Editorial

Breathing problems in focus

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Respiratory problems are the main symptoms that make people suffer, less able to live an active life, and to experience worsening distress during illness and at the end of life. The importance and consequences of breathlessness have been highlighted as covid-19 has spread and affected millions of people across the human population globally. This focus has fueled increased investigation and improved understanding of the underlying, contributing causes to breathlessness.

This *issue* offers insights in the current state of the art of breathlessness research and management in relation to covid-19, but also in other conditions and more broadly on contributing causes of chronic breathlessness in the population, methods to improve ventilation and oxygenation for symptom relief and impact on family caregivers. Starting off, symptoms and palliative care in covid-19 is reviewed by Janssen [1]. The 'hidden nature' of breathlessness in some people despite having severe disease as well as prolonged or worsening symptoms and disability after the acute covid-19 infection has been discussed. This review is timely as the timing and components of palliative care in covid-19 have been controversial and subject of heated debates in some countries.

Nasal High flow (NHF) oxygen therapy has emerged as an important method to provide titrated and more efficient oxygen supplementation, as reviewed by Munsif *et al*. [2]. Advantages include the provision of warm, humidified gas (compared to the cold and dry oxygen of regular low flow therapy) which can improve patient comfort and adherence, as well as the opportunity to use much higher flow rates which can 'wash out' dead space and decrease carbon dioxide retention. The net clinical benefit between these advantages and potential adverse effects are discussed by the authors to inform improved management of worsening respiratory failure and symptoms. Of note, high flow oxygen therapy has limited evidence for treating acute hypercapnic respiratory

failure, with significant alveolar hypoventilation, where the first line treatment is non-invasive ventilation (NIV) [2].

NIV support for patients with amyotrophic lateral sclerosis (ALS) is reviewed by Barry and co-authors [3]. ALS patients experience deterioration – variable, unpredictable and often rapid, with progressive functional and ventilatory impairment (hypoventilation). NIV is important to improve survival and well-being in many patients but might be complicated by variable degrees of bulbar involvement. NIV is an integral part of a multidisciplinary team management in ALS.

Despite the importance of breathlessness for the individual and society at large, there are a dearth of studies on the epidemiology of breathlessness and underlying, contributing conditions in the population. Data for middle and high income countries are scarce – and for low income settings non-existent. Sandberg et al. review recent advancements in our understanding of contributing causes and their overlap in populations, as well as methods to explore the interplay of the multiple causes (genetic, physiological, psychological, social, etc.) of the symptom, such as machine learning [4]. As editors we also acknowledge the importance, needs and recent advances in the research and management of chronic cough; planned contributions on chronic cough were impacted by the ongoing pandemic, and will covered in forthcoming *issues*.

Pulmonary fibrosis is an important and increasing cause of chronic and worsening breathlessness. As reviewed by Lindell and colleagues [5], caregivers play such a pivotal role supporting patients but experience a range of unmet caregiver needs related to symptom management, access to care, advanced care planning and psychological support. The paper discusses alleviation through comprehensive support tailored throughout the disease course.

New treatment options for breathlessness are needed and would function as game changers in research and management of this pervasive symptom. The upside of the complex mechanisms contributing to breathlessness is the multitude of potential factors to target. L-menthol administered (nebulized) to the upper airways is a promising candidate, as reviewed by Kanezaki *et al.* [6]. Activating the transient receptor potential melastatin 8 (TRPM8), L-menthol has been reported to increase the perceived level of ventilation despite no real change in respiratory function. Thus, the airways may signal that the person is breathing more (than is actually the case), reducing any mismatch between the respiratory drive (need to breathe) and the breathing perceived. Breathlessness is integrated and perceived by the brain, and L-menthol may be a white lie for symptoms relief.

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