

Development of a scoring system to predict risk of death in exacerbations of chronic obstructive pulmonary disease (COPD) requiring assisted ventilation.

Submission date 23/06/2015	Recruitment status No longer recruiting	☐ Prospectively registered ☐ Protocol
Registration date 07/08/2015	Overall study status Completed	☐ Statistical analysis plan ☒ Results
Last Edited 02/11/2022	Condition category Respiratory	☐ Individual participant data

Plain English summary of protocol

Background and study aims

COPD is a common chronic lung disease. Acute exacerbations (AECOPD) are often triggered by infection and are the second commonest reason for hospital admission in the UK. Severe exacerbations resulting in respiratory failure are associated with high mortality (death), which is reduced by 2-3 times by the use of non-invasive ventilation (NIV). Unfortunately the national COPD audit showed that of 26% of patients who met the criteria for ventilation, only 12% received it. In part, this reflects difficulty in accurately predicting outcome following NIV and widespread prognostic pessimism. Decisions about suitability for ventilation should be informed by reliable estimates of the patients' chance of surviving the acute event and subsequent outcomes. Clinicians are unduly pessimistic as shown in a recent study (CAOS); actual six-month survival was four-fold better than predicted in some patients. Most survivors would choose ventilation again. Prognostic tools outperform clinicians' estimates in most settings. The trialists will assess outcomes following AECOPD requiring ventilation and develop simple prognostic tools assessing in-hospital mortality.

Who can participate?

The study is retrospective (i.e. looking at events that have already occurred). It will include all those admitted consecutively to our trust with AECOPD requiring assisted ventilation from December 2008 onwards until at least 425 patients have been identified and included.

What does the study involve?

The patients included in the study are not exposed to any test or treatment only collection of data from case records. Any analysis or publication of data is anonymised. As such individual patient consent is not being sought for inclusion in the study. This approach has been approved by both patient focus group and a research ethics committee.

What are the possible benefits and risks of participating?

It is hoped that the successful development of a predictive tool will lead to better decision in a

life-threatening situation. Nihilism will be challenged and more patients will consequently receive non-invasive ventilation. There are no perceived risks of participation.

Where is the study run from?

North Tyneside General Hospital (UK)

When is the study starting and how long is it expected to run for?

May 2014 to May 2016.

Who is funding the study?

Northumbria Healthcare NHS Foundation Trust (UK)

Who is the main contact?

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Contact information

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Additional identifiers

Protocol serial number

Protocol ref v4.1

Study information

Scientific Title

Derivation of a novel scoring system to predict inpatient mortality in exacerbations of chronic obstructive pulmonary disease requiring assisted ventilation.

Study objectives

Clinicians' estimate of survival and prognosis is poor and is consistently outperformed by predictive tools. In acute exacerbations of COPD (AECOPD) requiring assisted ventilation the CAOS study highlighted pronostic nihilism. The national COPD audit showed that 26% of patients developed respiratory acidaemia but only 12% were ventilated. No predictive tool is routinely used in clinical practice in this group. The use of non-invasive ventilation is widespread and often initiated by the non specialist. Developing a predictive tool to augment decision making will reduce nihilism and increase use of a treatment shown to save lives, allow better prognostic information to be shared with a patient leading to shared decision making and in a small number of patients highlight the importance of palliative care.

Ethics approval required

Old ethics approval format

Ethics approval(s)

NRES Committee North West - Liverpool Central 29/5/2015, ref: 15/NW/0389

Study design

Observational single-centre study

Primary study design

Observational

Study type(s)

Other

Health condition(s) or problem(s) studied

Chronic obstructive pulmonary disease (COPD).

Interventions

Consecutive patients with acute exacerbation of chronic obstructive pulmonary disease (AECOPD) requiring assisted ventilation will be identified. Indices including; socio-demographic data, biochemical, clinical data and functional status will be collected. Variables related to mortality on univariate analysis will be identified. Eligible variables will be entered into backward stepwise logistic regression, with in-hospital mortality as the dependant variable. To ensure that the final model can be easily applied at the bedside, the final number of variables will be reduced to the minimum required to maintain prediction of in-hospital mortality. Performance will be assessed by AUROC curve. Mortality and readmission rates will be compared in patients with and without predefined characteristics, namely: Late failure of NIV, persistent hypercapnia, long term oxygen, long term ventilation.

Intervention Type

Mixed

Primary outcome(s)

Prediction of in-hospital mortality within the derivation cohort, assessed by the area under the receiver operating characteristic (AUROC) curve for tools developed using:

1. Indices available on admission
2. All indices up to and including the time of deterioration

Key secondary outcome(s)

1. Comparison of the AUROC curves for both novel tools
2. Comparison of the AUROC curves for both novel tools to CAPS and APACHE II
3. 30 day, 90 day, 180 day and 1 year mortality
4. 30 and 90 day readmission rates
5. Comparison of outcomes in patients with, and without pre-defined characteristics:
 - 5.1. Late failure of NIV (recurrent respiratory acidaemia, despite on-going ventilatory support)
 - 5.2. Persistent hypercapnia
 - 5.3. Long-term oxygen therapy
 - 5.4. Long-term ventilation on discharge

Completion date

01/05/2016

Eligibility**Key inclusion criteria**

1. Aged over 35 years
2. Smoking history greater than or equal to 10 pack years
3. Obstructive spirometry (FEV1/FVC < 0.7)
4. AECOPD primary diagnosis
5. Respiratory acidosis treated with NIV or IPPV (arterial blood gas pH <7.35, pCO₂ > 6.0)

Participant type(s)

Patient

Healthy volunteers allowed

No

Age group

Adult

Sex

All

Total final enrolment

489

Key exclusion criteria

1. Previous inclusion in the study
2. Other illness likely to limit survival to less than 1 year

Date of first enrolment

01/07/2015

Date of final enrolment

01/02/2016

Locations**Countries of recruitment**

United Kingdom

England

Study participating centre**North Tyneside General Hospital**

Rake Lane

North Shields

United Kingdom

NE29 8NH

Study participating centre**Wansbeck General Hospital**

Woodhorn Lane

Ashington

United Kingdom

NE63 9JJ

Sponsor information**Organisation**

Northumbria Healthcare NHS Foundation Trust

ROR

<https://ror.org/01gfeyd95>

Funder(s)**Funder type**

Hospital/treatment centre

Funder Name

Research and Development Department, Northumbria Healthcare NHS Foundation Trust

Results and Publications

Individual participant data (IPD) sharing plan

Not provided at time of registration

IPD sharing plan summary

Not provided at time of registration

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Results article		12/08/2021	02/11/2022	Yes	No
HRA research summary			28/06/2023	No	No