CASE OF ADVANCED COPD: LESSONS LEARNT

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ABSTRACT

A case study of a 76-year-old man with end-stage chronic obstructive pulmonary disease (COPD) with refractory breathlessness and the challenges in managing the dyspnoea he had been experiencing are described. A multi-modal approach is the mainstay of management, encompassing pharmacological agents, home oxygen therapy, and non-pharmacological approaches, namely: breathing techniques and smoking cessation. As this patient was at an advanced stage of disease, integration of palliative care with disease care was needed. Administering oxygen therapy for a patient who is still smoking and has household members who are current smokers need firm adherence to rules. The AIC HOME Programme is also briefly described.

Keywords: Advanced Chronic Obstructive Pulmonary Disease; Dyspnoea; Home Oxygen Therapy; Smoking;

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INTRODUCTION

Mr. M, a 76-year-old Malay gentleman was seen during a home visit made with the AIC advanced disease homecare team in August 2016. He was enrolled into this program called AIC HOME Programme (Agency of Integrated Care HOlistic MEdical Programme) in June 2016 when he declined further hospitalizations and clinic visits for end-stage COPD. In this case study, we illustrate the challenges of managing dyspnoea in such a patient.

In the AIC HOME Programme, advanced COPD patients receiving homecare are managed by a multi-disciplinary team of primary care physicians, trained nurses, medical social workers, and counsellors. It looks after advanced COPD patients, advanced renal and heart failure patients at home.

PATIENT'S REVELATION

"Just as I was feeling relieved..." Mr. M remarked with a tinge of disappointment as the safety alarm of the oxygen concentrator went off and the stream of oxygen came to a halt. The smell of cigarette smoke wafting in from the adjoining patio where his teenage grandsons were explained it all. The smoke had triggered the safety alarm of the oxygen concentrator, grinding it to an abrupt halt.

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Case history

The 76-year-old ex-security officer had been enrolled into the AIC HOME Programme just two months earlier for management of advanced COPD in the community-setting. He was diagnosed with COPD six years ago, in 2010. His perpetual non-adherence to smoking cessation had culminated in an increasing number of hospitalizations for COPD exacerbations. In the first year of being diagnosed, he was only admitted once. Within the sixth year, he had accrued five hospital admissions (timeline in Figure 1 and Table 1).



TABLE 1. MR. M'S COPD EXACERBATIONS FROM DIAGNOSIS TO HOME VISIT

Date	Significant Events
May'10	- COPD diagnosed
	- Presented with a month of chronic cough; Spirometry-
	FEV1 56%, FEV1/FVC 71%
Mar'11	- Admitted for AECOPD
Apr-	- Required BiPAP for type 2 respiratory failure, failed trial of
Jun'12	BiPAP and needed intubation and ICU admission
	- Developed septic shock secondary to community-acquired
	pneumonia
	- Developed right-sided pneumothorax while receiving
	invasive ventilation, chest tube inserted
	- Recovered, extubated and discharged
	- Long-term oxygen therapy initiated and COPD medications
	restarted
	- Defaulted follow-up
Dec'13	- Admitted for stroke, COPD medications restarted
	- Recovered and discharged but defaulted follow-up
Jun'15	- Admitted for AECOPD with type 2 respiratory failure
	- Refused BiPAP and extent of care discussed
	- Continued smoking and later defaulted follow-up
Aug'15	- Admitted for myocardial infarction, underwent percutaneous
	coronary intervention
	- Noted to have impaired left ventricular ejection fraction of
	45% and apical thrombus; started on warfarin

Nov'15	Admitted for AECODD accordant to community acquired
100 15	- Admitted for AECOPD secondary to community-acquired
	pneumonia
	- Concomitant fluid overload
Feb'16	- Admitted for AECOPD secondary to community-acquired
	pneumonia
	- Concomitant fluid overload
May'16	- Admitted for AECOPD secondary to community-acquired
Jun-	- Admitted for AECOPD secondary to healthcare-associated
Jul'16	pneumonia
	- Not compliant to BIPAP initiated for type 2 respiratory
	failure
	- Palliative referral made and eventually referred to AIC
	HOME Programme
Jul-	- Admitted for AECOPD secondary to community-acquired
Aug'16	pneumonia
	- Concomitant fluid overload- 2D Echocardiogram showed
	ejection fraction had further reduced to 40%
	- Trial of BiPAP to alleviate symptoms
	- Discharged and follow-up by AIC HOME Programme
	resumed
Late	- Home visit
Aug'16	

Within the brief span of a few months, the overwhelming dyspnoea had led to significant functional-impairment and social isolation. The previously independent man was now only able to walk to the coffeeshop a street away from his home while assisted by his helper. Ambulating within the living room of the five-room flat alone left him visibly breathless.

Examination findings

On examination at the home visit, his blood pressure was 80/50mmHg, heart rate 59/min and SpO2 89-95% on 2L nasal prongs. On auscultation, he had scattered crepitations and rhonchi over bilateral lung fields and he had marked bipedal pitting oedema. These were in keeping with cor pulmonale.

INSIGHTS

Mr. M's revelation triggered the following insights:

- 1. Looking at the timeline, what would have helped Mr. M with his breathlessness?
- 2. How should he have used the oxygen therapy?
- 3. How do we deal with the smoking situation?

MANAGEMENT

Applying the insights in our management, the following were implemented at the home visit:

I. Looking at the timeline, what would have helped Mr. M with his breathlessness?

In this patient with advanced disease, an integration of disease care and palliative care was desired, namely: the integration of palliative care principles (symptom relief, optimizing quality of life, and not striving to prolong life unduly) and disease specific therapies were desired.¹

Pharmacological agents

His dyspnoea was multi-factorial and the selected pharmacotherapy was targeted to alleviate these individual biological causes, besides the use of morphine for pure palliation of dyspnoea.² This has been the basic principle for pharmacological management of dyspnoea in end-stage COPD.³ In the history and assessment, we concluded that his dyspnoea was chiefly secondary to fluid overload, reversible airflow limitation and the ongoing airway inflammation.

Bronchodilator and inhaled steroids. In terms of the component of reversible airflow limitation caused by his COPD, he was told to continue with the prescribed inhaled therapy (consisting both short and long-acting beta2 agonists, muscarinic antagonists and corticosteroids) for their bronchodilating and anti-inflammatory effects. He said he had been compliant.

Diuretic. Fluid overload management was a challenge. It was not fully amenable as the dose of diuretics that could be used was ceilinged by his precariously low blood pressure.

Vaccinations. What could have been lacking was ensuring his pneumococcal and influenza vaccinations were up to date, to minimize infective exacerbations.

Non- Pharmacological approaches

Mr. M's dyspnoea was most pronounced on exertion (in undertaking daily activities). Non-pharmacological measures such as activity-modification, pacing of activities and pulmonary rehabilitation were introduced, for him to go about performing daily activities with minimal exertional dyspnoea. Due consideration was also given to the effects dyspnoea had on his emotional state. Dyspnoea is known to trigger anxiety and this intensifies the feeling of dyspnoea^{4, 5}. Dyspnoea limits activity tolerance, resulting in confinement to one's home and social isolation, often engenders low mood or even depression ^{4, 5}. Simple exercises to improve endurance were also taught in a bid to increase his sense of control over his condition and symptoms and minimize anxiety. Activity-modification alongside pulmonary rehabilitation allowed sustained participation in activities of daily living, with the aim of minimizing any sense of "loss of independence" and social isolation. These measures were readily adopted by Mr. M. Measures that are goal-directed and tailored in accordance to a patient's values, which also addressed the emotional needs stemming from his condition and circumstance- naturally promoted adherence. In reviewing palliative care in the context of advanced COPD, Harington et al also advocated incorporating pulmonary rehabilitation into home visits.¹

2. How should he have used the oxygen therapy?

Although Mr. M qualified for the use of long-term oxygen

therapy (LTOT), we did not advocate this. LTOT would entail oxygen therapy of at least 15 hours a day. Traditionally, LTOT has been directed towards improving survival benefit.⁶⁻⁹ However, in the recent Long-Term Oxygen Treatment Trial Study, the use of LTOT did not confer a survival benefit.¹⁰ Neither did it lessen the propensity towards anxiety or depression for those with advanced COPD.¹⁰ In his case, oxygen therapy was primarily to improve exercise endurance during activity and minimize dyspnoea while undertaking activities of daily living.¹¹ By definition, this would be classified as ambulatory oxygen therapy (AOT).⁶ He had been instructed to use it in anticipation of dyspnoea triggered by activities. With limited benefits of LTOT, coupled with the potential drawback of LTOT resulting in him being self-conscious of his reliance on supplemental oxygen, we had opted to prescribe AOT to him instead. Low-flow oxygen therapy to maintain oxygen saturations at 90-92% during activities was prescribed, to avoid inhibiting his respiratory drive as he had Type II respiratory failure.

3. How do we deal with the smoking situation?

Notably, the presence of smokers in the house combined with home oxygen therapy posed a fire hazard. While smoking cessation in Mr. M's case would have attenuated further progression of COPD, it was equally pivotal in avoiding fire hazards. Smoking cessation for Mr. M and his household members would have been of utmost importance for this reason. If this could not have materialized (because of the tenacity of addiction to smoking), it would have been necessary to ensure they do not smoke in the house. Gentle dissuasion often proves to be ineffective - as illustrated by the response from Mr. M's grandsons.

There is currently no local data available regarding the proportion of patients receiving oxygen therapy and who are still current smokers or have household members who are current smokers. However, based on US data, an estimated 14-51% of domiciliary oxygen users continued smoking.¹² Lacasse et al highlighted that smoking is not a strict exclusion criterion in current guidelines for domiciliary oxygen therapy, which may explain these numbers.¹³

To encourage adherence to avoid smoking in the household and even smoking cessation, the incentive of a more liberal use of oxygen therapy could have been reinforced to Mr. M and his family.

EPILOGUE

Mr. M was told that the AIC staff nurse will visit him again in two weeks to see his progress with the home oxygen therapy and also dyspnea control. He was happy. We were told a week later that he had passed away in his sleep.

DISCUSSION

This case study shows contextually the areas of learning in managing Mr. M as an example of a patient with advanced

COPD.

What is known?

End stage COPD is a challenge to the patient, family members, and the health care team. We should continue to try to encourage smoking cessation. A recent paper by Tashkin provides strategies to achieve smoking cessation.¹⁴ Basic exercises to improve endurance and appropriate pacing can be implemented and are efficacious. They not only help manage dyspnoea per se, but also address the negative emotions such as anxiety, low mood, loss of independence and social isolation that plague patients with chronic dyspnoea.

While AOT can minimize exertional dyspnoea, it should only be prescribed on the premises that smoking cessation within the household has been ensured. Firm handling of non-smoking when oxygen therapy is in progress was insisted.

Finally, sudden demise although unpredictable, is an expected trajectory. Ek et al describes two patterns of unpredictable death: a temporary improvement where death was unexpected; a continued deterioration where death was inevitable. Mr. M belongs to the first pattern.¹⁵

What is new?

AIC HOME Programme. Not many family physicians may be aware that there is a home-based programme for advanced disease patients. The patients are seen at home and the frequency is determined by the symptom severity as their disease progress: from monthly for the stable ones, to fortnightly for the stable but slowly progressive ones e.g., COPD with frequent acute exacerbations, to very symptomatic and end of life patients where they are seen weekly or more frequent than that.

Oxygen therapy. Advanced COPD marks the far end of the disease spectrum. The availability of portable oxygen concentrators, without the need for bulky stored oxygen cylinders, is a valuable assistive device for such patients.

Specific lessons learnt from this patient

Trajectory of COPD. COPD is marked by increasing frequency of acute exacerbations. Mr. M's case was just too late in the trajectory of disease for anything to delay deterioration to be done. The question is whether Mr. M could have his breathlessness slowed down by more intensive efforts, including intense efforts at smoking cessation.

Oxygen therapy. In refractory dyspnoea with hypoxemia due to COPD, oxygen can relieve symptoms, as shown by Mr. M. The continued function of the machine demanded a non-smoking environment. It is a good parallel to show smoking patients what smoking does to human lungs – stop them from functioning. In Mr. M, it was quite clear what he and his grandsons should have done. Ambulatory oxygen therapy, while not being equivalent to long-term oxygen therapy (in that the latter arguably demonstrated the benefit of improved survival in earlier

studies)- suffices to meet the needs of a patient with end-stage COPD in alleviating dyspnoea and not resulting in undue restraint secondary to the use of medical paraphernalia.

Low dose opioid. The use of low dose opioid to relieve refractory breathlessness may not be known to patients and their caregivers.

CONCLUSONS

The conclusions to be made from this case study are:

- 1. Dyspnoea for advanced COPD patients is often multi-factorial and a methodical approach in dissecting the exact aetiology is essential for prescribing the appropriate pharmacotherapy, oxygen therapy and non-pharmacological approaches.
- 2. Intermittent home oxygen therapy alleviates exertional dyspnea and its use should be encouraged to achieve an oxygen saturation of 90-92%.
- 3. Fire hazards need to be emphasized while oxygen is being used. Specifically, the presence of family smoking within the compounds of the house should be stopped.
- 4. Low dose morphine helps to relieve refractory breathlessness and should be used.
- 5. Pulmonary rehabilitation and pacing of activities enable patients to maximize endurance and engagement in daily activities, optimize social engagement and therefore minimize of loss in function, social isolation and even low mood.
- 6. AIC HOME Programme is a home-based, multi-disciplinary team programme for advanced COPD patients as well as advanced renal and heart failure patients. The referral to AIC is made by the hospital specialist for a patient, whom this programme may help to reduce admissions and promote a better quality of life through better continuing advanced disease care.

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