Chronic Obstructive Pulmonary Diseases and Co-morbidities : A Cross – sectional Study

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Abstract :

Introduction : COPD is currently the 4th leading cause of death in the world but is projected to be the 3rd leading cause of death by 2020 worldwide. It is 2nd leading cause of disease in India after heart disease. Comorbidities like gastrointestinal disorder, diabetes, hyperuricemia, mental disorders, osteoporosis, heart failure, hypertension, dyslipidemia are commonly seen in patients of COPD. Early diagnosis & proper management of patients of COPD is important to reduce morbidity & mortality because co morbidities have negative impact on COPD. **Materials & Method :** This hospital based cross-sectional study has been conducted over a period of 5 months in Respiratory Medicine department, L.G. Hospital. After detailed history & clinical examination, CAT score, mMRC score & SGRQ score & spirometry were done. Frequency of exacerbation in past one year and requirement of hospitalization was also recorded. The GOLD groups A to D were defined in accordance with GOLD 2019 recommendations. **Result :** 54% of the patients in present study were presented with comorbidities. Higher the GOLD categorization, more are the comorbidities. **Conclusion :** COPD patients are associated with significant comorbidities which cause significant physical & mental stress to COPD patients.

Key Words : Comorbidities, COPD, GOLD categorization

Introduction :

COPD is currently the 4th leading cause of death in the world but is projected to be the 3rd leading cause of death by 2020 worldwide.[1] It is 2nd leading cause of disease in India after heart disease.[2] Comorbidities like gastrointestinal disorder, diabetes, hyperuricemia, mental disorders, osteoporosis, heart failure, hypertension, dyslipidemia are commonly seen in patients of COPD & the presence of which impair overall prognosis of the disease. Early diagnosis & proper management of patients of COPD is important to reduce morbidity & mortality. Smoking has major impact on development of COPD & development of comorbidities. The additional knowledge gained about the association of comorbidities could prove to be valuable in management of COPD.

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Methods:

A hospital based cross-sectional study was conducted over a period of 5 months, spanning over April 2019 to August 2019, in the Respiratory Medicine department of L.G. Hospital. A total of 100 COPD patients, who were willing to participate in the study were included after detailed history and clinical examination. CAT(COPD Assessment Test) score & mMRC(modified Medical Research Council) scoring was done. Spirometry of the patients was done. Frequency of exacerbation in past one year and requirement of hospitalization was also recorded. The GOLD groups A to D were defined in accordance with GOLD 2019 recommendations.[1] Specific history for comorbidities like hypertension, dyslipidemia, diabetes, asthma, coronary artery disease, gastrointestinal disorder, heart failure, etc. was analyzed in detail. Quality of life of the patients was measured by SGRQ(St. George's Respiratory Questionnaire)score.

Inclusion criteria:

1. Patients more than 40 years of age.
2. Patients diagnosed as COPD according to GOLD 2019 criteria.
3. Patients with smoking history of more than 10 pack years.
4. Patients who were willing to participate in study.

Exclusion criteria:

1. Patients less than 40 years of age.
2. Patients with history of allergy/asthma.
3. Patients with smoking history of less than 10 pack years.
4. Patients who gave negative consent for the study.

Result:

100 male patients were enrolled in the present study. The mean age was 68.5 years(SD: 14). The distribution of COPD severity was: 6% in group A, 30% in group B, 24% in group C & 40% in group D.

As severity of disease increased, mean BMI of the patients decreased. Cachexia was more common in group C & D patients. (Table 1)

p-value for group D patients was 0.00254 which is significant at $p < 0.5$. So as the disease severity increases, cachexia increases.

As pack year history of smoking increased, mean FEV1% & mean FEV1/FVC was decreased & severity of disease increased, which is reflected by increase in GOLD categorization.

Mean pack year in group A was 13.5, in group B was 21.92, group C was 30.79 & group D was 42.88.Mean FEV1% in group A was 82%, in group B was 67.21%, group C was 47.75% & group D was 39.10%.Mean FEV1/FVC ratio in GOLD group A was 67.03, in

Figure 1: Distribution of patients according to severity of COPD in different groups

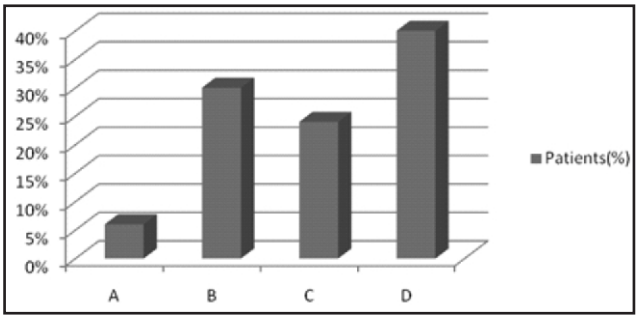

Table 1: Mean BMI of patients of various groups

GOLD grouping	Mean BMI (kg/m2)
A	25.58
B	20.46
C	18.49
D	17.33

Figure 2 : Correlation between GOLD grouping with different parameters.

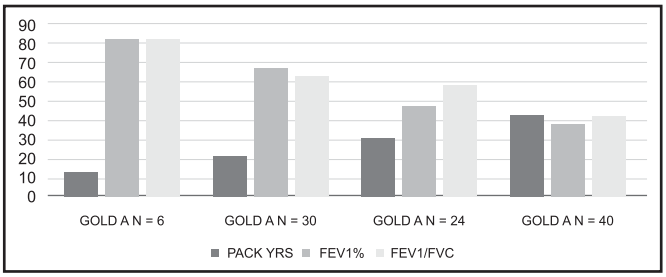

Table 2: Incidence of comorbidities in the GOLD groups

DISEASES	GOLD GROUP D	GOLD GROUP A+B+C
Diabetes	45%	23.33%
Hypertension	57.50%	25%
GERD	40%	8.33%
Dyslipidemia	38%	19%
Coronary Artery Disease	20.12%	4.5%
Psychiatric disorder	7.5%	1.66%

GOLD group B ratio was 63.33, in GOLD group C ratio was 58.2 & in GOLD group D ratio was 42.6. Patients of GOLD group D had severe obstruction on spirometry. p-value was 0.0425. This is statistically significant at $p<0.5$ (Figure 2)

46% of the patients in present study had comorbidities. 67.5% of group D, 45.83% of group C, 20% of group B & 33.33% of group A patients had comorbidities. In GOLD group D, 45% patients had diabetes, 57.50% patients had hypertension, 40% patients had GERD & 7.5% patients had psychiatric illness like depression, anxiety. Comorbidities were highest in patients of GOLD group D & it was even higher than comorbidities combined in GOLD group A, B & C. Two patients were diagnosed as having osteoporosis by DEXA scan, they belonged to GOLD group D. 3 patients having obstructive sleep apnea belonged to group B, OSA diagnosed in those patients by polysomnography. (Table 2)

Mean SGRQ in group A was 29.4 ± 5.1, group B was 35.8 ± 8.7, group C was 48.7 ± 10.5 and group D was 52.6 ±11.2. Patients' quality of life became poorer with increase in GOLD categorization.

Table 3: Comparative presence of comorbidities in the studies.

Study done	COPD				
	Without co-morbidity	Multiple comorbidities			
		GOLD A	GOLD B	GOLD C	GOLD D
Chantal Raherison et al.[3]	28.40%	35.4%	50.40%	34.30%	53.10%
Present Study	54%	16.66%	6.66%	37.50%	47.50%

Discussion:

In India smoking is not so common in females so all the patients were male in the present study as females did not meet the inclusion criteria.The mean age was 66.5 years (SD: 11) in a study of Chantal Raherison et al.[3] which is comparable to present study in which mean age was 68.5 years (SD: 14). A total of 1584 patients were taken into the study of Chantal Raherison et al & distribution of COPD severity in that study was: 27.4% in group group A, 24.7% in group B, 11.2% in group C & 36.6% in group D. In present study, out of 100 patients, the distribution of COPD severity was: 6% in group A, 30% in group B, 24% in group C & 40% in group D. In the study of Chantal Raherison et al, COPD patients without comorbidities were 28.40%, patients with multiple comorbidities in group A were 35.4%, in group B 50.40%, in group C 34.30% & in group D 53.10%. (Table 3)

In a study by Janine A. M. Westerik et al, [4] 89.1% of patients with COPD had comorbidies & 23.1% patients had more than 5 comorbidities. In present study, 54% of patients of COPD had no comorbidities; patients with multiple comorbidities in group A were 16.66%, in group B 6.66%, in group C 37.50% & in group D 47.50%. 6.42% patients had more than 5 comorbidities. In present study, average pack year of COPD patients was 27.27 ± 5.4 & the mean FEV1% was 59.01% ± 7.18 compared to a study by Rubiya Shaikh et al,[5] mean pack year was 31.04 ± 6.6 & mean FEV1% was 47.73% ± 8.13. A study of Mrinmoy Mitra et al[6] suggested that mean BMI of group A COPD subjects was 26.21, group B was 22.91, group C was 20.78, and group D was 15.71, which was comparable to present study in which mean BMI of group A was 25.58, group B was 20.46, group C was 18.49 & group D was 17.33.

Mean SGRQ score in a study by Samir Kumar Sarkar et al[7] group A was 27.7 ± 6.1, group B was 36.1 ± 10.7, group C was 50.5 ± 12.3 and group D was 57.7 ±10.1 which is comparable to present study in which SGRQ in group A was 29.4 ± 5.1, group B was 35.8 ± 8.7, group C was 48.7 ± 10.5 and group D was 52.6 ±11.2. From present study, we can say that comorbidities are associated with severity of diseases. COPD may increase the risk of development of comorbidities & presence of comorbidities leads to increased risk of exacerbation of COPD & hospital admission. Both leads to decrease in quality of life.

Conclusion:

COPD patients, who are associated with significant comorbidities have significant physical & mental stress. So one should have integrated approach for management of COPD & associated comorbidities for better management of the patients.

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