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Cardiopulmonary Collaboration in Respiratory Care: Shifting the Paradigm

Pierre Landry, MD

Our Patients Do Not Exist in a Vacuum—Their Care Should Not Either

In recent years, the management of chronic obstructive pulmonary disease (COPD) has evolved from a symptom driven focus to prioritizing the reduction of exacerbations, with a view to preventing morbidity and mortality. This treatment landscape continues to evolve, with biologic therapies on the horizon that promise to substantially alter the current paradigm centred on inhaled therapies. While other jurisdictions have approved dupilumab and mepolizumab as add-on therapies to prevent COPD exacerbations, these options are not yet approved for use in Canada. Regardless of regulatory status, the foundation of COPD therapy remains the same: triple inhaled therapy, combined with inhaled corticosteroids, long-acting anti-muscarinic agents, and long-acting beta-agonists. At the time of enrolment in the studies, single inhaler triple therapy (SITT) was not yet the standard of care; however, the majority of enrolled patients (over 98%) were receiving all three components.[1,2] While multiple inhaler triple therapy was permitted, both studies demonstrated a statistically significant reduction in COPD exacerbations.[1,2] Biologics are intended as an add-on to baseline therapy, yet many patients remain undertreated and lack access to SITT.

Our Canadian COPD guidelines have emphasized a clear preference for SITT, advocating for its rapid initiation in highly symptomatic patients, and those at increased risk of exacerbations.[3] SITT has been demonstrated to reduce exacerbations and mortality, contributing to a reduction in hospitalizations and emergency department visits.[3] Nevertheless, many patients remain on inadequate therapy and continue to face an elevated risk of exacerbations, thus predisposing them to increased mortality. In both the ETHOS and IMPACT trials, the most commonly adjudicated causes of death were cardiopulmonary in nature.[3-6]

Single inhaler therapy has been shown to be safe, effective, and economical. The number needed to treat (NNT) to prevent a moderate or severe COPD exacerbation is 1:4, while the number needed to harm (NNH) for pneumonia is 1:33.[3] Despite this favourable profile, there appears to be hesitancy regarding initiation of therapy. Whether this stems from regulatory barriers regarding access to medication, hesitancies based on risk perception pertaining to pneumonia or other adverse events, or gaps in knowledge, this is a situation which deserves urgent attention, in light of the simplicity and effectiveness of this intervention.

Beyond Breathing- Understanding Cardiopulmonary Risk

Exacerbations increase the risk of cardiopulmonary deaths[4-6] as well as elevate the risk of cardiac events. This signal is not associated solely with myocardial infarctions, but includes arrhythmias, congestive heart failure, and stroke.[4,5,7] Conversely, COPD exacerbations are frequently observed in patients admitted for cardiac issues. Exacerbations of either condition not only complicate but also potentiate hospital admissions. Compared to patients without comorbid heart failure, those with comorbid COPD and heart failure have a 1.61-fold higher risk of all-cause mortality, and 2.01-fold higher risk of COPD-related hospitalization.[8] Patients with COPD are also more likely to have risk factors such as hypertension and diabetes, while COPD itself is an independent risk factor for major adverse cardiac events, even in the absence of established cardiac disease.[7]

There are many plausible factors contributing to this association. While smoking is a common risk factor that is shared by both conditions, it is not the sole explanation. A complex interplay of many factors, including social determinants of health, along with certain biological and physiological factors has been proposed.[7] Cardiovascular causes of death are common across all stages of COPD, with the risk of adverse cardiac outcomes persisting for up to one-year post-exacerbation.[3] At milder and moderate stages of COPD, cardiovascular-associated deaths are more likely than respiratory related causes of death.[7]

Prior exacerbations are the strongest predictor of future exacerbations.[3,7] Additionally, an elevated symptom burden is associated with an increased risk of hospitalization in the next 12 months, and those with frequent productive cough appear to be at an increased risk of major cardiovascular events over the following 3 years.[7]

The relationship between cardiovascular and pulmonary outcomes are, as of yet, not fully understood. Proposed mechanisms revolve around a few factors: systemic inflammation spurred by underlying pulmonary inflammation, which may drive atherothrombosis; hyperinflation leading to reduced cardiac output and impaired oxygenation; and pulmonary vasoconstriction resulting in pulmonary hypertension, right ventricular dysfunction, and reduced cardiac output.[7]

COPD Exacerbations are Costly to Patients and Health Systems

COPD exacerbations are the second most common cause of hospitalization in Canada after childbirth,[9] and are projected to cost our healthcare system $1.5 billion annually.[10] In contrast to peripartum care, however, the average length of stay for a COPD admission is longer, at 7.2 days vs 2.2 days for peripartum care.[9] The annual direct cost per COPD patient is estimated to be between $3,910 to $6,690 (CAD), with combined total direct and indirect costs expected to exceed $9 billion by 2030.[11]

COPD remains a common comorbidity, affecting at least 10% of Canadian adults.[10] Despite this, COPD is underdiagnosed—current estimates suggest that approximately half of all cases remain undiagnosed. Those of us working in COPD care also recognize that misdiagnosis is common: many patients labelled with COPD show no evidence of airflow obstruction on spirometry,[12] and many others have not undergone spirometry testing to confirm their diagnosis. While hospitalization for COPD is increasing, associated mortality has declined;[13] however, it remains elevated, with an in-hospital and 90-day post discharge mortality rate of approximately 11.1%.[3] COPD exacerbations often result in irreversible lung function decline, and over half of patients hospitalized for an exacerbation die within 3.6 years of their first admission.[7] In our current Canadian healthcare climate, marked by persistent hospital overcrowding among other resource constraints, every attempt at preventing exacerbations should be undertaken.

Copd Care Faces Myriad Barriers

COPD care requires a multidisciplinary approach. Clinicians providing care for COPD patients span a wide spectrum, including family physicians, nurse practitioners, other internal medicine subspecialists, respiratory therapists, and nurses. It is likely that not all providers are aware of the serious repercussions of COPD exacerbations. Mortality risk is well established,[3] and a history of prior exacerbations is a strong predictor of subsequent exacerbations.[14] A 4 month delay in initiating triple therapy was associated with an increased risk of hospital readmission, both from COPD-related causes (15%), and all causes (22%), in addition to healthcare visits, overall healthcare costs, and the risk of disease progression.[14]

In the PRIMUS Study,[8] patients who experienced delays in initiating triple therapy were more likely to have a higher degree of baseline comorbidities and be covered by Medicaid.[14] This is replicated in the Canadian environment, where those with public drug coverage encounter many regulatory barriers to prompt SITT initiation, including requirements for mandatory waiting periods between therapeutic class escalations.[15] Drug coverage remains heterogeneous across the country owing to the provincial structure of healthcare provision, and the combination of private and public drug reimbursement schemes. Non-pharmacological interventions, including smoking cessation programs and pulmonary rehabilitation, are under-resourced and unavailable to many patients across the country.[7] This challenge is compounded by the fact that smoking remains the primary cause of COPD in Canada, and nicotine addiction is a major public health issue impacted by many factors including social determinants of health.

Furthermore, patients encounter barriers to accessing COPD care. Beyond frequent under or misdiagnosis, access to primary and specialty care is challenging for many patients. A substantial number of them lack a primary care provider, and respiratory medicine specialists are scarce. In Ontario, it was found that only 10% of patients with COPD receive a referral to a respirologist.[13] Accurate COPD diagnosis revolves around spirometry, yet this service is effectively unavailable in many parts of the country, owing to prolonged wait times and inefficient access.

System issues notwithstanding, patients face their own barriers. Non-adherence to prescribed therapies remains a major issue, as does poor health literacy.[8] On the provider side barriers exist as well, with therapeutic inertia and clinical nihilism impacting the quality of COPD care.[8] In addition, providing inappropriate therapy is also a major factor,[8] with many patients remaining undertreated for their disease.

Why Does This Matter?

We have therapies that are safe, effective, and simple to use that have been demonstrated to be cost effective.[13] These therapies have favourable side effect profiles, require no titration, and demonstrate efficacy across pulmonary and cardiac medicine. COPD exacerbations are common, they should be recognized as punctuations in the trajectory of illness, which can result in irreversible declines in health. It is time to acknowledge the public health importance of COPD, and its exacerbations, recognizing that their impact extends far beyond worsening pulmonary symptoms. Respirologists should champion these simple and effective interventions, and emphasize their importance to colleagues across the spectrum of medical subspecialties, as stakeholder involvement is key to reducing this public health burden.

Medical trainees and attending physicians alike can readily recite the four pillars of heart failure management and recognize the benefits of standardized medical therapies post myocardial infarction. These interventions are rote, and ingrained as standard of care, and cardiac rehabilitation is routinely offered at hospital discharge. Why then, do our patients with COPD leave hospital on ineffective and outdated therapies? Why does COPD care differ so markedly, given the close relationship with cardiovascular disease?

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