Hospital admission and readmission for acute exacerbation of COPD. A tough nut to crack

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Reducing acute hospital care for people with long-term conditions has become a key element of health policy as governments strain every sinew to contain the escalating healthcare costs arising from ageing populations. Attention has been drawn to the problem of unscheduled hospitalisation for acute exacerbations of COPD (AECOPD) because it is such a common cause of emergency admission and because there is a high readmission rate following discharge. The latter has driven the perception in many quarters that admissions to hospital should be preventable and, with regards to readmission particularly, may be due to poor quality hospital care. Clinicians are frequently caught in the crossfire of these arguments—under pressure to discharge patients quickly to free up precious hospital bed capacity but also to ensure ‘safe’ discharge to reduce the risk of further presentation. Primary care physicians are experiencing similar pressures to avoid referral to hospital while at the same time providing safe management of the episode in the patient’s home.

The impact of an AECOPD on an individual is determined by the composite effects of the severity of the acute event (eg, respiratory infection) and the underlying condition of the patient (the respiratory disease and other factors such as multimorbidity). In making clinical judgements about discharge from hospital clinicians need to also take into account the evidence of the patient and their carers that they are ready to leave hospital. It would be fair to say that currently, these judgements are largely subjective and do not routinely incorporate objective measurements of the risk of subsequent readmission to assist in shared decision-making.

Two papers published in this issue of Thorax are relevant to this debate and have the potential to impact on clinical care. Suh et al. used parasternal electromyography (EMG) to measure neural respiratory drive (NRD), a surrogate measure of the load imposed on the respiratory system during hospitalisation for AECOPD. Patients whose EMG_{parasternal, max} (parasternal EMG activity during tidal breathing as a proportion of activity during a maximal sniff manoeuvre) did not fall by 3.1 absolute percentage points were at greater risk of short-term readmission (14 days) suggesting that in these individuals, adequate recovery had not yet occurred. This prediction was superior to other simple assessments such as Medical Research Council (MRC) Breathlessness score, Borg breathlessness score and respiratory rate. Indeed the negative predictive power for readmission in patients where NRD did drop by this amount was in the order of 97%. The measurement performed less well as a predictor of readmission at 28 days only doing so in patients aged less than 85 years in a post hoc analysis.

In a study of similar design, Kon et al. performed 4 m gait speed (4MGS) at discharge in a cohort of patients hospitalised for AECOPD. This simple measurement of the speed an individual walks over a short 4 m course is easy to perform in hospital and is widely used in geriatric medicine as a measure of ‘frailty’ and a risk stratifier for future health outcomes including hospitalisation. The authors observed higher readmission rates at 90 days in patients recording lower quartiles of 4MGS although the measurement was only independently predictive of readmission in patients over the age of 65 years.

These measurements are by no means the first attempts to identify discriminatory biomarkers for future outcomes following AECOPD and hospital admission in particular. Some would appear to relate to the severity or character of the triggering illness (eg, the blood eosinophil count or Dyspnoea, Eosinopenia, Consolidation, Acidemia and atrial Fibrillation (DECAF) score) and will probably be most useful in predicting short-term outcomes (such as hospital mortality or length of stay) or treatment responses. NRD falls into this category with potential to assist with discharge decision-making. Other indicators such as habitual physical activity and bedside measures of muscle mass have been shown to be predictive of hospital readmission after discharge over a longer period (eg, 12 months) and may therefore be indicators of the underlying general health of the patient. The performance of these measures will be affected by the acuity of the event if they are performed before discharge, particularly if they require the cooperation and effort of the patient. It is notable for example that in the study by Greening et al. rectus femoris cross-sectional area measured by ultrasound (a measure independent of patient effort) was predictive of 12-month hospital readmission whereas maximum voluntary quadriiceps strength was not. 4MGS might provide a sensible compromise—a measure that assesses frailty which is easy for staff and patients to perform which appears to retain discriminatory power when performed prior to discharge.

While the studies of Suh and Kon highlight the potential utility of such biomarkers, we need multicentre studies to determine whether these or other measures, when provided to clinicians in the field actually improve decision-making. Standardisation of such measures may not be straightforward. For example the threshold for a significant reduction of NRD of 3.1% was lower than the standard deviation of the initial measurement. Distinguishing genuine change from measurement variation might therefore confound interpretation of the results if rolled out more widely.

Being able to predict future events does not mean they can be prevented. Evidence from the recent UK national COPD audit indicates that hospital mortality and length of stay are reducing but hospitalisation for AECOPD remains a stubbornly prevalent problem. Interventions to identify and treat events earlier following their onset such as telemonitoring or self-management plans have generally failed to reduce hospitalisation rates despite often resulting in more treatment provision in the form of systemic corticosteroids and antibiotics. Phenotype specific exacerbation management, for example using the blood eosinophil count as a biomarker, hold promise not least to reduce harm and waste from unnecessary treatment but it is unknown whether this will impact on admission rates. In broad terms the available evidence suggests that once the acute event is underway, admission (if it is needed) is hard to
prevent. A more promising approach is to implement prevention strategies in the stable state or in the aftermath of the admission. The most effective intervention in this category is pulmonary rehabilitation (PR) which, when provided within 4 weeks of discharge has been shown to reduce re-hospitalisation in the short to medium term (up to 3 months). However, enthusiasm for the widespread provision of post-discharge PR has been tempered by clinical experience which suggests few patients who are offered therapy at the point of discharge are willing or able to attend PR in this time frame. It appears also that comprehensive therapy at the point of discharge PR has been tempered by clinical and managed care programmes requiring hospital care would therefore be considered as ‘planned but unscheduled’ (we know they are going to happen but we don’t know when). This is not to suggest efforts should not be made to prevent hospitalisation. However considering the admission in this way might help ensure the event itself prompts the development of an individualised prevention strategy that can dovetail with wider health promotion measures that are known to have better long-term efficacy in reducing healthcare utilisation such as smoking cessation, physical activity and rehabilitation and activation/engagement of the patient through supported self-management.

Incorporating risk stratification biomarkers such as those described in the Journal into routine clinical assessments may have an important role to play in developing such tailored management plans and cracking this particularly hard-shelled nut.

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REFERENCES