below the threshold chosen for statistical significance (usually the 0.10, the 0.05, or 0.01 level), then the null hypothesis is rejected in favour of the alternative hypothesis. P-value $\leq$ 0.05 was considered for statistically significant.

RESULTS

Our study showed that in mild dyspnea 12 score, 16(57.1%) patients had reticular pattern HRCT. In moderate dyspnea 12 score, 6(60.0%) patients had reticular pattern HRCT. In severe dyspnea 12 score, 11(91.7%) patients had reticular pattern HRCT. Association of reticular pattern HRCT vs. dyspnea 12 score was not statistically significant ($p=0.0972$)

We also found that in mild dyspnea 12 score, 5(17.9%) patients had consolidation HRCT. In moderate dyspnea 12 score, 3(30.0%) patients had consolidation HRCT. In severe dyspnea 12 score, 2(16.7%) patients had consolidation HRCT. Association of consolidation in HRCT vs. dyspnea 12 score was not statistically significant ($p=0.6741$). In mild dyspnea 12 score, 8(28.6%) patients had ground glass HRCT. In moderate dyspnea 12 score, 4(40.0%) patients had ground glass HRCT. In severe dyspnea 12 score, 3(25.0%) patients had ground glass HRCT. Association of ground glass appearance in HRCT vs. dyspnea 12 score was not statistically significant ($p=0.7239$).

Our study showed that in mild dyspnea 12 score, 9(32.1%) patients had nodular pattern HRCT. In moderate dyspnea 12 score, 1(10.0%) patients had nodular pattern HRCT. In severe dyspnea 12 score, 4(33.3%) patients had nodular pattern HRCT. Association of nodular pattern in HRCT vs. dyspnea 12 score was not statistically significant ($p=0.3652$).

We found that in mild dyspnea 12 score, 12(42.9%) patients had traction bronchiectasis HRCT. In moderate dyspnea 12 score, 6(60.0%) patients had traction bronchiectasis HRCT. In severe dyspnea 12 score, 11(91.7%) patients had traction bronchiectasis HRCT. Association of traction Bronchiectasis in HRCT vs. dyspnea 12 score was statistically significant ($p=0.0163$).

Also we observed that in mild dyspnea 12 score, 9(32.1%) patients had honey combing HRCT. In moderate dyspnea 12 score, 5(50.0%) patients had honey combing HRCT. In severe dyspnea 12 score, 11(91.7%) patients had honey combing HRCT. Association of honey combing HRCT vs. dyspnea 12 score was statistically significant ($p=0.0026$).

DISCUSSION

DIFFUSE PARENCHYMAL LUNG DISEASES are the group of disorders those presents with progressive dyspnea, dry cough, and chest discomfort. In our study we have taken dyspnea 12 score as a measure of perceived dyspnea. It has been graded as MILD (10-20), MODERATE (20-30), AND SEVERE (>30) based on patients perception of dyspnea. HRCT is a very essential tool for diagnosis and categorising DPLDS. HRCT has been done for all the patients. Association between dyspnea 12 score and HRCT findings has been made.⁴

- IN our study 15(30.0%) patients had GROUND GLASS HRCT. 33(66.0%) patients had RETICULAR PATTERN in HRCT. 10(20.0%) patients had CONSOLIDATION in HRCT. 25(50.0%) patients HAD HONEY COMBING HRCT. 14(28.0%) patients had NODULAR pattern HRCT. 29(58.0%) patients had TRACTION BRONCHIECTASIS HRCT.
- A STUDY by HUSSAIN et al⁵ showed The largest subsets of patients were found in the 51-60 age groups. Fibrotic pattern was the most common pattern in this study (50%) followed by ground glassing (44%). Nodular pattern was the least predominant pattern (6%).

Air Trapping

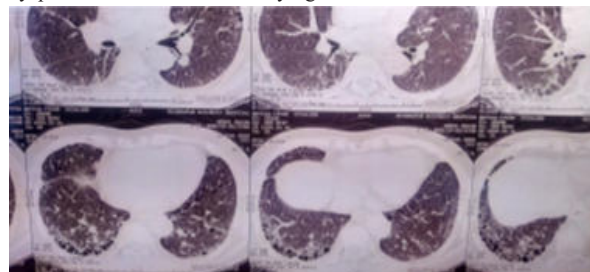
A Study by STAPLES AND MULLER⁶ et al showed Correlation between disease extent on computed tomographic (CT) scans and severity of clinical and functional impairment was obtained in 23 patients with usual interstitial pneumonia (UIP) by review of the clinical data, RESPIRATORY function tests, chest radiographs, and CT scans. The CT scans and chest radiographs were each read twice by two independent observers. Disease extent was assessed on CT scans by a visual score (0%-100% involvement of the lung parenchyma) and on the radiograph by the International Labor Office classification. There was good intra observer and inter observer agreement for both CT and radiograph scores (all r greater than or equal to .71). CT scans gave a better estimate of disease extent and showed more extensive honeycombing than did the radiograph. A significant correlation was found between the extent of disease as assessed with CT and the

severity of dyspnea ($r = .62$, P less than .001), as well as between CT and impairment in gas exchange.

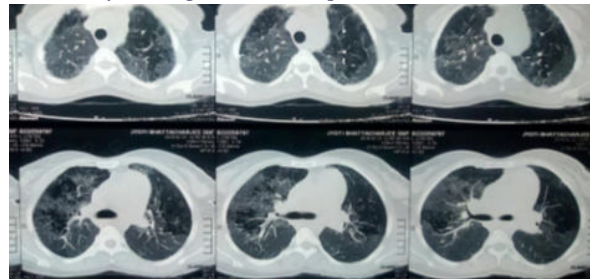
In our study Association between Reticular pattern, Ground glass appearance, Consolidation in HRCT with dyspnea 12 score was not statistically significant

In our study Association of honey combing in HRCT with dyspnea 12 score was statistically significant

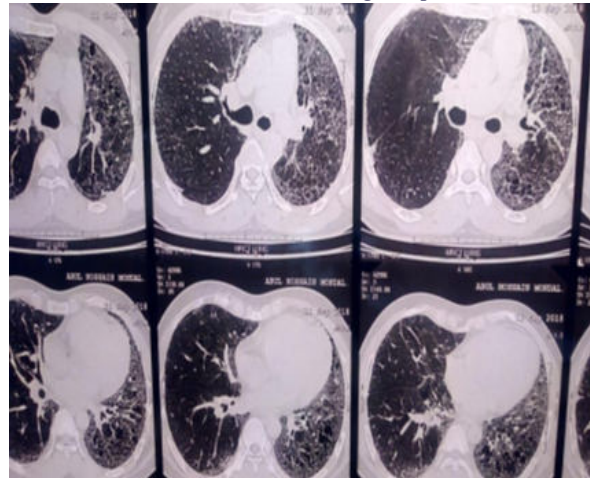
In our study Association of traction bronchiectasis in HRCT with dyspnea 12 score was statistically significant



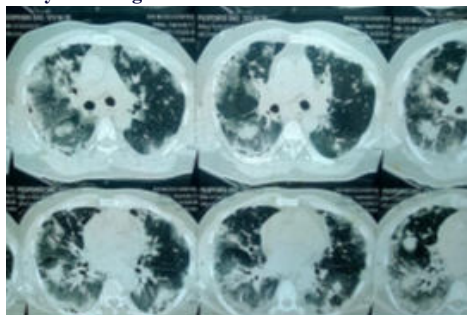
Hrct Thorax Showing B/I Basal Reticular Shadows With Fibrosis With Honeycombing In A Case Of Dpld



HRCT Thorax Shows Bilateral Ground glass opacities



D Glass Opacities With Bilateral Hrct Thorax Showing Left Sided Reticulo Nodular Shadow With Trction Bronchiectasis With Ggo With Honey Combing



Hrct Thorax Showing B/I Ggo With Patchy Consolidation In A Case Of Organising Pneumonia

Table: Distribution of all parameters: DYSPNEA 12 SCORE

		Mild	Moderate	Severe	TOTAL
RETICULAR PATTERN HRCT	NO	12	4	1	17
	Row %	70.6	23.5	5.9	100.0
	Col %	42.9	40.0	8.3	34.0
	YES	16	6	11	33
	Row %	48.5	18.2	33.3	100.0
	Col %	57.1	60.0	91.7	66.0
	TOTAL	28	10	12	50
	Row %	56.0	20.0	24.0	100.0
	Col %	100.0	100.0	100.0	100.0
CONSOLIDATION in HRCT	NO	23	7	10	40
	Row %	57.5	17.5	25.0	100.0
	Col %	82.1	70.0	83.3	80.0
	YES	5	3	2	10
	Row %	50.0	30.0	20.0	100.0
	Col %	17.9	30.0	16.7	20.0
	TOTAL	28	10	12	50
	Row %	56.0	20.0	24.0	100.0
	Col %	100.0	100.0	100.0	100.0
GROUND GLASS APPEARANCE HRCT	NO	20	6	9	35
	Row %	57.1	17.1	25.7	100.0
	Col %	71.4	60.0	75.0	70.0
	YES	8	4	3	15
	Row %	53.3	26.7	20.0	100.0
	Col %	28.6	40.0	25.0	30.0
	TOTAL	28	10	12	50
	Row %	56.0	20.0	24.0	100.0
	Col %	100.0	100.0	100.0	100.0
NODULAR PATTERN in HRCT	NO	19	9	8	36
	Row %	52.8	25.0	22.2	100.0
	Col %	67.9	90.0	66.7	72.0
	YES	9	1	4	14
	Row %	64.3	7.1	28.6	100.0
	Col %	32.1	10.0	33.3	28.0
	TOTAL	28	10	12	50
	Row %	56.0	20.0	24.0	100.0
	Col %	100.0	100.0	100.0	100.0
TRACTION BRONCHIECTASIS HRCT	NO	16	4	1	21
	Row %	76.2	19.0	4.8	100.0
	Col %	57.1	40.0	8.3	42.0
	YES	12	6	11	29
	Row %	41.4	20.7	37.9	100.0
	Col %	42.9	60.0	91.7	58.0
	TOTAL	28	10	12	50
	Row %	56.0	20.0	24.0	100.0
	Col %	100.0	100.0	100.0	100.0
HONEY COMBING HRCT	NO	19	5	1	25
	Row %	76.0	20.0	4.0	100.0
	Col %	67.9	50.0	8.3	50.0
	YES	9	5	11	25
	Row %	36.0	20.0	44.0	100.0
	Col %	32.1	50.0	91.7	50.0
	TOTAL	28	10	12	50
	Row %	56.0	20.0	24.0	100.0
	Col %	100.0	100.0	100.0	100.0

CONCLUSION

Dyspnea 12 score has positive correlation with honeycombing and traction bronchiectasis on HRCT.

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