

UTILITY OF THE DECAF SCORE IN PREDICTING IN HOSPITAL OUTCOME IN PATIENTS WITH ACUTE EXACERBATION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN A TERTIARY CARE HOSPITAL OF SOUTHERN INDIA

Ravi Chethan Kumar A. N¹, Sreerashmi Sasikumar²

¹Assistant Professor, Department of General Medicine, Mysore Medical College and Research Institute, Mysuru.

²Postgraduate Student, Department of General Medicine, Mysore Medical College and Research Institute, Mysuru.

ABSTRACT

BACKGROUND

Acute exacerbation of chronic obstructive pulmonary disease being an all too common cause for hospital admissions Worldwide poses a logistical stress for the treating physicians and hospital administration with regards to morbidity and mortality rates. Identifying upon admission those at higher risk of dying in-hospital could be useful for triaging patients to the appropriate level of care, determining the aggressiveness of therapies and timing safe discharges.

The aim of this study was to evaluate the utilisation of the DECAF score in predicting in hospital outcome in patients with acute exacerbation of chronic obstructive pulmonary disease (AECOPD) in a Tertiary Care Hospital of Southern India.

MATERIALS AND METHODS

Patients admitted with COPD exacerbations in K.R. Hospital, Mysore Medical College And Research Institute, Mysuru in between the May 2017 and July 2017 were taken as study subjects. A total of 80 patients were taken into the study. The duration of hospital stay, ICU admission and deaths were noted. DECAF score is applied to all study subjects and the severity of AECOPD is graded at the time of admission. The data collected and compiled were then analysed for the correlation between score and subsequent management and overall outcome.

RESULTS

Total of 80 patients were recruited in the study. Mean age for male was 66.47, female was 70.86. Length of hospital stay was more in patients with decaf score more than 3 (average hospital stay 10 days). Patients with DECAF score of 2, 70.4% required inhalations oxygen, remaining 29.6% were managed with only bronchodilators whereas patients with DECAF score of 5 (max score in our study group) there was a 100% initiation of assisted ventilation 33.3% received NIV ventilation while 66.6% required endotracheal intubation with ventilator support. In present study, 85 percent patients were survived. Total 6 patients (7.5%) had died, belonging to high risk DECAF group (score 3 to 6).

CONCLUSION

The DECAF score can easily be incorporated at the time of admissions for acute exacerbations of COPD, and can be used as a reliable tool to guide the management and in deciding the time of discharges appropriately.

KEYWORDS

AECOPD, Chronic Obstructive Pulmonary Disease, BODE, Dyspnoea, Eosinopenia, Consolidation and Acidemia.

HOW TO CITE THIS ARTICLE: Kumar ANRC, Sasikumar S. Utility of the decaf score in predicting in-hospital outcome in patients with acute exacerbation of chronic obstructive pulmonary disease in a tertiary care hospital of southern India. *J. Evid. Based Med. Healthc.* 2017; 4(72), 4261-4264. DOI: 10.18410/jebmh/2017/848

BACKGROUND

Chronic Obstructive Pulmonary Disease (COPD) is a leading cause of morbidity and mortality worldwide.¹ According to the World Health Organization approximately 65 million people are living with moderate to severe COPD. India and China constitute 33% of the total human population and

Financial or Other, Competing Interest: None.

Submission 26-08-2017, Peer Review 30-08-2017,

Acceptance 03-09-2017, Published 05-09-2017.

Corresponding Author:

Dr. Sreerashmi Sasikumar,

Postgraduate Student,

Department of General Medicine,

Mysore Medical College and Research Institute, Mysuru-570001.

E-mail: dravichethankumar@gmail.com

DOI: 10.18410/jebmh/2017/848



account for 66% of the global COPD mortality.^{2,3} Further, it has been estimated that COPD associated mortality is likely to grow by 160% in the Southeast Asian region in the coming decades.

Acute Exacerbations of Chronic Obstructive Pulmonary Disease (AECOPD) is defined as "An acute worsening of respiratory symptoms that result in additional therapy".⁴ Acute Exacerbation of COPD (AECOPD) is common cause for hospital admission in COPD patients. AECOPD causes negative impact on hospital stay, treatment, readmission and diseases progression.^{4,5,6} In stable COPD, prognostic indices have been thoroughly investigated and tools predicting mortality risk, such as the BODE Score, are well established.⁷ However, prognostic research in exacerbations requiring hospitalisation has been limited.

The DECAF SCORE (Dyspnoea, Eosinopenia, Consolidation, Acidaemia, and atrial Fibrillation score) is a severity scoring system applied to patients of AECOPD. (DECAF) score was first introduced by Steer et al.⁸ DECAF showed strong performance and good correlation with clinical outcome in majority of studies.^{8,9,10} The present study conducted to study the utilisation of DECAF score in predicting in hospital outcome in patients with acute exacerbation of chronic obstructive pulmonary disease.

MATERIALS AND METHODS

Patients admitted in K.R Hospital with AECOPD were recruited between the May 2017 and July 2017. Approval was granted by the Ethical Committee of Mysore Medical College and Research Institute. A pretested proforma meeting the objective of the study was prepared for collection of data. The subjects of the study are selected in accordance with inclusion and exclusion criteria, the purpose of the study is explained to the patients and informed consent is obtained.

Inclusion criteria encompassed known cases of COPD patients with acute exacerbation, patients with clinically probable indicators of COPD with acute exacerbation, patients who meets the GOLD criteria for diagnosis of COPD with exacerbation. Patients who were excluded from the study were patients with known case of asthma, COPD patients with ischemic heart disease, patients with neuromuscular disease, patients with restrictive lung disease.

Data Collection- Data is collected through a preformed proforma from each patient. Consent of the patient and or guardian was taken. Qualifying patients were subjected for a detailed history, clinical examination and relevant biochemical investigations. A thorough clinical examination was carried out with particular reference to vital parameters, respiratory system, cardiovascular system and other parameters as per prescribed proforma. DECAF score was applied to all study subjects and the severity of AECOPD is graded at the time of admission. Dyspnoea was graded according to the extended Medical Research Council Score (eMRC), patients unable to leave the house without assistance due to breathlessness were divided into eMRC 5a and 5b based on ability to wash and undress independently and the inability to do so respectively. Where necessary, blood was collected on admission for arterial blood gas analysis. Atrial fibrillation was confirmed with ECG, consolidation was noted from chest X-ray. Complete blood picture was noted for presence of eosinopenia. Patients managed according to their condition and current hospital protocols. For in-hospital outcome, the total duration of hospital stay, need of assisted ventilation and in hospital deaths were noted. Once patient was recovered from acute exacerbation patient has been discharged from hospital with maintenance therapy for COPD. Discharge of patient has been considered as positive outcome in our study.

DECAF Score.⁹

DECAF (Table 1) has 5 variables (Baseline dyspnoea eMRC 5a or 5b, Eosinopenia ($<0.05 \times 10^3$ L), μ / Consolidation, Acidemia, Atrial fibrillation). Maximum score is six. Based on scoring AECOPD patients are divided into Low risk (0-1 point), Intermediate risk (2 points) and High risk (3-6 points).

Statistical Methods- This is a prospective observational descriptive intention to treat study of patients of COPD admitted in KR Hospital, Mysore Medical College and Research Institute, Mysore from May 2017 to July 2017.

Statistical analysis was done with uni-variate analysis of imputed data. Standard deviations, mean and various frequency and percentages were calculated for each of the components of DECAF score. Chi square was contemplated for each.

RESULTS

Total 80 patients were recruited and entered in the study. Mean age of males was 66.5 years whereas mean age for females was 70.9 years (Table 2). Age distribution of our study population is given in Table 3. A majority of patients 33.8% had a total DECAF score of 2 points while the maximum DECAF score was 5 points which was seen in only 3.8% of subjects. Overall 58.8% of patients had eMRC score of 5b. Eosinopenia was seen in only 12 subjects (15%). Evidence of consolidation was seen in 32 subjects (40%). Only 16 patients had acidaemia (20%) and 8 patients had atrial fibrillation (10%). Out of eighty patients six patients are withdrawn from the study.

The need for invasive ventilation raised linearly with the DECAF score as well as the in-hospital deaths. Majority of patients with DECAF score of 1 were managed with bronchodilators and discharged after a mean of 3 days. Of the 33.8% of patients with DECAF score of 2 70.4% required inhalations oxygen, remaining 29.6% were managed with only bronchodilators, average hospital stay was 6 days. Patients with DECAF score of 3 had an average hospital stay of 10 days with 66.7% requiring inhalational oxygen and remaining 33.3% required NIV ventilation. Whereas patients with DECAF score of 4 or more had an average of 15 days hospital stay. The length of hospital increases with increase in decaf score (Figure 1). 46.2% of patients with DECAF score of 4 died, whereas only 38.5% were discharged for the same score, Of the total 16.3% of patients with DECAF score of 4, 15.8% required inhalational oxygen while 53.8% required NIV ventilation and remaining 30.8% required mechanical ventilation following intubation (Table 4). Of the 3.8% of patients with DECAF score of 5 (max score in our study group) there was a 100% initiation of assisted ventilation 33.3% received NIV ventilation while 66.6% required endotracheal intubation with ventilator support. In present study 85 percent patients were survived. Total 6 patients (7.5%) had died, belonging to high risk DECAF group (Score 3 to 6) (Table 5). Patients who are in low and moderate risk group had good outcome.

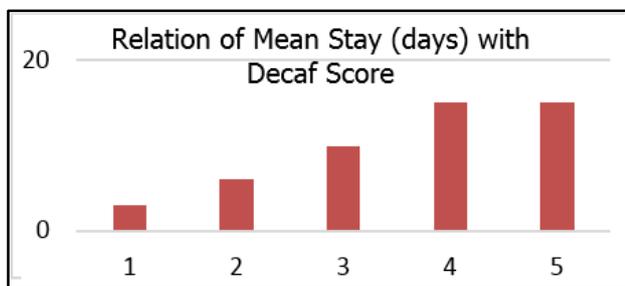


Figure 1. Relation of Hospital stay with DECAF Score

	Variables	Score
D	eMRCD 5a	1
	eMRCD 5b	2
E	Eosinopenia (<0.05 X 10 ⁹ /L)	1
C	Consolidation	1
A	Acidaemia (pH <7.30)	1
F	Atrial Fibrillation	1

Table 1. Decaf Score

Gender	Number	Mean	Std. Deviation
Male	73	66.4658	10.83344
Female	7	70.8571	8.45436
Total	80	66.8500	10.67483

Table 2. Distribution of Gender among Patients with AECOPD

Age	Number	Percentage
Less than 50	8	10
51-60	18	22.5
61-70	25	31.2
70-80	23	28.8
More than 80	6	7.5

Table 3. Age Distribution among AECOPD Patients

Crosstab Decaf Score		Treatment				Total
		Inhalation Oxygen Therapy	Bronchodilators	Noninvasive Ventilation	Mechanical Ventilation	
Crosstab	1	3	16	0	0	19
		15.8%	84.2%	0.0%	0.0%	100.0%
	2	19	8	0	0	27
		70.4%	29.6%	0.0%	0.0%	100.0%
	3	12	0	6	0	18
		66.7%	0.0%	33.3%	0.0%	100.0%
	4	2	0	7	4	13
		15.4%	0.0%	53.8%	30.8%	100.0%
		0	0	1	2	3
Crosstab Total		37	24	14	5	80
		46.2%	30.0%	17.5%	6.2%	100.0%

Table 4. Treatment among Study Populations in Relation to Decaf Score

Decaf Score	Risk Group	Total Number (Percentage)	Number of Discharge (Percentage)	Number of Deaths (Percentage)
0-1	Low	19 (23.75)	19 (23.75)	0 (0.00)
2	Intermediate	27 (33.75)	25 (31.25)	0 (0.00)
3-6	High	34 (42.50)	24 (30.00)	6 (7.50)

Table 5. Outcome in Different Risk Group of Patients

DISCUSSION

Identification upon admission of AECOPD patients those at higher risk of dying can be useful in triaging the patients. Those are at higher risk needs aggressive management to improve patient overall health and to reduce readmission in AECOPD. Studies done by R. Nafea et al¹¹, Wildman MJ et al¹², Steer J et al⁹ showed that dyspnoea was the most common presentation for exacerbations of COPD which is comparable to present study. Most of the studies^{9,10,13,14} of AECOPD reports mortality rate between 4 to 30%, present study has the mortality rate of 7.5%.

Steer et al⁹ observed that Low (0-1 DECAF point) risk group has in-hospital mortality 1.4%, Intermediate (2 DECAF points) group had in-hospital mortality 8.4% and High (3-6 DECAF points) group had in-hospital mortality 34.6%. In present study mortality was seen only in high risk DECAF group. Studies done by Wildmann MJ et al¹², R.K

Yadavilli et al.¹⁵ Observed that patients with high DECAF score requires assisted ventilation compared to lower scores, this findings are comparable to present studies.

R.K. Yadavilli et al¹⁵ reported that length of hospital stay was more in patients with DECAF score of more than 3. Study done by R.K. Yadavalli et al¹⁵ included total 78 patients, among them 66 were survived and 12 patients died. Average Length of Stay in hospital was 15.1 days. Length of stay was highest in those with DECAF scores of 3-5 (16.7 days) and lowest in those with scores of 0-1 (12 days). This finding is consistent with present study. R. Nafea et al.¹¹ carried out a study on 200 AECOPD patients, they illustrated that the DECAF score showed an excellent discrimination for in-hospital mortality. Based on our study population the DECAF score provided a linear correlation between hospital stay and in-hospital deaths. Patients divided according to the DECAF score severity were able to

receive optimum treatment based on their level of exacerbation. With the use of the DECAF score patients were able to be shifted to for intensive care treatment and assisted ventilation on a timely manner.

CONCLUSION

DECAF score provided a fast, simple and effective tool to triage patients to receive the appropriate level of care for their needs. In conclusion the DECAF score can easily be incorporated at the time of admissions for acute exacerbations of COPD, and can be used as a reliable tool to guide the management and in deciding the time of discharges appropriately.

REFERENCES

- [1] World Health Organization. Burden of COPD. <http://www.who.int/respiratory/copd/burden/en/>
- [2] Gupta D, Agarwal R, Aggarwal AN, et al. Guidelines for diagnosis and management of chronic obstructive pulmonary disease: joint recommendations of Indian Chest Society and National College of Chest Physicians (India). *Indian J Chest Dis Allied Sci* 2014;56 Spec No:5–54.
- [3] Report on causes of death in India (2001-03). 2014 www.censusindia.gov.in/Vital_Statistics/Summary_Report_Death_01_03.pdf
- [4] Vogelmeier CF, Criner GJ, Martinez FJ, et al. Obstructive Pulmonary Disease 2017. Global strategy for the diagnosis, management, and prevention of chronic obstructive lung disease 2017 report: GOLD Executive Summary. *Eur Respir J* 2017;49(3):1-32.
- [5] Donaldson GC, Seemungal TA, Bhowmik A, et al. Relationship between exacerbation frequency and lung function decline in chronic obstructive pulmonary disease. *Thorax* 2002;57(10):847-852.
- [6] Halpin DM, Decramer M, Celli B, et al. Exacerbation frequency and course of COPD. *Int J Chron Obstruct Pulmon Dis* 2012;7:65-661.
- [7] Steer J, Gibson SC, Bourke SC. Predicting outcomes following hospitalization for acute exacerbations of COPD. *QJM* 2010;103(11):817-829.
- [8] Steer J, Norman EM, Afolabi OA, et al. Dyspnoea severity and pneumonia as predictors of in-hospital mortality and early. *Thorax* 2012;67(2):117-121.
- [9] Steer J, Gibson J, Bourke SC. The DECAF score: predicting hospital mortality in exacerbations of chronic obstructive pulmonary disease. *Thorax* 2012;67(11):970-976.
- [10] Echevarria C, Steer J, Heslop-Marshall K, et al. Validation of the DECAF score to predict hospital mortality in acute exacerbations of COPD. *Thorax* 2016;71(2):133-140.
- [11] Nafae R, Embarak S, Gad DM. Value of the DECAF score in predicting hospital mortality in patients with acute exacerbation of chronic obstructive pulmonary disease admitted to Zagazig university hospitals, Egypt. *Egypt J Chest Dis Tuberculosis* 2015;64(1):35-40.
- [12] Wildman MJ, Sanderson C, Groves J, et al. Predicting mortality for patients with exacerbations of COPD and asthma in the COPD and Asthma Outcome Study (CAOS). *QJM* 2009;102(6):389-399.
- [13] Anthonisen NR, Manfreda J, Warren CP, et al. Antibiotic therapy in exacerbations of chronic obstructive pulmonary disease. *Ann Intern Med* 1987;106(2):196-204.
- [14] Donaldson GC, Wedzicha JA. COPD exacerbations. 1: epidemiology. *Thorax* 2006;61(2):164-168.
- [15] Yadavilli RK, Shah N, Craig C, et al. Does higher DECAF score increase length of hospital stay in acute exacerbation of COPD? *European Respiratory Journal* 2016;48:PA34-37.