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Original article

AN OBSERVATIONAL STUDY ON THE ROLE OF DECAF SCORE IN PREDICTING PROGNOSIS IN PATIENTS WITH ACUTE EXACERBATION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE.

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Abstract

Objective:

The study was done to validate the DECAF score for the prediction of prognosis in AECOPD patients.

Methodology:

92 AECOPD patients were given scores as per the DECAF system. Patients were monitored during their whole hospital stay. The final results were classified as death and recovery.

DECAF score's importance for the prediction of clinical outcomes was analyzed.

Result:

Out of 92 patients evaluated, 27 had a DECAF score range between 0-1 (low risks), 5-9 had a DECAF score range between 2-4 (intermediate risks), and 6 had a DECAF score range between 5-6 (high risks). The high-risk group experienced a 100% fatality rate. On the other hand, there was no mortality seen in patients with DECAF scores 0-4 & all the patients recovered successfully.

Conclusion:

DECAF score uses routine parameters to classify AECOPD Patients into clinically relevant risk groups. Doctors are benefitted from this regarding management purposes.

Keywords: predictors of mortality, inhospital mortality, COPD, COPD exacerbation, acute exacerbation of COPD, Submitted: 2023-06-22 Accepted: 2023-06-25

1. Introduction:

COPD ("Chronic Obstructive Pulmonary Disease") is a main cause of mortality globally in non-communicable disease populations [1]. The DECAF ("Dyspnoea, Eosinophilia, Consolidation, Academia, Atrial Fibrillation") score has been developed in a large group of consecutive AECOPD patients as an easy-to-use estimator of in-hospital mortality. This work focuses on the DECAF score to estimate prognosis in AECOPD patients admitted to Medicine ward/ICU [2].

Acute Exacerbation of COPD (AECOPD) is an acute event characterised by symptom deterioration that exceeds normal day-to-day fluctuations and results in a change in medication [3]. Exacerbations accelerate the rate of decline in lung function and are associated with an extraordinarily high mortality rate [3]. An additional com-

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mon definition of AECOPD was provided by Anthonisen and coworkers. Acute exacerbation is defined by the presence of three cardinal symptoms: increased sputum quantity, altered sputum character (increased purulence), and increased dyspnea [4].

Exacerbations have a negative effect on the quality of life of patients, influence their symptoms and lung function, and require several weeks to recover from. The in-hospital mortality rate for patients presenting with hypercapnic exacerbations is approximately 10% [5]. The one-year mortality rate for patients placed on mechanical support during hospitalisation reaches 40 percent [6]. Three years after discharge, mortality reaches 49% [7]. A comprehensive approach that includes prevention, prompt diagnosis, and immediate management of exacerbations can reduce the burden of COPD. COPD exacerbations are caused by respiratory tract infections [8], air pollution, congestive heart failure, pulmonary embolism, and discontinuing maintenance therapy. About one-third of exacerbations cannot be attributed to a specific cause.

Acute exacerbation of Chronic Obstructive Pulmonary Disease is primarily diagnosed based on the clinical presentation of worsening dyspnea, increased sputum production, and altered sputum quality [9]. A panel of biomarkers for diagnosing an exacerbation has yet to be identified. Similarly, there are insufficient clinical data to determine the appropriate length of hospitalisation for these patients. Studies evaluating prognostic factors in hospitalised AECOPD patients have been conducted infrequently. There are no robust clinical tools that assist in management decisions [10]. The purpose of this study was to validate the DECAF score for predicting prognosis in AECOPD patients.

2. Methodology:

This hospital-based observational study was done in the Medicine department at FAAMCH, Barpeta, Assam for a period of 1(one) year between November 2021 to November 2022. Inclusion criteria contain patients aged more than 40 years admitted with a main AFCOPD diagnosis as per GOLD criteria. Patients who had domiciliary ventilation, survival-limiting comorbidities (such as metastatic malignancy), and a primary reason for admission other than AECOPD were excluded. For each patient detailed history and clinical examination were done. A lung function test (Spirometry), was done when patients were stable. eMRC grade was used to measure dyspnoea. Absolute Eosinophil Count was analyzed. A plain Chest X-Ray was taken to look for the presence/absence of consolidation. Arterial Blood Gas analysis was done to determine Academia was performed to look for Atrial Fibrillation. Apart from these LFT, KFT, serum electrolytes (Na, K, Cl), serum TSH, RBS, and CT thorax were to rule out other lung pathology. 2D Echocardiography was done to rule out structural heart disease.

3. Results and Discussion:

Even with advanced care, in-hospital mortality for AECOPD remains a difficult issue [2]. Because AECOPD is frequently fatal, predicting the prognosis of hospitalized patients is both important and difficult. Identifying those who are more likely to die during their hospitalization upon admission might be helpful to make a triage for better care, deciding the intensities of therapies, as well as timing safe discharges. As a result, Steer et al. [3] created the DECAF ("Dyspnoea, Eosinopenia, Consolidation, Acidaemia, and Atrial Fibrillation") Score for accurate estimation of mortality in "AECOPD patients" admitted to the hospital. The DECAF Score uses data that is easily available when an AECOPD patient is admitted to a hospital. The current research included 92 patients admitted with AECOPD and the helpfulness of the DECAF SCORE in estimating outcomes and in-hospital mortality was investigated. The current study had the highest age distribution (38% between 70 and 79 years) and the lowest (9%) in the age group between 40-49 years followed by age above 80 years (10%). There are 57 men and 35 women among the 92 patients. The average age was calculated to be 67.4 years which was similar to the analysis by Nafae et al [2]

which indicates older age has a poorer prognosis. Two patients had dyspnoea grades 5a and 5b on the eMRCD, and one patient had grades 2 and 3 on the eMRCD. The baseline dyspnoea grade (EMRCD grade) was considerably greater in non-survivors compared to survivors, which was highly substantial with a p-value of 0.001*, implying that high grades of baseline dyspnoea predict mortality. These results are similar to research in Nafae et al. [2] with a p-value of 0.001. The mortal- ity rate has been 6.52% (out of 92 deaths), which is consistent with published mortality figures of 4.4–7.7% [4]. In our study, 72 of the 92 cases had dyspnoea of grade eMRCD 0-4, 16 cases had dyspnoea of grade eMRCD 5a, and 4 cases had dyspnoea of grade eMRCD 5b. The average hospital stays for patients with and without eosinopenia is 7.6 days and 5.7 days, respectively. It showed suggestive significance (p-value: 0.016 in ICU duration and 0.023 inward stays), which is similar to the results of Holland et al., who evaluated total hospital stay and eosinopenia. P=0.005 for 8 vs. 5 days [5]. Eosinopenia was found in 5 of the 6 people who didn't make it to the hospi- tal (83.33%), but only in 26 of the 86 people who did. When compared to Rahimi Rad et al. [6], the mortality rate was 5 times greater in the eosinopenia than in the non-eosinopenia group. In their study, 37.5% (12/44) of patients with eosinopenia died, compared to 7.6% (4/56) of patients without eosinopenia [4]. In our study, 59.78% of AECOPD patients with consolidation on chest X-ray required a longer hospital stay than AECOPD patients without consolidation (4.3 days vs 2.3 days in ICU and 7.1 days vs 5.2 days total hospital stay), which was statistically significant.

Steer et al [3] found similar results when comparing the total hospital stay length in a sub- set of patients with consolidation (7 vs 6 days, p=0.001). 57 of the 92 patients in the current study had respiratory acidosis. When compared to patients who did not have respiratory acidosis, these 57 patients required a longer hospital stay. Individuals with respiratory acidosis had a statistically significant increase in ICU stay (4.2 vs. 2.4 days) and total hospital stay (7.1 vs. 5.1 days). According to a study conducted by John Steer, John Gibson, and colleagues, arterial pH was lower and statistically significant in patients who died within the hospital than in those who survived until discharge ("pH 7.3 odds ratio (95 percent CI) 2.68(1.41 to 5.09)" p=0.003) [3]. In our study, 24 of the 92 participants had atrial fibrillation. Patients with atrial fibrillation required a longer hospital stay than patients who did not have atrial fibrillation. The length of ward stay (3.1 vs. 2.8 days), as well as ICU stay (4.2 vs. 3.3 days), have been statistically significant, with a total hospital stay of 7.3 vs 6 days. Because 50% of the six patients who died had atrial fibrillation, no statistical significance could be established between atrial fibrillation and mortality. In a study conducted in the United Kingdom, 12.5% of patients with AECOPD had atrial fibrillation, and mortality was found in 26% of patients with "atrial fibrillation" than in 10.9% of survivors, indicating atrial fibrillation as an independent estimator of mortality [7]. The average hospital stays length in work by Ying et al. in Oslo, which included 590 patients treated with AECOPD, was six days. Several analyses have shown a broad variety of hospital stays ranging from 3 to 12 days, which is consistent with our findings [8]. Six patients died in the current study, out of 92. The average length of stay in the ward from a DECAF score of 0-4 was 2.5, 3.3, 2.3, 2.7, and 3.3 days respectively, and the ICU stay from a DECAF score of 0-4 was 0.6, 2.1, 3.4, 4.3 and 5.5 days respectively. The mean duration of stay for a DECAF score of 5 & 6 cannot be determined because the mortality rate was 100%. C. Echevarria et al. studied 1725 patients with AECOPD, and the mean hospital stay length was almost identical to our study [4]. According to a South Indian study, individuals with a DECAF score of 1 had a mean hospital stay of 3 days, while those with a DECAF score of 4 had a mean stay of 15 days, according to the study. These findings were consistent with the current study, which had a mean duration of 5.3 days and 8.8 days [9]. R.K. Yadavilli et al. found that patients having a DECAF score greater than 3 had a longer hospital stay. The study included 78 patients, with an average stay length in the hospital of 15.1 days. The stay length has been

shortest for DECAF scores of 0-1 (12 days) and longest for DECAF scores of 3 to 5 (16.7 days). The current study found total hospital stay for DECAF "0 vs.1 vs.2 vs.3 vs.4 vs.5 vs.6 days to be 3.1 vs. 5.3 vs. 5.7 vs 7.1 vs 8.8 vs. 10 vs. 12 days" [10]. All "non-survivors" in our analysis belonged to the high-risk DECAF group (DECAF score of 5 and 6), which is similar to the findings of Zidan et al., who found that all non-survivors (six out of eighty) belonged to the DECAF score of 3 to 6 [11]. The current study's findings suggest that patients hospitalized having AECOPD may be categorized as having a low risk of in-hospital mortality (DECAF 0-1) and thus could be eligible for early assisted discharge. Therefore, a high risk ("DECAF Score 3") could be utilized to guide early care escalation.

4. Conclusion:

DECAF scoring in acute COPD exacerbation is an effective scoring system for risk-stratifying hospitalized patients and assisting in appropriate management. The DECAF score estimates hospital mortality more accurately than any other system. The greater the DECAF score, the greater the in-hospital mortality. The score of DECAF also aids in estimating the length of hospital and ICU stays. It is recommended to use DECAF scoring for AECOPD in assessing mortality in the emergency setting and for guiding further treatment decisions.

5. Limitations:

The size of the sample was relatively small and the analysis duration was short.

6. Recommendations:

Considering the limitation of this study, further findings are required to examine the role of the DECAF score in the estimation of the prognosis in AECOPD patients.

7. Acknowledgement:

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8. List of Abbreviations:

COPD- Chronic Obstructive Pulmonary Disease

DECAF- Dyspnoea, Eosinophilia, Consolidation, Academia, Atrial Fibrillation

AECOPD- Acute Exacerbation of COPD

eMRC- extended Medical Research Council

EMRCD- extended Medical Research Council Dyspnoea

LFT- Liver Function Test

KFT- Kidney Function Test

TSH- Thyroid stimulating hormone

RBS- Random Blood sugar

CT- Computed tomography

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