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A. UNAL ET AL.

Comparison of two scores for short-term outcomes in patients with COPD exacerbation in the emergency department: the Ottawa COPD Risk Scale and the DECAF score

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Backround

- In 2019, the World Health Organization considered COPD the third most common cause of death in the world.
- Exacerbations of COPD (ECOPD) are one of the common causes of shortness of breath admissions to the emergency department (ED).
- Studies evaluating safe discharge and decisions on hospitalisation in the evaluation of patients in the ED are limited .
- The Global Initiative for Chronic Obstructive Lung Disease guidelines recommend using the patient’s history, the response to first treatments, physical examination findings and home care support in determining the need for hospitalisation.

Aim

- This study compares the predictive efficacy of the Ottawa Chronic Obstructive Pulmonary Disease Risk Scale (OCRS) and the Dyspnea, Eosinopenia, Consolidation, Acidemia, and Atrial Fibrillation (DECAF) score in estimating the short-term poor outcome of patients in our ED with exacerbations of COPD.

The Ottawa COPD risk scale

Total the points for the following items:

Items	Points
1. Initial assessment	
a) History of CABG	(1) ____
b) History of intervention for PVD	(1) ____
c) History of intubation for respiratory distress	(2) ____
d) Heart rate on ED arrival > 110	(2) ____
2. Investigations	
a) ECG has acute ischemic changes	(2) ____
b) Chest x-ray has any pulmonary congestion	(1) ____
c) Hemoglobin < 100 g/L	(3) ____
d) Urea 12 mmol/L	(1) ____
e) Serum CO_2 35 mmol/L	(1) ____
3. Re-Assessment after ED treatment	
a) SaO_2 < 90% on room air or usual O_2, or HR 120	(2) ____
Total score (0–16):	____

COPD risk categories for serious adverse events

Total score	Risk, %	Category
0	2.2	Low
1	4.0	Medium
2	7.2	Medium
3	12.5	High
4	20.9	High
5	32.9	Very high
6	47.5	Very high
7	62.6	Very high
8	75.6	Very high
10	91.4	Very high

The DECAF score

DECAF Score		Circle
D	eMRCD 5a (Too breathless to leave the house unassisted but independent in washing and/ or dressing)	1
	eMRCD 5b (Too breathless to leave the house unassisted and requires help with washing and dressing)	2
E	Eosinopenia (eosinophils < 0.05 x10^9/L)	1
C	Consolidation	1
A	Moderate or severe Acidaemia (pH < 7.3)	1
F	Atrial Fibrillation (including history of paroxysmal AF)	1
	Total:	

In-hospital mortality: DECAF 0-1 (low risk) = 1 - 1.4%; DECAF 2 (intermediate risk) = 5.4 – 8.4%; DECAF 3+ (high risk) = 21.4 – 34.7%. Mortality remains low in DECAF 1 patients who score for pneumonia or acidaemia.

Methods

- This single-centre prospective observational study was conducted over 6 months.
- Patients with acute exacerbations of COPD admitted to the ED during the study period were included in the study.
- A poor outcome was defined as any of the following:

  **readmission and requiring hospitalisation within 14 days of discharge

  **requiring mechanical ventilation on the first admission

  **hospitalisation for longer than 14 days on the first admission

  **death within 30 days

- The sensitivity and specificity of the OCRS and the DECAF score for a poor outcome were calculated.

Results

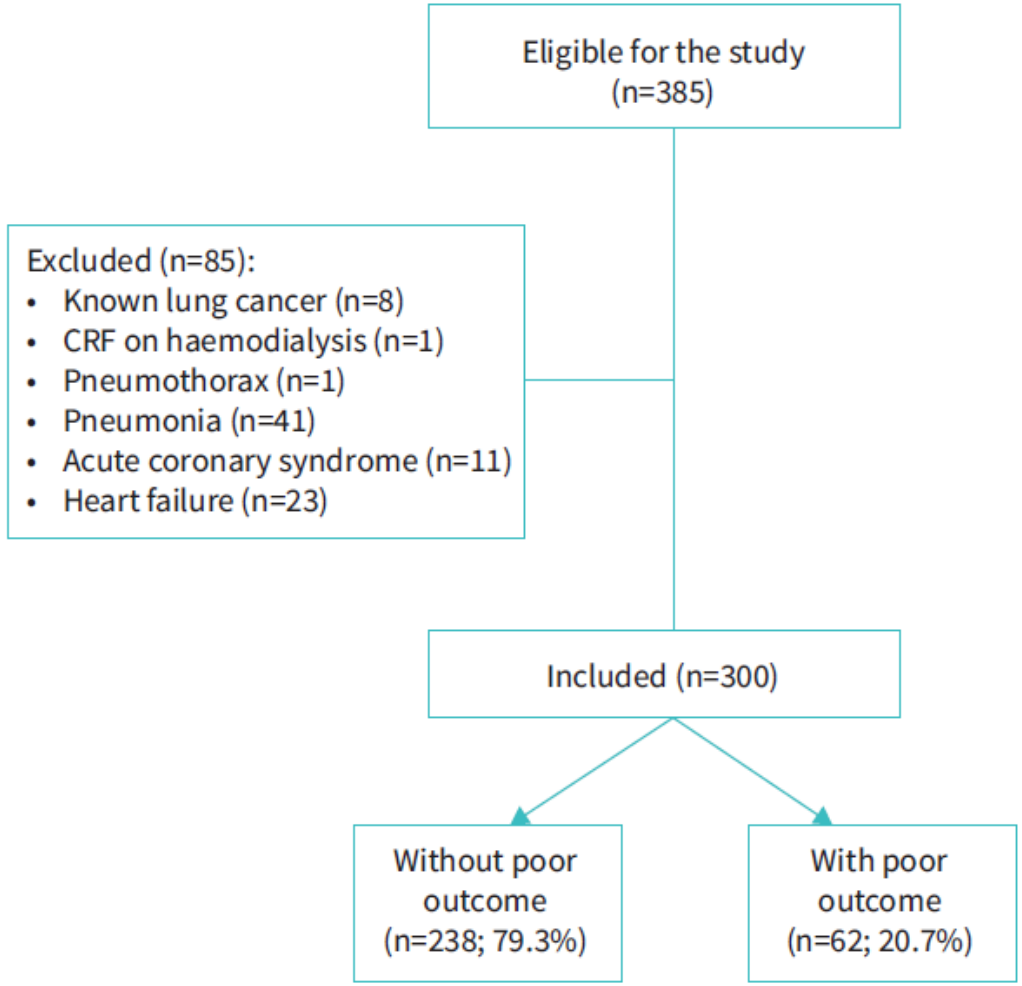

FIGURE 1 Patient flowchart. CRF: chronic renal failure.

Results

TABLE 1 Patient characteristics

Variable	Subjects n (%)
Gender	
Male	197 (65.7)
Female	103 (34.3)
Smoking	
Current	67 (22.3)
Ex-smoker	182 (60.7)
Never-smoker	51 (17.0)
ECOPD history in the last year	
Any hospitalisation	90 (30.0)
Intensive care unit admission	33 (11.0)
Noninvasive ventilation	67 (22.3)
Invasive ventilation	2 (0.7)
ED visit	265 (88.3)
Last visit to the outpatient clinic	
No visit	8 (2.7)
<1 week	26 (8.7)
<1 week to <1 month	27 (9.0)
<1 month to <3 months	24 (8.0)
>3 months	215 (71.7)
Usual medications and devices	
None	33 (11)
Only oxygen	10 (3.3)
Only BiPAP	2 (0.7)
Only inhaled medications (LABA or LAMA or ICS)	153 (51)
Oxygen and BiPAP	5 (1.7)
Oxygen and inhaled medications (LABA or LAMA or ICS)	45 (15)
Oxygen, BiPAP and inhaled medications (LABA or LAMA or ICS)	42 (14)
Oxygen, oral steroid and inhaled medications (LABA or LAMA or ICS)	8 (2.7)
Oxygen, BiPAP, oral steroid and inhaled medications (LABA or LAMA or ICS)	2 (0.7)

ECOPD: exacerbation of chronic obstructive pulmonary disease; ED: emergency department; BiPAP: bilevel positive airway pressure; LABA: long-acting β-agonist; LAMA: long-acting muscarinic antagonist; ICS: inhaled corticosteroid.

Results

TABLE 2 Results of both risk scores for poor outcome in discharged patients

	Poor outcome (n)		Total (n)
	Yes	No	
OCRS total			
0	**0**	**41**	**41**
1	6	82	88
2	2	32	34
3	3	33	36
4	2	12	14
5	4	3	7
6	1	3	4
DECAF score			
0	**2**	**77**	**79**
1	4	80	84
2	6	34	40
3	5	15	20
4	1	0	1
Current practice of ED	**18**	**206**	**224**

OCRS: Ottawa Chronic Obstructive Pulmonary Disease Risk Scale; DECAF: Dyspnea, Eosinopenia, Consolidation, Acidemia, and Atrial Fibrillation; ED: emergency department.

TABLE 3 Outcome of patients with poor outcomes

Reason	Subjects n (%)
Death within 30 days of hospitalisation	5 (8.1)
Death within 30 days after discharge from ED	1 (1.6)
Readmission to ED and hospitalisation within 14 days of discharge	17 (27.4)
Hospitalisation longer than 14 days	19 (30.6)
Noninvasive mechanical ventilation	20 (32.2)
Invasive mechanical ventilation	0 (0.0)
Total	62 (100.0)

ED: emergency department.

TABLE 4 Comparison of DECAF and OCRS scores and current practice in predicting poor outcomes

Method		Sensitivity	Specificity	NPV	PPV
Current practice		71.0 (58.05–81.8)	86.6 (81.6–90.6)	92.0 (88.6–94.4)	57.9 (49.0–66.3)
Score cut-off					
0	DECAF	88.7 (78.1–95.3)	34.5 (28.4–40.9)	92.1 (85.1–96.0)	26.1 (23.7–28.6)
	OCRS	96.8 (88.8–99.6)	18.5 (13.8–24.0)	95.7 (84.6–98.9)	23.6 (22.3–25.0)
<2	DECAF	69.3 (56.4–80.4)	74.8 (68.8–80.2)	90.4 (86.5–93.2)	41.8 (35.3–48.5)
	OCRS	82.3 (70.5–90.8)	56.7 (50.2–63.1)	92.5 (87.7–95.5)	33.1 (29.1–37.4)
<3	DECAF	41.9 (29.5–55.2)	92.0 (87.8–95.1)	85.9 (83.1–88.3)	57.8 (44.8–69.7)
	OCRS	71.0 (58.1–81.8)	73.5 (67.4–79.0)	90.7 (86.7–93.5)	41.1 (34.9–47.7)

conclusion

- In this study, the OCRS was more sensitive than the DECAF score in predicting a poor outcome .
- The DECAF score was more specific than the OCRS in predicting a poor outcome .
- Using either the OCRS or DECAF score alone may result in unnecessary hospitalisations .
- Physicians had high specificity but low sensitivity in predicting a poor outcome.
- Consequently,evaluation using the OCRS before discharge by the patient’s physician in cases where hospitalisation is not indicated will facilitate safe discharge by increasing both sensitivity and specificity.