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ORIGINAL ARTICLE

# 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



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## KEYWORDS

DECAF;  
APACHE II;  
CAPS;  
CURB-65;  
Acute exacerbation;  
COPD

**Abstract** *Background:* Acute exacerbations of chronic obstructive pulmonary disease (AECOPD) are both common and often fatal. Lack of an accurate prognostic tool that can accurately predict in-hospital mortality and help clinicians triaging patients to the appropriate level of care is a challenge. Toward this aim, the Dyspnea, Esinopenia, Consolidation, Acidemia and atrial Fibrillation (DECAF) Score is needed to be assessed against other available scores.

*Patients and methods:* Two hundred patients with primary diagnosis of AECOPD were included. They were subjected to thorough medical history taking, full clinical examination, plain chest X-ray, routine laboratory investigations, ECG, ABG<sub>2</sub> analysis, assessment of DECAF Score, Acute Physiology and Chronic Health Evaluation (APACHE II) score, COPD and Asthma Physiology Score (CAPS) and CURB-65 score. In-hospital mortality was recorded.

*Results:* Twenty-five (12.5%) patients died in hospital. The DECAF Score showed an excellent discrimination for in-hospital mortality (AUROC = 0.83) and performed significantly better for the prediction of in-hospital mortality than: APACHE II Score (AUROC = 0.68, DECAF vs APACHE II  $p = 0.03$ ); and the COPD and Asthma Physiology Score (CAPS) (AUROC = 0.65,  $p = 0.01$ ). Furthermore, DECAF was a significantly stronger predictor of in-hospital mortality than CURB-65 for the subgroup of patients with radiological consolidation (AUROC = 0.87 vs 0.65,  $p = 0.02$ ).

*Conclusion:* The DECAF Score is a simple and effective clinical tool that can risk stratify hospitalized patients with AECOPD and could therefore help clinicians managing this fatal condition.

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## Introduction

Acute exacerbations of chronic obstructive pulmonary disease (AECOPD) are both common and often fatal [1]. In-hospital mortality of 4–30% has been reported in patients with AECOPD requiring hospitalization [1–3]. A robust clinical prediction tool, developed from a large prospective cohort of unselected admissions, could assist decisions regarding: location of care; early escalation of care; appropriateness for end-of-life care; and suitability for early supported hospital discharge and therefore could help to reduce morbidity and mortality and direct the most efficient use of resources [1].

In stable COPD, prognostic indices have been thoroughly investigated and tools predicting mortality risk, such as the BODE Score, are well established [4]. However, prognostic research in exacerbations requiring hospitalization has been limited, and there appears to be little common ground between predictors of mortality in stable disease and during AECOPD [5]. Moreover, none of the prognostic scores developed in stable disease have been tested on hospitalized patients, and most require clinical measurements not routinely available at hospital admission. Of the prognostic scores proposed for use in AECOPD requiring hospitalization, most were derived in highly selected, [6–9] rather than unselected, patients [10,11]. AECOPD are often complicated by radiographic consolidation especially in patients receiving ventilatory support [12]. Currently, in patients hospitalized with AECOPD complicated by consolidation, the CURB-65 (Confusion, Urea, Respiratory Rate, Blood pressure, Age > 65) community acquired pneumonia prognostic score [13] is often used to risk assess and guide antibiotic therapy [14]. However, it has been recently shown that the use of CURB-65 in patients with AECOPD and consolidation is suboptimal [15]. Hence, the Dyspnea, Esinopenia, Consolidation, Acidaemia and atrial Fibrillation (DECAF) score was first introduced by Steer et al. [1]. The tool is simple to administer at the bedside, using indices routinely available on admission. The value of the DECAF Score as a clinical prediction tool that can accurately risk stratify all patients with AECOPD is needed to be assessed against other available scoring systems in our locality.

## Patients and methods

### Patients

This study was carried out at the Respiratory ICU and Chest Department, Zagazig University Hospitals during the period from October 2010 to April 2013. It included 200 AECOPD patients with a mean age of  $69.3 \pm 8$ ; they were 102 males and 98 females. Criteria for exclusion were: previous inclusion in the study; malignancy; or a primary reason for admission other than AECOPD.

### Methods

All studied patients were subjected to the following:

- 1- Thorough medical history.
- 2- Full clinical examination (general and local examination).
- 3- Plain Chest X- ray (postero-anterior or antero-posterior view according to circumstances).

- 4- Routine laboratory investigations:
  - Complete blood picture (CBC)
  - Liver functions
  - Kidney functions
  - Serum electrolytes (Na, K, Cl)
- 5- Arterial blood gases' analysis (ABGs).
- 6- Diagnosis of AECOPD according to Global Initiative for Chronic Obstructive Lung Disease (GOLD) criteria [16] supported by spirometric evidence of airflow obstruction (forced expiratory volume in one second (FEV1)/forced vital capacity (FVC) < 0.70) when clinically stable; with clinical criteria of exacerbation including increased dyspnea, increased sputum volume or sputum purulence.
- 7- Stable-state dyspnea was assessed using the extended Medical Research Council (MRC) dyspnea (eMRCD) Score [15]; this subdivides patients too breathless to leave the house unaided (traditional MRCD5) into those able independently to manage washing and/or dressing (eMRCD5a) and those requiring assistance with both (eMRCD5b).
- 8- Assessment of Acute Physiology And Chronic Health Evaluation II (APACHE II) Score [17], COPD And Asthma Physiology Score (CAPS) [7] and CURB-65 Score [13].
- 9- Assessment of the DECAF Score according to Steer et al. [1].

Variable	Score
-Dyspnea	
eMRCD 5a	1
eMRCD 5b	2
-Esinopenia ( $< 0.05 \times 10^3$ /dl)	1
-Consolidation	1
-Acidemia (pH < 7.30)	1
-Atrial Fibrillation	1
Total DECAF Score	6

*DECAF, Dyspnea, Esinopenia, Consolidation, Acidaemia and atrial Fibrillation; eMRCD, extended MRC dyspnea.*

- 10- The presence of atrial fibrillation was confirmed by ECG at the time of hospital admission.
- 11- Assessment of outcome which was either in-hospital death or discharge.

### Statistical analysis

Statistical analysis was performed with the SPSS statistical software package version 19 (SPSS Inc., Chicago, IL, USA). *P*-value < 0.05 was considered significant.

## Results

Two hundred patients with AECOPD were recruited with a mean age of  $69.3 \pm 8$ ; they were 102 males and 98 females. In total, 25 (12.5%) patients died during their hospital stay.

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