Managing patients with COPD exacerbation: does age matter?

ROBERT A. STONE1,2, DEREK LOWE1,3, JONATHAN M. POTTER1, RHONA J. BUCKINGHAM1, C. MICHAEL ROBERTS1,4, NANCY J. PURSEY1

1Clinical Standards Department, Royal College of Physicians, 11 St Andrews Place Regents Park, London NW1 4LE, UK
2Somerset Lung Centre, Musgrove Park Hospital, Taunton, Somerset TA1 5DA, UK
3Clinical Effectiveness and Evaluation Unit, Royal College of Physicians, London, UK
4Department of Respiratory Medicine, Whips Cross University Hospital, London E11 1NR, UK

Address correspondence to: R. Stone. Tel: (+44) 01823342041; Fax: (+44) 01823343709. Email: robert.stone@tst.nhs.uk; ra.stone@btinternet.com
Introduction: there is little information about the relationship between age and management of COPD exacerbation (AECOPD), although older persons are known to be at a greater risk of hospital admission.

Methods: we have investigated responses from the clinical and patient questionnaire elements of the 2008 UK COPD audit, splitting the data into age decile.

Results: age ranged from 27 to 102. Patient-reported data suggested older patients had inferior knowledge of COPD, undertook less self-care and were less likely to recognise symptoms of exacerbation prior to hospitalisation. Clinician-reported data showed that although older patients had severe disease and symptoms, greater co-morbidity at presentation and higher mortality, fewer were seen in hospital or followed up subsequently by respiratory specialists. Older patients were more likely to have a DNR order signed within 24 h of admission, irrespective of co-morbidities or performance status. The observations were particularly applicable to those aged 80 or above.

Conclusions: clinicians should consider increasing age as a specific risk factor in the management of COPD. Acute units and community teams should review carefully their protocols and pathways for how they assess, manage, discharge and follow-up older patients with COPD exacerbation.

Keywords: COPD, National Audit, age decile, patient reported data, clinician-reported data

Methods

Methods used in the 2008 UK COPD audit are well described [5–9]. Hospital units admitting unselected emergency admissions identified prospectively up to 60 consecutive cases of COPD exacerbation between March and May 2008, and audited retrospectively their in-hospital care and outcomes 90 days following the index admission. Data were entered onto a web-based tool and collated centrally at the Royal College of Physicians (RCP). Reliability of clinical audit case data was assessed by asking units to double-enter data on the first five cases using a different auditor. The levels of reliability for 952 submitted cases were generally good with kappa values of 0.60 and higher dominating, with many over 0.80 (very good).

Units also asked 30 of their audited patients to complete a survey about the management of their COPD as they approached discharge from hospital. Responses were returned directly to the Project Team at the Clinical Effectiveness and Evaluation Unit (CEEU) within pre-paid envelopes. The patient questionnaire [8] comprised 20 questions, compiled following consultation with professional groups and patients attending meetings run by the British Lung Foundation (BLF). It was designed to assess how patients access COPD care, the period leading up to exacerbation, self-care, who might benefit from enhanced case management and to assess potential for interventions that might prevent hospital admission.

Data were analysed using SPSS (SPSS, Inc., V18). Missing data values affect patient denominators and results presented as percentages will vary in their denominators accordingly. Data were divided into subgroups by age decile, beginning as <50 years and finishing at ≥90 years for the extremes. Association of patient clinical characteristics was tested using the Chi-squared test for the age decile group and Mann–Whitney/Kruskal–Wallis test as appropriate for age in years.

Results

Clinical audit data

Data were received from 232 units (177 trusts), with 9,716 patients available for the analysis, median 46 and inter-quartile range 29–58 per unit. Age distribution was 2%
(194) below 50 years, 9% (906) 50–59 years, 24% (2,344) 60–69 years, 36% (3,523) 70–79 years, 25% (2,475) 80–89 years, and 3% (274) 90 years and older. Age range was 27–102 years. The male:female ratio was 1.02 (4,906:4,810), varying across the age categories as 0.76, 0.78, 1.03, 1.09, 1.06 and 0.90, respectively (P < 0.001; Chi-squared test), with a marked predominance of females in patients aged below 60 years.

Three per cent (202) of below 80 year olds, 10% (243) of 80–89 year olds and 21% (58) of above 90 year olds lived in residential care. The percentage living alone in a house or flat increased from 28 to 42% for age groups below 90 years but was 38% for ≥90 years, more of whom lived in residential care. The percentage of older patients requiring unpaid or paid personal care increased with age (6, 10, 13, 19, 31 and 35%, respectively).

Older patients were less likely to report an increase in sputum or change in the colour of phlegm (see the Supplementary data available in Age and Ageing online, Appendix Table 1) and there were marked increases in oedema, pneumonia, hypo-albuminaemia and blood urea (Supplementary data are available in Age and Ageing online, Appendix Table 2). Body mass index (62% missing overall) and spirometry were recorded poorly, especially in those aged ≥80 years (Supplementary data are available in Age and Ageing online, Appendix Table 2). The median predicted FEV₁ was 38% (IQR: 28–52%), values ranging with no clear pattern from 33 to 43% across age groups <90 years and 55% aged ≥90 years. Although younger patients had higher median percentages of FEV₁ values ≥1 L (68, 40, 37, 38 and 32% across age groups), the most severely impaired levels (<20% predicted) were more often noted in younger patients (13, 13, 10, 6, 3, 1%).

Performance status stage 3 (limited activity but self-care) was by far the commonest in each age group (range 42–50%) during the weeks leading up to the hospital admission (Table 1). Performance status 1 (normal activity) and 2 (strenuous activity limited) declined considerably with age and this was offset by age-related increases in grades 4 (limited self-care) and 5 (bed or chair bound and no self-care). Grades 4 (36% overall) and 5 (31% overall) of the MRC breathlessness scale were commonest, though notably some 47% of those ≥90 years were scored at level 5 (Table 1). The percentage of patients with Grades 1, 2 and 3 breathlessness declined with age while the percentages of Grades 4 and 5 increased with age.

The presence and number of co-morbidities (particularly cardiovascular disease, locomotor problems, stroke, visual impairment and malignancy) increased with age (Table 2). Current smoking habit was 70% in the <50 year group, 56% in the 50–59-year group and declined steadily to 10% in those ≥90 years.

For patients ≥90 years, fewer received antibiotics (range 0.5–1.2%, except 0% for ≥90 years) and more steroids (range 11–17% except 20% for ≥90 years) in the first 24 h. Oxygen prescribing was poor (range 13–17%) and notably fewer patients ≥90 years had arterial gases taken on admission (range 84–89% except 79% for ≥90 years). There were minimal differences in admission bicarbonate or carbon dioxide levels (<20% with age).

Table 1. Performance status in the weeks prior to admission with exacerbation of COPD, accompanied by Medical Research Council (MRC) dyspnoea score in the stable state before this exacerbation, according to age decile

<table>
<thead>
<tr>
<th>Age deciles</th>
<th>Performance status 1</th>
<th>Performance status 2</th>
<th>Performance status 3</th>
<th>Performance status 4</th>
<th>Performance status 5</th>
<th>MRC 1</th>
<th>MRC 2</th>
<th>MRC 3</th>
<th>MRC 4</th>
<th>MRC 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>27–49</td>
<td>43/166</td>
<td>38/166</td>
<td>70/166</td>
<td>10/166</td>
<td>5/166</td>
<td>15/92</td>
<td>21/92</td>
<td>19/92</td>
<td>20/92</td>
<td>17/92</td>
</tr>
<tr>
<td>60–69</td>
<td>252/2,112</td>
<td>372/2,112</td>
<td>1,026/2,112</td>
<td>358/2,112</td>
<td>104/2,112</td>
<td>86/1,092</td>
<td>126/1,092</td>
<td>218/1,092</td>
<td>382/1,092</td>
<td>280/1,092</td>
</tr>
<tr>
<td>70–79</td>
<td>246/2,112</td>
<td>467/3,219</td>
<td>1,026/2,112</td>
<td>684/3,219</td>
<td>104/2,112</td>
<td>86/1,092</td>
<td>126/1,092</td>
<td>218/1,092</td>
<td>382/1,092</td>
<td>280/1,092</td>
</tr>
<tr>
<td>80–89</td>
<td>145/2,211</td>
<td>245/2,211</td>
<td>1,041/2,211</td>
<td>584/2,211</td>
<td>196/2,211</td>
<td>46/1,135</td>
<td>82/1,135</td>
<td>191/1,135</td>
<td>427/1,135</td>
<td>389/1,135</td>
</tr>
<tr>
<td>Total</td>
<td>806/8,748</td>
<td>1,320/8,748</td>
<td>4,214/8,748</td>
<td>1,826/8,748</td>
<td>582/8,748</td>
<td>255/4,561</td>
<td>428/4,561</td>
<td>843/4,561</td>
<td>1,627/4,561</td>
<td>1,408/4,561</td>
</tr>
</tbody>
</table>

*Performance status: 1, normal activity; 2, strenuous activity limited; 3, limited activity but self-care; 4, limited self-care; 5, bed or chair bound—no self-care.

Both variables associated with age decile (Chi-squared; P < 0.001) and with age in years (Kruskal–Wallis; P < 0.001).
pCO2 but progressive increases in the percentage of patients with pO2 < 7.3 kPa on admission (from 14 to 23%) across the age groups (Table 2).

Receipt of ventilatory (predominantly NIV) support decreased (12, 14, 12, 10, 9%) and DNR orders increased (4, 6, 9, 12, 15, 22%) with age. Fewer older patients received NIV as performance status declined or the number of co-morbidities increased, but the age-related increase in DNR orders written in the notes within 24 h of admission was irrespective of performance status (apart from level 5) or number of co-morbidities (see Supplementary data available in Age and Ageing online, Appendix Table 3).

In-hospital and 90-day mortality increased with age (Table 2), as did the mean length of stay (6.6, 7.3, 7.6, 9, 10.5 and 12.7 days, respectively) and the percentage of patients with stays of ≥15 days (6, 10, 11, 16, 18 and 26%). In-patient stays of less than a week declined with age (82, 76, 70, 63, 58 and 49%). Fewer patients aged 80–89 (72%) and ≥90 years (66%) were seen by respiratory specialists during their admission (range 79–84%). One-third (34%, 3,025) of patients were discharged under the care of general physicians (range 32–38% by age group). One-half (53%, 4,730) were discharged under respiratory physicians (range 55–59% for <80 years, 42% for patients of 80–89 years and 33% if ≥90 years). Care of the elderly physicians discharged 11% (1,021) of patients overall, the percentage rising with age group (4, 3, 5, 10, 22 and 32%).
Managing patients with COPD exacerbation

Table 3. Responses of patients to questionnaire, according to age decile

<table>
<thead>
<tr>
<th>Response</th>
<th>Age deciles</th>
<th>Total</th>
<th>P-value**</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you understand what COPD stands for?</td>
<td>20–49</td>
<td>55/65</td>
<td>5.56/2.842</td>
</tr>
<tr>
<td>Did you know you had COPD before your recent hospital admission?</td>
<td>50–59</td>
<td>85/94</td>
<td>2.42/2.842</td>
</tr>
<tr>
<td>If not the first time admitted to hospital with COPD then, when your chest was bad?</td>
<td>60–69</td>
<td>75/84</td>
<td>2.245/2.842</td>
</tr>
<tr>
<td>Contact your GP immediately</td>
<td>70–79</td>
<td>73/79</td>
<td>9.62/2.114</td>
</tr>
<tr>
<td>Contact a Respiratory Nurse</td>
<td>80–89</td>
<td>80/56</td>
<td>6.82/2.114</td>
</tr>
<tr>
<td>Wait a bit then contact your GP</td>
<td>90+</td>
<td>79/79</td>
<td>9.62/2.114</td>
</tr>
<tr>
<td>Go to hospital rather than your GP</td>
<td>50–59</td>
<td>40/59</td>
<td>6.07/2.114</td>
</tr>
<tr>
<td>Have antibiotics and/or steroids to take when chest is bad?</td>
<td>50–59</td>
<td>18%</td>
<td>6.07/2.114</td>
</tr>
</tbody>
</table>
| 20% for deciles 50–59, 60–69 and 70–79 years, who in any case had the shortest lengths of stay. Readmissions within 90 days of the audit index admission were lowest in this youngest group (29%), but there was no difference in readmission rates across other age groups (range 32–36%).

P-value**

Patients often selected more than one option, these depending mainly on how severe their chest was.

**Chi-squared test. Note: age in years was not known, as the age question only specified age decile groups, hence no Mann–Whitney tests were possible.

Table 3. Responses of patients to questionnaire, according to age decile

Patients questionnaire data

Age distribution of the 2,842 survey responders was very similar to the clinical audit, with slightly fewer very elderly patients: 2% (65) below 50 years, 11% (308) 50–59 years, 28% (785) 60–69 years, 38% (1,081) 70–79 years, 20% (571) 80–89 years and 1% (32) 90 years and older. The male:female ratio was 1.03 (1,349:1,314), varying across the age categories as 0.91, 0.81, 0.95, 1.05, 1.20 and 1.00, respectively, with again a marked predominance of females in
Discussion

Our patient and clinician-reported data show older people (particularly those above 80) admitted with AECOPD have severe disease, reduced performance status and greater co-morbidity. Older patients describe higher levels of respiratory disability and breathlessness prior to exacerbation and are more likely to present with respiratory failure on admission to hospital, where they are less likely to receive NIV. They are more likely to have a DNR order written in their notes within 24 h of admission (independent of performance status or the number of co-morbidities) and have higher in-patient/90-day mortality following exacerbation.

The reasons for these observations are unclear, although our data show greater social isolation, an increased need for personal care, a reduced likelihood of self-transfer to hospital, reduced understanding of disease/medication, reduced awareness of signs suggesting exacerbation and reduced self-care in older patients. We did not specifically audit for dementia as a co-factor that might have influenced clinical management or patient behaviour in our cohort.

Fewer older patients, despite the severity of their disease, are seen by respiratory specialists in hospital/ chest clinics but this trend is not reflected in primary care, with the exception of the above 90s who are also less likely to have respiratory check-ups at surgery.

The results suggest that due consideration should be given to how intensively older patients with COPD exacerbation are being managed on arrival and during their stay in UK hospitals, whether they are being managed appropriately and how much attention is given to their follow-up. There needs to be greater emphasis on the promotion of self-care and symptom recognition in this group and strategies for how the most vulnerable (i.e. the very old, who have severe symptoms and disease) might be monitored more effectively out of hospital, so reducing the impact of exacerbation.

There seems a paucity of data relating to COPD and the older person; the 2003 UK COPD audit similarly shows older patients fare less well in hospital [10] and there is little change in 2008. Cydulka et al. [11] showed poor adherence to guidelines in the emergency management of older patients with COPD and an analysis of COPD exacerbations in Spain demonstrated increasing age above 75 as an adverse prognostic factor [4]. The effect of age as an additional prognostic factor is well described in the CURB 65 score for community-acquired pneumonia [12], and our observations suggest similar awareness of prognostic indicators would be helpful when assessing/admitting patients with AECOPD. Age, performance status, blood urea, serum albumin and arterial oxygen saturation have been independent predictors of mortality in both the 2003 and 2008 audits, and while COPD guidelines provide clear advice regarding the clinical management of exacerbation, they do not emphasise the extra in-patient care or follow-up that may be necessary to support those admitted with additional age-related issues that might affect prognosis, such as frailty, sarcopenia and co-morbidity.

The patient-reported data suggest older people are less aware of how to recognise and act upon exacerbation prior to hospitalisation. Thus, in addition to improving clinical management at the point of hospitalisation, we need to develop better strategies for ensuring review of older patients by COPD specialists within and outside hospital. It really should not be difficult to achieve in-hospital review and follow-up of older patients if cases are identified by acute teams or respiratory specialists at the point of entry. COPD in socially isolated older patients is a particular risk for admission [13] and COPD management should be considered specifically alongside co-morbidities and linkage into the wider care system at the point of discharge. Referral to community matrons or COPD teams is important in this context and tele-health approaches are now proving helpful in reducing re-admission rates in older patients with chronic diseases, including COPD [14].

In summary, there are age-related differences in the acute management, outcome and follow-up of patients with
COPD exacerbation. Extreme old age is a specific adverse factor and we recommend further study of the reasons for these observations in older patients. We suggest health communities examine how older people with COPD are assessed and cared for across their primary and secondary sectors, particularly at the point of admission to and discharge from hospital. The presence of specific predictors of mortality in patients with COPD, including age itself, should be highlighted within disease management guidelines.

Key points

- Older people present with severe symptoms and COPD, often in respiratory failure.
- Older people with COPD have the greatest mortality and lowest performance status.
- Older people with COPD are more likely to have a DNR order assigned to them, irrespective of performance status.
- Older people are less likely to receive specialist respiratory review.
- There is a need to review care processes for managing older people with COPD in both secondary and primary care.

Conflicts of interest

None declared.

Ethical approval

Ethics approval for the patient survey element of the audit was given by the University College Hospital/University College London MREC.

Funding

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Supplementary data

Supplementary data mentioned in the text is available to subscribers in Age and Ageing online.

References


Clinical characteristics and mortality risk in relation to obstructive and central sleep apnoea in community-dwelling elderly individuals: a 7-year follow-up

PETER JOHANSSON1, URBAN ALEHAGEN1,2, EVA SVANBORG3,4, ULF DAHLSTRÖM1,2, ANDERS BROSTRÖM3

1Department of Cardiology, Linkoping University Hospital, Linkoping, Sweden
2Division of Cardiovascular Medicine, Department of Medical and Health Sciences, Faculty of Health Sciences Linköping University, Linkoping, Sweden
3Department of Clinical Neurophysiology, Linkoping University Hospital, Linkoping, Sweden
4Faculty of Health Sciences Linköping University, Institution of Clinical and Experimental Medicine, Linkoping, Sweden

Address correspondence to: P. Johansson. Tel: (+46) 101032223; Fax: (+46) 101032224. Email: peter.johansson@aries.vokby.se

Abstract

Background: little is known about demographic and clinical characteristics associated with sleep-disordered breathing (SDB) and obstructive sleep apnoea (OSA) or central sleep apnoea (CSA) in community-dwelling elderly. We also examined these (OSA and CSA) associations to all-cause and cardiovascular (CV) mortality.

Methods: a total of 331 community-dwelling elderly aged 71–87 years underwent a clinical examination and one-night polygraphic recordings in their homes. Mortality data were collected after seven years.

Results: a total of 55% had SDB, 38% had OSA and 17% had CSA. Compared with those with no SDB and OSA, more participants with CSA had a left ventricular ejection fraction <50% (LVEF <50%), ischaemic heart disease (IHD) and transient ischaemic attack (TIA)/stroke. There was no difference in the rate of IHD and TIA/stroke between OSA and no SDB, but more LVEF <50% was found in those with OSA. CSA significantly increased the risk for all-cause (P = 0.002) and CV mortality (P = 0.018) by more than two times. After adjustments for CV disease, diabetes and the biomarker NT-pro-brain natriuretic peptide CSA associations to all-cause mortality and CV mortality lost significance.

Conclusion: OSA, in persons >75 years does not appear to be associated with cardiovascular disease (CVD) disease or mortality, whereas CSA might be a pathological marker of CVD and impaired systolic function associated with higher mortality.

Keywords: elderly, obstructive sleep apnoea, central sleep apnoea, mortality