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Research Article

A STUDY OF MODIFIED DECAF SCORE IN PREDICTING HOSPITAL MORTALITY IN PATIENTS OF ACUTE EXACERBATIONS OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE AT PBM HOSPITAL, BIKANER

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ABSTRACT

Background- Hospitalisation due to acute exacerbations of COPD (AECOPD) is common, and subsequent mortality high. The modified DECAF score was derived for accurate prediction of mortality and risk stratification to inform patient care.

Methods- Hospital based descriptive type of observational study was conducted between July 2016 and June 2017. After applying inclusion and exclusion criterias, study population for Acute exacerbation of COPD was selected. Admission clinical data, including modified DECAF indices, and mortality were recorded.

Results- There were 74 cases who presented with dyspnea (eMRCD 0–4) with score 0, 25 cases presented with dyspnea (eMRCD 5a) with score 1 and 13 cases presented with dyspnea (eMRCD 5b) with score 2. In our study there was a statistically significant association (p=0.0001) between the Modified DECAF score and In Hospital mortality of Acute Exacerbation of COPD.

Conclusion-We concluded that the Modified DECAF score is a powerful score to predict in hospital mortality from AECOPD.

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a common, preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and/ or alveolar abnormalities usually caused by significant exposure to noxious particles or gases[1]. Exacerbation and co-morbidities contribute to the overall morbidity and mortality in individual patient.

Chronic obstructive pulmonary disease (COPD) is a multisystem condition defined as "a preventable and treatable disease with some significant extra-pulmonary effects that may contribute to the severity in individual patients." Its pulmonary component is characterized by airflow obstruction that is usually progressive and not fully reversible. In the western world, COPD is typically caused by long-term exposure to tobacco smoke[1].

The Modified DECAF score is more sensitive and specific in predicting in-hospital mortality in AECOPD than the DECAF score[2]

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Table 1 Modified DECAF score

Variable	Points
Dyspnea limiting the patient to home (MRCD 5) and Independent in bathing and/or dressing (eMRCD 5a)	1
Requires assistance with bathing and dressing (eMRCD 5b)	2
Eosinopenia (<0.05X10^9/L)	1
Consolidation (on chest X-ray)	1
Acidemia (pH<7.30)	1
Frequency of admission	1
Total score	6

MATERIALS AND METHODS

Study Area: The study was undertaken in Department of Pulmonary medicine, S.P. Medical College, Bikaner.

Study Design: Hospital based descriptive type of observational study.

Study Universe: Patients attending OPD and Emergency department, Department of pulmonary medicine with Acute Exacerbation of COPD.

Sample Size: 112 Patients

Sample size is calculated at 95% confidence level assuming Standard deviation (SD) of 1.62 in Modified DECAF score as per reference study.[3] At the precision of 0.3 in Modified DECAF score, minimum 112 cases of AECOPD were required.

Inclusion Criteria

- Patient who were previously diagnosed COPD (as per GOLD Guidelines) and had Acute Exacerbation at the time of admission.
- Those giving informed consent.

Exclusion Criteria

- Primary reason for admission other than Acute Exacerbation of COPD
- Patients presenting with Myocardial Infarction
- Unstable cardiovascular status, unstable angina
- Past or present history of tuberculosis
- Pneumothorax
- Malignancy
- Septic Shock

Statistical analysis

Data were entered in MS Excel sheet and were subjected for statistical analysis. The quantitative data were expressed as proportion and percentages. The difference in proportion was analysed using Chi-Square test. The significance level for tests were determined as 95% (P<0.05). MED CALCI 12.2.1.0 Version software was used for statistical calculation.

RESULTS

The profile of study population shows that, maximum patients 54(48.21%) were from 61-75 Yrs age group, 23(20.53%) patients were from more than 75Yrs, 33(29.46%) patients were from 46-60Yrs age group and 2(1.79%) patients were from 30-45 Yrs age group. 93(83.04%) patients were male and 19(16.96%) patients were female.

Table 1 Distribution of the studied cases according to Modified DECAF score (n=112)

Modified DECAF score		No. of patients	Percentage (%)
eMRCD score	0	74	66.07
	1	25	22.32
	2	13	11.60
Eosinopenia	0	93	83.04
	1	19	16.96
Consolidation	0	57	50.89
	1	55	49.11
Acidemia	0	90	80.38
	1	22	19.62
Frequency of admission	0	74	66.07
	1	38	33.93
Mean score =1.65		SD=1.35	

There were 74 cases who presented with dyspnea (eMRCD 0–4) with score 0, 25 cases presented with dyspnea (eMRCD 5a) with score 1 and 13 cases presented with dyspnea (eMRCD 5b) with score 2.There were 93 cases whose eosinophil count was $>0.05 \times 10^9$/L with score 0 and for 19 cases their eosinophil count was $<0.05 \times 10^9$/L with score 1.There were 57 cases whose X-ray did not show consolidation with score 0 and in 55 cases their X-ray showed consolidation with score 1.There were 22 cases in our study with their ABG (Arterial Blood Gas sample) showing Acidemia (pH < 7.30) with score 1 while the remaining cases were (pH > 7.30) with score 0.There were 74 cases who had past history with less than 2 times of previous admission in the last year by Acute Exacerbation of COPD with score 0. There were 38 cases who had past history with more than or equal to 2 times of admission in the last year with score 1.

Table 2 Relationship between mortality and Modified DECAF score

Modified DECAF score		Mortality present (n=12)	Mortality absent (n=100)	Chi-square	p-value
eMRCD score	0	3(4.05%)	71(95.95%)	22.34	0.0007
	1	4(16%)	21(84%)		
	2	5(38.46%)	8(61.54%)		
Eosinopenia	0	11(11.83%)	82(88.17%)	6.54	0.22
	1	1(5.26%)	18(94.74%)		
Consolidation	0	2(3.51%)	55(96.49%)	11.2	0.014
	1	10(18.18%)	45(81.72%)		
Acidemia	0	3(3.33%)	87(96.66%)	14.3	0.0001
	1	9(40.91%)	13(59.09%)		
Frequency of admission	*0*	3(4.05%)	71(95.95%)	14.98	0.002
	1	9(23.68%)	29(66.32%)		

In our study there was a statistically significant value ($p = 0.0007$) between grade of dyspnea in the Modified DECAF score and in-hospital mortality of Acute Exacerbation of COPD. There was also, a statistically significant value ($p = 0.014$) between the presence of consolidation in X-ray of cases and in-hospital mortality of eCOPD. There was a significant value ($p = 0.0001$) between respiratory acidosis (pH < 7.30) which was present in the ABG of some cases and in-hospital mortality rate and also statistically significant value ($p = 0.002$) between frequency of admission and in the Modified DECAF score. There was insignificant relationship (p value = 0.22) between Eosinopenia and in hospital mortality.

Table 3 Relationship between severity and Modified DECAF score

Modified DECAF score		Mild (n=46)	Moderate (n=51)	Severe (n=15)	Chi-square	p-value
eMRCD score	0	45(60.80%)	25(33.78%)	4(5.41%)	12.34	0.0001
	1	1(4.00%)	22(88.00%)	2(8.00%)		
	2	0(0.00%)	4(30.77%)	9(69.23%)		
Eosinopenia	0	46(49.46%)	40(43.01%)	7(7.53%)	12.3	0.0001
	1	0(0%)	11(57.89%)	8(42.11%)		
Consolidation	0	36(63.16%)	15(26.32%)	6(10.53%)	9.35	0.014
	1	10(18.18%)	36(65.45%)	9(16.36%)		
Acidemia	0	44(48.89%)	44(48.89%)	2(2.22%)	11.8	0.0001
	1	2(9.09%)	7(31.82%)	13(59.09%)		
Frequency of admission	*0*	40(54.05%)	33(44.59%)	1(1.35%)	11.2	0.0001
	1	6(15.79%)	18(43.37%)	14(36.84%)		

In our study there was a statistically significant association between all predictors of the Modified DECAF score (statistically significant p < 0.05) and severity of Acute Exacerbation of COPD present. There is statistically significant p value between eMRCD score (0.0001), *Eosinopenia (0.0001), Consolidation (0.014), Acidemia (0.0001) and* Frequency of admission (0.0001) found.

DISCUSSION

The present study was undertaken to Study the Modified DECAF Score In Predicting Hospital mortality in patients of Acute Exacerbations of Chronic Obstructive Pulmonary Disease at tertiary care hospital in Western Rajasthan, in the Department of Pulmonary medicine, Sardar Patel Medical College, Bikaner.

In this Hospital based descriptive type of observational study 112 Patients attending OPD and Emergency department of Department of Pulmonary medicine with Acute Exacerbation

of COPD were studied. Patients who were previously diagnosed COPD (as per GOLD Guidelines) and had Acute Exacerbation at the time of admission were included in the study with informed consent. Patients with Primary reason for admission other than Acute Exacerbation of COPD, Patients presenting with Myocardial Infarction, Unstable cardiovascular status, unstable angina, past or present history of tuberculosis, Pneumothorax, Malignancy and Septic Shock were excluded.

In present study there was a statistically significant value ($p = 0.0007$) between grade of dyspnea in the Modified DECAF score and in-hospital mortality of Acute Exacerbation of COPD. There was also, a statistically significant value ($p = 0.014$) between the presence of consolidation in X-ray of cases and in-hospital mortality of AECOPD. There was a significant value ($p = 0.0001$) between respiratory acidosis (pH < 7.30) which was present in the ABG of some cases and in-hospital mortality rate and also statistically significant value ($p = 0.002$) between frequency of admission and in the Modified DECAF score. There was insignificant relation between Eosinopenia and in hospital mortality (p=0.22).

M H zidan *et al* (2015)[3] found that there was a statistically significant value (p= 0.001) between grade of dyspnea in the DECAF score and in-hospital mortality of Acute Exacerbation of COPD. There was also, a statistically significant value (p = 0.030) between the presence of consolidation in X-ray of cases and in-hospital mortality of AECOPD. There was a significant value (p < 0.001) between respiratory acidosis (pH< 7.30) which was present in the ABG of some cases and in-hospital mortality rate There were statistically significant values (p <0.001) between the frequency of admission and in-hospital mortality due to AECOPD.

In present study we observed a significant relationship (p<0.001) between Modified DECAF score and mortality due to AECOPD. There was 2.17% Mortality in Mild (Modified DECAF score 0-1), 7.84% mortality in Moderate (Modified DECAF score 2) and 46.6% mortality in severe (Modified DECAF score 3-6).

Ramadan Nafae *et al*. (2015)[4] studied that in-hospital mortality rates according to each grade of the DECAF score with relevant sensitivity and specificity: DECAF 0–1 ('low risk'; inhospital mortality = 3.37%); DECAF 2 ('moderate risk'; mortality = 7.7%); and DECAF 3–6 ('high risk'; mortality = 37%). This was in line with our study.

C E chevarria (2016)[5] *et al* also found significant relationship (p<0.0001) between in-hospital mortality and DECAF score.They found: DECAF 0–1 ('low score; in-hospital mortality = 1.5%); DECAF 2 ('Intermediate score'; mortality = 5.4%); and DECAF 3–6 ('high score'; mortality = 21%).

John Steer *et al*. (2012)[6] found that the significant values ($p < 0.001$) between the Modified DECAF score and mortality due to AECOPD. The Modified DECAF score is more sensitive and more specific in predicting in-hospital mortality in Acute Exacerbation of COPD.

CONCLUSION

We concluded that the Modified DECAF score is a powerful score to predict in hospital mortality from AECOPD.

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