ISSN- O: 2458 - 868X, ISSN–P: 2458 – 8687
Index Copernicus Value: 49. 23
PubMed - National Library of Medicine - ID: 101731606

International Journal of Medical Science and Innovative Research (IJMSIR)
IJMSIR : A Medical Publication Hub
Available Online at: www.ijmsir.com
Volume – 3, Issue –4, August - 2018, Page No. : 126 - 130

Value Of Decaf Score In Grading The In-Hospital Mortality Risk And Triaging The Subjects To Appropriate Level Of Care, In The Setting Of Acute Exacerbation Of Chronic Obstructive Pulmonary Disease.

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Type of Publication: Original Research Paper

Conflicts of Interest: Nil

Abstract: Acute exacerbation of Chronic Obstructive Pulmonary Disease (AE-COPD) is an indispensible part of the natural history of COPD. It can be fatal at times. There is lack of a robust tool that can accurately predict the risk of In-hospital mortality and thus help clinicians in providing the appropriate level of care. None of the currently available scores developed for stable COPD have been tested in the setting of AE-COPD and most of them require investigations not readily available at the time of hospital admission**.** This prompted us to evaluate DECAF (Dyspnea, Eosinopenia, Consolidation, Acidemia, Atrial Fibrillation) Score for its usefulness in this situation. We found it to be a reliable tool in assessing the In-hospital mortality risk and triaging the subjects to appropriate level of care.

Keywords: AE-COPD, DECAF SCORE, IN-HOSPITAL MORTALITY

Introduction: AE-COPD is defined as "sustained worsening of the subject's condition from the stable state and beyond normal day-to-day variation that is acute in onset and necessitates a change in regular medications".[1] In-hospital mortality of 4-30% has been reported in subjects with AE-COPD.[2, 3]

John Steer and colleagues[4] in their path breaking study on AE-COPD formulated the DECAF score. They showed that, score of 0-1 had low mortality risk and early discharge with scores equal and greater than 3 having high mortality risk and requiring ICU care. The DECAF Score could assist the decisions regarding location of care, early escalation of care, appropriateness of end of life care and suitability for early supported hospital discharge and therefore could help reduce morbidity and mortality and direct the cost effective and appropriate use of resources.

Methodology: It was a hospital based, prospective observational study conducted between January 2016 and June 2017. 70 consecutive consenting subjects diagnosed with AE-COPD as per the clinical criteria of exacerbation i.e., increased dyspnoea, increased sputum volume or sputum purulence, were included in the study. Diagnosis of COPD was supported by spirometric evidence of

airflow obstruction (GOLD criteria; Post bronchodilator FEV1/FVC<0.70) when clinically stable, either during prior visits to the hospital or during subsequent visits. Non consenting subjects, subjects who couldn't perform spirometry or had contraindications to spirometry or died during hospital stay without having undergone spirometry ever, subjects with known bronchial asthma, active pulmonary tuberculosis, malignancies, congestive cardiac failure were excluded. Approval from the institutional ethics committee was obtained.

DECAF Score was calculated as shown in Table 1.

Stable state dyspnea was measured as per the eMRCD score (extended Medical Research Council Dyspnea score).

Subjects were categorized into 3 mortality risk groups: 1.Low-risk (0-1 score) 2.Intermediate risk (2 score) 3. High risk (score=>3) requiring ICU admission and possibly ventilator support. Final outcomes measured were – 1.In-hospital Death 2.Recovery.

Data collected was entered in SPSS, descriptive analysis was done and Chi square & Fischer exact test was done to assess the association and level of significance between variables and In-hospital mortality.

Results: Age group 61-70 years had majority of subjects - 27 (38.6%). There were 48(69%) male subjects and 22(31%) female subjects. With respect to major risk factors, we found that 47(67%) subjects were smokers, 21(30%) had history of exposure to biomass fuel, and the rest two (3%) subjects had neither of these risk factors.

We grouped these subjects as per the GOLD criteria for COPD staging by spirometry. We found that the majority of the subjects - 36(51.4%) belonged to GOLD stage 3. This was followed by GOLD stage 4 which contained 23(33.1%) subjects. (Table 2)

When DECAF scoring was employed to triage the subjects according to the mortality risk, we found that majority of them - 31(44.3%) belonged to High risk category. This was followed by Low risk category which had 27 (38.6%) subjects. Intermediate risk category has least number of subjects - 12 (17.1%). (Table 3)

When we measured the final outcome of subjects, we found that 16 (22.9%) subjects had died and 54 (77.1%) subjects had recovered. (Table 4)

When we studied the final outcome of subjects in each of the three risk categories of DECAF scoring, we discovered that, in low risk category, DECAF score had accurately predicted the final outcome of all subjects as all 27(100%)of them had recovered with zero mortality. In the intermediate risk category, only two (16.7%) subjects had died and the rest 10 (83.3%) subjects had recovered. Whereas, in the high risk category in spite of undergoing aggressive treatment, 14 (45.2%) subjects had died and the rest had recovered. (Table 5)

With the help of Chi Square/Fishers exact test, we examined whether there is any significant association between mortality and any of the variables belonging to the subjects. We found highly significant statistical association between DECAF score, Acidemia, ICU admission, Ventilatory support and mortality. (Table 6)

Discussion: Globally, by the year 2020 COPD is expected to rise to the third position as a cause of death and to the fifth position as a cause of loss of disability adjusted life years (DALY) according to the baseline projections made in the Global Burden Of Disease Study.[5] The largest increase in the mortality is estimated to occur in India, China and other Asian countries. In India, COPD alone is responsible for more than fifty lakh deaths every year, which is four times higher than western world. According to current prevalence data, over 30 million subjects suffer from COPD resulting in significant reduction in quality of life and economic burden to the society in India.[6]

In their pioneering study done employing DECAF score, John steer and colleagues [4] found following mortality

rates; DECAF 0-1 ('low risk') In-hospital mortality rate = 1.4%; DECAF 2 ('moderate risk') mortality rate = 8.4% and DECAF 3 ('high risk') mortality rate = 34.6%. We found In-hospital mortality rates as following; Low risk = 0%; Moderate risk = 16.7%; High risk = 45.2%. Though our findings are in agreement with that of John steer with respect to "low risk" group, we found higher mortality rates in other groups. One of the reasons may be that, treatment decisions were not guided by DECAF score for the subjects included in our study. Also, the authors have found that nearly 50% of all subjects admitted for AE-COPD can be classified as 'Low risk' by DECAF scoring whereas; we found this proportion to be 40%. Both these revelations of our study appear to emphasise that the DECAF score has ample role to play in guiding treatment decisions and optimal utilization of health care resources.

Echevarria C and colleagues[7] have done internal validation of the DECAF score. A cohort of 840 subjects consecutively admitted with AECOPD was recruited. An analysis of the performance of DECAF in the first 623 subjects recruited to the internal validation cohort came to the conclusion that DECAF score is a good predictor of inpatient mortality (AUROC = 0.82), with a stepwise increase in mortality with increasing DECAF score. The DECAF score accurately identifies low risk (DECAF score 0–1) and high risk patients (3 or greater) admitted with an exacerbation of COPD, potentially helping select subjects for early supported discharge schemes, or for intensified medical treatment or early palliation. Our results with respect to 'low' and 'high' risk groups are similar.

As per the study conducted by Rabbani B and Brammer P[8], high DECAF score did not predict the need for Non-invasive ventilation. In contrast, our study detected an association between higher DECAF score and the need for ventilatory support. Additionally, acidemia determined by arterial blood gas analysis showing pH <7.30 was found to be a strong predictor of In-hospital mortality and this association was proven to be statistically significant. Hence, acidemia which is an important component of the DECAF score is a strong indicator of mortality which can be reduced by timely intervention in the form of non - invasive ventilation or mechanical ventilatory support by endotracheal intubation.

Steer J and colleagues[9] in another study where 920 subjects were recruited, concluded that the eMRCD scale identifies a subgroup of patients at a particularly high risk of In-hospital mortality. However, in our study, we couldn't find such statistically significant association.

Steer J and colleagues[10] have the rare distinction of being the first to describe in detail, longitudinal changes in quality of life following hospitalisation for COPD exacerbations and demonstrate that, in the majority of subjects; quality of life either improves or does not significantly decline. They prospectively recruited two cohorts of 183 subjects (82 ventilated; 101 not ventilated). On an average, post discharge quality of life improved in non-ventilated and did not decline in ventilated subjects. This finding further ascertains the scope for routine utilization of DECAF score in everyday practice, in order to meticulously plan ventilatory support which has a bearing on the post discharge quality of life of the subjects who would already be leading a life of compromised quality.

Conclusions: We conclude that, the DECAF score is a robust tool which can help clinicians to triage AE-COPD subjects to most appropriate level of care, in order to judiciously use the resources and achieve lower In-hospital mortality rates.

References

1. Rodriguez RR. Towards a consensus definition for COPD exacerbations. *Chest* 2000; 117: 398-01.
2. Patil SP, Krishnan JA, Lechtzin N, Diette GB. In-hospital mortality following acute exacerbations of

chronic obstructive pulmonary disease. *Arch Intern Med* 2003; 163: 1180–86.

3. Bustamante-Fermosel A, De Miguel-Yanes JM, Duffort-Falco M, Munoz J. Mortality-related factors after hospitalization for acute exacerbations of chronic obstructive pulmonary disease: the burden of clinical features. *Am J Emerg Med* 2007; 25: 515-22.
4. Steer J, Gibson J, Bourke SC. The DECAF Score: predicting hospital mortality in exacerbations of chronic obstructive pulmonary disease. *Thorax* 2012; 67: 970-7.
5. Murray CJL, Lopez AD. Alternative projection of mortality and disability by cause 1990-2020: Global burden of disease study. *Lancet* 1997; 349: 1498-04.
6. SK Jindal. COPD: The Unrecognized epidemic in India. *JAPI* (Supplement) 2012; 60.
7. Echevarria C, Steer J, Gibson GJ and Bourke SC. Internal Validation Of The Decaf Score As A Predictor Of Inpatient Mortality In Acute Exacerbations Of COPD. *Thorax jnl* 2013; 204457.287; doi: 10.1136.
8. Rabbani B, Brammer P. Can The Decaf Score Be Used To Guide Prognosis After An Acute Admission For COPD Exacerbation? *Thorax* 2014; 69: A139-40.
9. Steer J, Norman EM, Afolabi OA, Gibson GJ, Bourke SC. Dyspnoea severity and pneumonia as predictors of in-hospital mortality and early readmission in acute exacerbations of COPD. *Thorax* 2012; 67: 117-21.
10. Steer J, Gibson GJ, Bourke SC. Longitudinal change in quality of life following hospitalisation for acute exacerbations of COPD. *BMJ Open Respir Res* 2015; 15: 2(1).

Tables

Table 1: Calculation Of Decaf Score

Variable	Score
Dyspnoea (stable state) eMRCD – 5a eMRCD - 5b	 1 2
Eosinopenia (<0.05 $^{x}10^{9}$/l)	1
Consolidation in chest x ray	1
Acidemia (pH <7.30)	1
Atrial fibrillation	1
Total DECAF Score	6

Table 2: Baseline Characteristics

Age groups (years):	51-60	19 (27.1%)
	61-70	27 (38.6%)
	71 and above	24 (34.3%)
Gender:	Male	48 (69%)
	Female	22 (31%)
Risk factors:	Smoking	47 (67%)
	Biomass fuel exposure	21 (30%)
GOLD stages of COPD:		
	Stage 1	1 (1.2%)
	Stage 2	10 (14.3%)
	Stage 3	36 (51.4%)
	Stage 4	23 (33.1%)

Table3: Mortality Risk-Wise Stratification Of Subjects Based On Decaf Score

RISK CATEGORY	NUMBER (%)
Low	27 (38.6%)
Intermediate	12 (17.1%)
High	31 (44.3%)

Table 4: Final Outcome Measures

OUTCOME	NUMBER (%)
Death	16 (22.9%)
Recovery	54 (77.1%)

Table 5: Distribution of Subjects in Various Decaf Risk Categories With Respect To Final Outcome Measures

RISK CATEGORY	FINAL OUTCOME	
	DEATH No (%)	RECOVERY No (%)
Low	0 (0%)	27 (100%)
Intermediate	2 (16.7%)	10 (83.3%)
High	14 (45.2%)	17 (54.8%)

Table 6: Association of Different Variables In The Subject Group With In-Hospital Mortality And Level Of Significance (P Value)

VARIABLE	Chi Square/Fishers exact test- p	LEVEL OF SIGNIFICANCE
AGE	0.689	-
SEX	0.528	-
DURATION OF COPD	0.957	-
SMOKING	0.446	-
BIOMASS	0.619	-
COPD STAGE	0.059	-
DECAF SCORE	0.000	HS
DYSPNEA	0.285	-
ACIDEMIA	0.003	HS
CONSOLIDATION	0.452	-
EOSINOPENIA	0.219	-
ATRIAL FIBRILLATION	0.354	-
ICU ADMISSION	0.001	HS
VENTILATORY SUPPORT	0.000	HS