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Original Research Article

A study on asthma and chronic obstructive pulmonary disease overlaps among patients with obstructive airway diseases

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ABSTRACT

Introduction: There is a need to re-evaluate the concept of asthma and chronic obstructive pulmonary disease (COPD) as separate conditions, and to consider situations when they may coexist, or when one condition may evolve into the other.

Materials and Methods: This is prospective, observational and descriptive study conducted at MNR Medical College and Hospital, Sangareddy, India from June 2020 to December 2020 among chronic airway diseases who were classified into three groups (COPD, Asthma, and Asthma and COPD overlap (ACO)). Patients with COPD and ACO were diagnosed according to GOLD guidelines 2020 and patients with asthma were diagnosed according to Global Initiative for Asthma (GINA) guidelines 2020.

Results: Regarding the age difference between groups, it was found that patients who were diagnosed as having COPD and ACO were with mean age of 57.23±8.54 and 56.26±7.73 years, respectively. The men age of patients of Asthma was 57.51±8.43. In our study, 28 (30%) patients as having COPD, 39 (45.5%) patients were diagnosed as having ACO, 23 (24.4%) patients were diagnosed as having asthma. In our study comparison of groups regarding history of atopy. We found that 71.7% of ACO group, 78.2% of asthma group and 25% of COPD group had a positive history of atopy. Comparison of study groups regarding sputum eosinophils revealed that 30.7 % of ACO group, 73.9% of asthma group and 32.1% of COPD group had positive sputum eosinophils.

Conclusions: ACO represents a large percentage among patients with obstructive airway diseases. It shares some features of asthma such as atopy and positive sputum eosinophilia, and some features of COPD like old age of presentation and positive smoking history.

1. Introduction

Asthma with incompletely reversible obstacle of airflow – that, relies upon adjustment in first expiratory volume (FEV_1) with bronchodilators – with or without emphysema or diminished carbon monoxide diffusing capacity (DLCO) to <80% anticipated.[1] Chronic obstructive pulmonary disease (COPD) with emphysema joined by somewhat reversible or reversible airflow obstruction, with or without natural hypersensitivities or diminished DLCO.[2]

In clinical practice, isolating asthma from COPD is troublesome as a result of the corresponding characters regularly to the two infections. Existing guideline for asthma, like to the National Asthma Education and Prevention Program, NIH, Expert Panel Report 3, and COPD, as both Global Initiative for Chronic Obstructive Lung Disease (GOLD) treatment rules and the understanding enunciation by the American College of Chest Physicians, American College of Physicians, American Thoracic Society (ATS) and European Respiratory Society, also don't totally get the heterogeneity of asthma and COPD, including chronic obstructive pneumonic disease overlap syndrome (ACOS),

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nor do they plan clinicians for the variable reactions to pharmacotherapies, especially the issues of corticosteroid resistance.[3–7]

All classification plans are best clinical because of nonappearance of demonstrative biomarkers. For finding, two critical criteria (FEV1 >15% and >400 ml after bronchodilator or sputum eosinophils or history of asthma) and two minor standards (increased IgE or history of atopy or FEV1 >12% and >200 ml after bronchodilator) are proposed.[8]

ACO prevalence has shifted broadly in investigations: from 0.9% to 11.1% in everybody, from 11.1% to 61.0% in asthma patients, and from 4.2% to 66.0% in COPD patients. ACOS commonness was considerably higher in extreme asthma centers contrasted and general pneumonic facilities (24.3 versus 15.8%). Among patients alluded explicitly for hard to-control (or serious) asthma, 24.3% had 'corresponding COPD', which best fit proposed ACOS definition.[9]

2. Materials and Methods

This is prospective, observational and descriptive study conducted at MNR Medical College and Hospital, Sangareddy from June 2020 to December 2020 among chronic airway diseases who were classified into three groups (COPD, asthma and ACO). Approval letter obtained from IEC. Patients with COPD and ACO were diagnosed according to GOLD guidelines 2020[4] and patients with asthma were diagnosed according to Global Initiative for Asthma (GINA) guidelines 2020.[6]

2.1. Inclusion criteria

Patients of either gender between ages above 40 years, Patient willing to give informed written consent.

2.2. Exclusion criteria

Restrictive lung disease, bronchiectasis, COPD exacerbation and vocal cord dysfunction.

2.3. Methodology

All patients are subjected to full history taking, clinical examination, full laboratory examinations, chest radiography, spirometry and post bronchodilator reversibility test was performed and sputum analysis, where induction of sputum by hypertonic saline or mannitol is done by a trained staff with strict airborne respiratory precautions. The procedure should be stopped when the patient has produced 5–10 ml of sputum, about 15 min of nebulization is reached. The patient complained of dyspnoea, chest tightness or wheeze. Sputum processing and staining and count were done with assessment of sputum eosinophils.[10]

2.4. Statistical analysis

The Statistical Package for the Social Sciences (SPSS) Software version 25 was used for analysing the data. The data collected were analysed using relevant descriptive and analytical statistical techniques. Descriptive statistics such as percentage, mean, and standard deviation were used. $P < 0.05$ was taken as statistically significant.

3. Results

This study was conducted on 90 patients with chronic airway diseases (COPD, asthma and asthma COPD overlap) were selected. It included 59 (65.5%) males and 31(34.4%) females [Table 1].

In Table 2, regarding the age difference between groups, it was found that patients who were diagnosed as having COPD and ACO were with mean age of 57.23±8.54 and 56.26±7.73 years, respectively. The men age of patients of Asthma was 57.51±8.43.

ACO=asthma chronic obstructive pulmonary disease overlap; COPD=chronic obstructive pulmonary disease.

InTable 3 , in our study, 28 (30%) patients as having COPD, 39 (45.5%) patients were diagnosed as having ACO, 23 (24.4%) patients were diagnosed as having asthma.

In Table 4, in our study comparison of groups regarding history of atopy. We found that 71.7% of ACO group, 78.2% of asthma group and 25% of COPD group had a positive history of atopy.

InTable 5 , comparison of study groups regarding sputum eosinophils revealed that 30.7 % of ACO group, 73.9% of asthma group and 32.1% of COPD group had positive sputum eosinophils.

4. Discussion

This exploration was done to consider the outline of ACO and its rate among patients with obstructive aviation route infections and to evaluate sputum eosinophils in these patients. It was discovered that the pervasiveness of ACO changes among various distributed examinations, and this might be identified with the distinction in the contemplated populaces and contrasts in demonstrative measures.[10–12]

For assessment regarding ACO, the assessment of airway inflammation would be significant. Asthma is more eosinophilic, and COPD is normally more neutrophilic. Whereas, there is heterogeneity with each disorder and overlap between the two conditions. In spite of the fact that there are a few changes over time and in response of treatments, numerous patients show relative dependability in aggravation aggregates, recommending steady basic underlying molecular mechanisms. The development in in molecular technologies can possibly recognize subgroups inside ACO on a molecular level.[13]

To judge whether patients have asthma, it is important to prove that eosinophilic airway inflammation is not merely a

Table 1: Sex distribution among the study group

	Males	Females	Total
No. of patients	59	31	90
Percentage	65.5	34.4	100

Table 2: Age differences between the study groups

	COPD	ACO	Asthma
No. of patients	28	39	23
Mean±SD	57.23±8.54	56.26±7.73	57.51±8.43

Table 3: Classification of study groups based on final diagnosis

	COPD	ACO	Asthma	Total
No. of patients	28	39	23	90
Percentage	30	45.5	24.4	100

Table 4: Comparison of studied groups regarding history of atopy

Atopy	Diagnosis		
	COPD (N=28)	ACO (N=39)	Asthma (N=23)
No			
Count	21	11	5
% within diagnosis	75.0	28.2	21.7
Yes			
Count	7	28	18
% within diagnosis	25.0	71.7	78.2

Table 5: Comparison of study groups regarding sputum eosinophils

Sputum Eosinophils	Diagnosis		
	COPD (N=28)	ACO (N=39)	Asthma (N=23)
No			
Count	19	27	6
% within diagnosis	67.8	69.2	26.0
Yes			
Count	9	12	17
% within diagnosis	32.1	30.7	73.9

past occurrence but a continuing condition. It is suggested that eosinophilic airway inflammation is a key prognostic factor for patients with ACO and COPD. Kolsum U et al. compared the management for minimising eosinophilic airway inflammation with the treatment according to traditional guidelines. By reducing the sputum eosinophil count, the management strategy that aims to minimise eosinophilic airway inflammation was accompanying with a reduction in severe exacerbations of COPD.[14] Jindal SK et al. compared the clinical features of COPD patients with asthmatic symptoms with those of COPD patients without asthmatic symptoms. The peripheral eosinophil counts and sputum eosinophil counts were significantly higher in the COPD with asthma group, and the increases in FEV_1 in response to treatment with an inhaled corticosteroid were significantly higher in the COPD with asthma group.[15]

To decide whether patients have asthma, it is essential to demonstrate that eosinophilic airway inflammation is not only a previous occurrence however a proceeding with condition. It is proposed that eosinophilic airway inflammation is a main prognostic factor for patients with ACO and COPD. Kolsum U et al. revealed that management for minimising eosinophilic airway inflammation with the treatment as indicated by conventional guidelines.[14] By decreasing the sputum eosinophil check, the management system that aims to minimise eosinophilic airway inflammation was accompanying with a decrease in severe exacerbations of COPD.[15] Jindal SK et al. investigated about the clinical features of COPD patients with asthmatic symptoms with those of COPD patients without asthmatic symptoms.[16]

Baarnes CB et al. compared exacerbation rates according to baseline peripheral eosinophil cell count strata in COPD patients in a secondary analysis of data from two parallel randomized controlled trials.[17] As the peripheral eosinophil counts increase, a combined inhaled corticosteroid and

long-acting muscarinic antagonist reduced the frequency of exacerbations, in addition, increased FEV_1 in response to treatment with inhaled corticosteroid compared with long-acting muscarinic antagonist alone.[18] Furthermore, Chung WS et al. found that in the subgroup with a higher blood eosinophil concentration among COPD patients, the inhibition of exacerbation by triple therapy with an inhaled corticosteroid, long-acting β_2 agonist, and long-acting muscarinic antagonist was greater than that with long-acting muscarinic antagonist monotherapy in the double-blind, parallel group, randomised controlled trial.[19]

5. Conclusions

ACO addresses an enormous rate among patients with obstructive airway diseases. It shares a few highlights of asthma like atopy and positive sputum eosinophilia, and a few highlights of COPD like old age of shows and positive smoking history.

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8. Conflict of Interest

The authors declare they have no conflict of interest.

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