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THE SINGAPORE FAMILY PHYSICIAN

PERMIT NO. MCI (P) : 058/12/2012

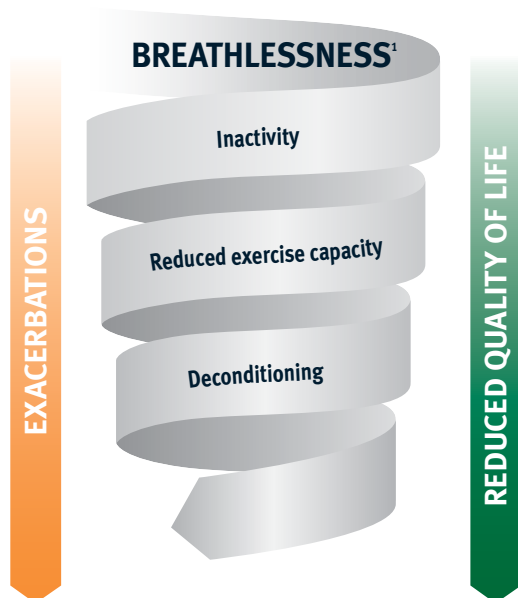
VOL 39(2) APRIL-JUNE 2013

CHRONIC LUNG DISEASE



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References: 1. Decramer M. Tiotropium as essential maintenance therapy in COPD. *Eur Respir Rev.* 2006;15:51-57. 2. Global Initiative for Chronic Obstructive Lung Disease. Global Strategy for the Diagnosis, Management, and Prevention of Chronic Obstructive Pulmonary Disease. Updated 2010. www.goldcopd.org. Accessed June 24, 2011. 3. Hurst JR, Vestbo J, Anzueto A, et al. Susceptibility to exacerbation in chronic obstructive pulmonary disease. *N Engl J Med.* 2010;363(12):1128-1138. 4. O'Donnell DE, Flüge T, Gerken F, et al. Effects of tiotropium on lung hyperinflation, dyspnoea and exercise tolerance in COPD. *Eur Respir J.* 2004;23(6):832-840. 5. Casaburi R, Mahler DA, Jones PW, et al. A long-term evaluation of once-daily inhaled tiotropium in chronic obstructive pulmonary disease. *Eur Respir J.* 2002;19(2):217-224.



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C O N T E N T S

EDITORIAL

4

Chronic Lung Disease

A/Prof Goh Lee Gan

DISTANCE LEARNING COURSE ON “CHRONIC LUNG DISEASE”

6

Overview of “Chronic Lung Disease” Family Practice Skills Course

A/Prof Goh Lee Gan

8

Unit 1: Epidemiology of Chronic Obstructive Pulmonary Disease (COPD)

A/Prof Ng Tze Pin

11

Unit 2: Guidelines for COPD & Non pharmacological Interventions

A/Prof Lee Pyng

15

Unit 3: A New GOLD Standard – Pharmacological Interventions of COPD

Adjunct Assistant Prof Augustine Tee

19

Unit 4: The Overlap Syndrome of Asthma & COPD

Dr Ong Kian Chung

21

Unit 5: Pulmonary Rehabilitation

Dr Ong Kian Chung

25

Unit 6: Community Care: A Team Based Approach to Managing Chronic Lung Disease

Dr Gerald Chua

30

Assessment of 30 MCQs

READINGS

36

A Selection of Ten Current Readings on “Chronic Lung Disease”

PRISM SECTION

44

Managing a 14-year-old Female Teenager Presenting with a Sexually Transmitted Infection

- What are the Issues Involved?

Dr Ong Shu Min

51

Guidelines and Information for Authors

Permit No. MCI (P) 058/12/2012

JOURNAL OF THE SINGAPORE FAMILY PHYSICIAN

Printed by Providence Company

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CHRONIC LUNG DISEASE

A/Prof Goh Lee Gan

SFP2013; 39(2): 4

The theme of this Family Practice Skills Course is Chronic Lung Disease and the spotlight is on Chronic Obstructive Pulmonary Disease (COPD). This condition is the 6th chronic disease identified in its 10 chronic conditions in the Ministry of Health's Chronic Disease Management Programme (CDMP).

A few more numbers to add to COPD. MOH has identified COPD as one of the 5 disease conditions amenable to intervention via an integrated care pathway (ICP). COPD was the 7th principal cause of death in Singapore with about 440 deaths. COPD was also the 7th most common condition for hospitalisation with more than 10,000 admissions in 2010.

The first unit in this Family Practice Skills Course dealt with the epidemiology of COPD. The key point to note is that it is under-recognised and under-diagnosed. COPD is more likely to be reported as contributory rather than the underlying cause of death or morbidity. In elderly patients, most cases of COPD are undiagnosed, because they are attributed to old age or labelled as asthma. A past history of asthma is often elicited in patients with COPD, and is a recognised risk factor for COPD, but COPD and asthma as distinct co-existing diseases are seldom clinically recognised as such. In developing countries, past tuberculosis is also common, and recent studies support its role as a risk factor for COPD.

In Unit 2, the guidelines for COPD and non-pharmacological interventions are discussed. Evidence on the natural history of COPD demonstrates that early institution of long acting bronchodilator therapy slows the rate of lung function decline and reduces frequency of exacerbations that can lead to further functional decline. The goals of therapy are symptom control, reduce exacerbations, and maintain quality of life. Smoking cessation is worthwhile at any stage of the disease.

In Unit 3, we note that the 2011 revision of the GOLD global strategy on COPD is a major paradigm shift in diagnosis and management of the disease. Detailed assessment of current symptom control and future risk of exacerbation allows categorisation of the patient into one of 4 categories, each with pharmacological interventions linked to each of these categories.

Units 4 deals with the overlap "syndrome" of asthma &

COPD, with a new label of Asthma-COPD Overlap "Syndrome" (ACOS). The key take home message is such patients have high disease burden compared to the asthma alone or COPD alone patient. They are also at increased risks of frequent exacerbations and therefore their treatment should be optimised before hospital discharge. Also rehabilitation immediately after an exacerbation has been shown to be safe and effective to prevent further exacerbations requiring hospitalisation.

Unit 5 focuses on pulmonary rehabilitation (PR). This has emerged as a standard of care for patients with COPD. PR identifies and treats the systemic effects of the disease and the positive outcomes are achieved without demonstrable improvements in lung function. It is multidisciplinary, patient centred and provides a comprehensive assessment upon which the three components of exercise training, self-management education, and psychosocial/behavioural intervention are conducted over a period lasting 6 to 12 weeks.

Unit 6 focuses on a team based approach to managing chronic lung disease that is being implemented by JurongHealth as its first Integrated Care Pathway (ICP) model of care. In the COPD ICP Team approach, the execution of care is based on 5 interdependent tenets: (1) Every patient has a primary care physician; (2) Every patient's care should be delivered as a set, rather than individual components; (3) Every patient has a single health record; (4) Every care process must represent value to the patient; (5) Every patient must be helped to navigate care, and supported to remain in care. Of note is the care is supported by care managers, communication links for tracking response to therapy, IT support, and equipment support.

The PRISM column in this issue has a paper on managing a 14-year-old female teenager presenting with a sexually transmitted infection. It is a good case to learn vicariously what should be done. In Singapore, sex with a minor is considered a seizable offence. The law dictates that anyone aware of such an offence being committed has a duty to inform the authorities. Doctors often come across this type of sticky situation and are sometimes unsure of what to do next. The paper deals with the ethical and legal considerations when faced with such a situation. A necessary read for all practitioners.

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Institute of Family Medicine, College of Family Physicians Singapore



“CHRONIC LUNG DISEASE” FAMILY PRACTICE SKILLS COURSE

- Overview of “Chronic Lung Disease” Family Practice Skills Course
- Unit 1 : Epidemiology of Chronic Obstructive Pulmonary Disease (COPD)
- Unit 2 : Guidelines for COPD & Non pharmacological Interventions
- Unit 3 : A New GOLD Standard – Pharmacological Interventions of COPD
- Unit 4 : The Overlap Syndrome of Asthma & COPD
- Unit 5 : Pulmonary Rehabilitation
- Unit 6 : Community Care: A Team Based Approach to Managing Chronic Lung Disease

OVERVIEW OF “CHRONIC LUNG DISEASE” FAMILY PRACTICE SKILLS COURSE

A/Prof Goh Lee Gan

SFP2013; 39(2): 6–7

INTRODUCTION

The theme of this Family Practice Skills Course is on chronic lung disease and the focus is on chronic obstructive pulmonary disease (COPD). COPD is the number 6 out of the 10 chronic diseases spot-lighted under the Ministry of Health's Chronic Disease Management Programme (CDMP) to be chosen.

There are now enough new things about COPD to justify a skills course with the disease taking the limelight. Thanks are due again to the many people who make this course a worthwhile experience for the course participants: all the speakers, writers and chairpersons who have made the delivery of this course possible. This Family Practice Skills Course is supported by an educational grant from Boehringer Ingelheim and we need to thank them too.

For the course participants we are very happy that the speakers have taken the time and effort to write a set of notes for The Singapore Family Physician. As the articles in The Singapore Family Physician are available at the College website 24/7, the dissemination of current information will be widened. We look forward to the participation of family physicians in this Skills Course.

COURSE OUTLINE AND CME POINTS

This Family Practice Skills Course is made up of the following components. You can choose to participate in one or more parts of it. The CME points that will be awarded are also indicated below.

Components and CME Points

- Distance Learning Course – 6 units (6 Core FM CME points upon attaining a minimum pass grade of 60% in Distance Learning Online MCQ Assessment)
- 2 Seminars (2 Core FM CME points per seminar)
- 2 Workshops (1 Core FM CME point per workshop)
- 10 Readings – read 5 out of 10 recommended journals (maximum of 5 CME points for the whole CME year)

GOH LEE GAN, Professorial Fellow, Division of Family Medicine, University Medicine Cluster, National University Health System
Director of Academic Development, Institute of Family Medicine, College of Family Physicians Singapore

Distance Learning Course

Unit 1: Epidemiology of Chronic Obstructive Pulmonary Disease (COPD)

A/Prof Ng Tze Pin

Unit 2: Guidelines for COPD & Non-pharmacological Interventions

A/Prof Lee Pyng

Unit 3: A New GOLD Standard – Pharmacological Interventions of COPD

Adjunct Assistant Prof Augustine Tee

Unit 4: The Overlap Syndrome of Asthma & COPD

Dr Ong Kian Chung

Unit 5: Pulmonary Rehabilitation

Dr Ong Kian Chung

Unit 6: Community Care: A Team Based Approach to Managing Chronic Lung Disease

Dr Gerald Chua

COURSE TOPIC DETAILS

Unit 1: Epidemiology of Chronic Obstructive Pulmonary Disease (COPD)

- Introduction
- Clinical epidemiology
- Medical comorbidity
- Clinical profile
- Population prevalence and risk factors

Unit 2: Guidelines for COPD & Non-pharmacological Interventions

- Introduction
- Lung Function Decline
- Role of Exacerbations
- Current Approach to COPD Management

Unit 3: A New GOLD Standard – Pharmacological Interventions of COPD

- Introduction
- Focus on Symptom Evaluation into 4 Category Classification
- Matching Pharmacological Management to 4 Category Classification
- Advice from GOLD 2011 Update
- Conclusion

Unit 4: The Overlap Syndrome of Asthma & COPD

- Introduction
- What is it?
- How big is it?
- Why is it important?
- How to deal with it?
- Conclusion

Unit 5: Pulmonary Rehabilitation

- Introduction
- Definition
- Effects of pulmonary rehabilitation
- Factors related to mortality in COPD
- The place of pulmonary rehabilitation programme
- Components of pulmonary rehabilitation
- Post-exacerbation reduction of exacerbations
- Maintaining benefits and integrating care
- Conclusion

Unit 6: Community Care: A Team Based Approach to Managing Chronic Lung Disease

- Introduction
- The Integrated Care Pathway
- The COPD ICP Team Approach
- Conclusion

FACE-TO-FACE SESSIONS**Seminar 1: 11 May 2013, 2.00pm – 4.00pm**

Unit 1: Epidemiology of Chronic Obstructive Pulmonary Disease (COPD)

A/Prof Ng Tze Pin

Unit 2: Guidelines for COPD & Non-pharmacological Interventions

A/Prof Lee Png

Unit 3: A New GOLD Standard – Pharmacological Interventions of COPD

Adjunct Assistant Prof Augustine Tee

Workshop 1: 11 May 2013, 4.30pm – 5.30pm

Case Studies: Mild, Moderately Severe and Severe COPD Patient

Adjunct Assistant Prof Augustine Tee

Seminar 2: 12 May 2013, 2.00pm – 4.00pm

Unit 4: The Overlap Syndrome of Asthma & COPD

Dr Ong Kian Chung

Unit 5: Pulmonary Rehabilitation

Dr Ong Kian Chung

Unit 6: Community Care: A Team Based Approach to Managing Chronic Lung Disease

Dr Gerald Chua

Workshop 2: 12 May 2013, 4.00pm – 5.30pm

Inhaler Techniques; Spirometry Use and Interpretation

Dr Ong Kian Chung

ABSTRACT

COPD is a major cause of morbidity and mortality. Its social and economic burden is expected to increase worldwide in coming decades. COPD is under-recognised and under-diagnosed. It results in disproportionately more numbers of physician visits, emergency department visits and hospitalisations than most other diagnoses. It is increasingly recognised that COPD is commonly accompanied by co-morbid medical conditions, cardiovascular disease, hypertension, diabetes, osteoporosis, chronic kidney disease, cognitive impairment and depression, due to systemic inflammation which impact on quality of life and survival. The prevalence of COPD among adults aged 40 and above varies widely from 8% to 26%. The most widely recognised risk factor for COPD is smoking, but non-smoking factors include biomass fuel, occupational exposure to dusts and gases, history of pulmonary tuberculosis, chronic asthma, respiratory-tract infections during childhood, outdoor air pollution, and poor socioeconomic status.

Keywords:

disease burden, comorbidity, prevalence, smoking, social and environmental factors.

SFP2013; 39(2): 8-10

INTRODUCTION

Chronic obstructive pulmonary disease (COPD) is a global health problem. It is a major cause of morbidity and mortality world-wide and carries a substantial and increasing economic and social burden. According to the World Health Organisation (WHO) Global Burden of Disease Study, COPD was the 6th leading cause of death worldwide in 1990; by 2030, it will be the 4th leading cause of death.¹ In terms of social burden of disease quantified by disability-adjusted life-years (DALYs) lost, COPD ranked as the 12th leading cause of DALYs lost worldwide in 1990, but will be the 7th leading cause of DALY lost worldwide in 2030.²

This global rise of COPD mortality and morbidity in the next decades is due to increasing trends in the proportion of older people in the population, limited progress in improving survival outcomes among COPD patients, high and increasing prevalence of risk factors for COPD. The global rise in morbidity and mortality from COPD will be particularly dramatic in the Asia-Pacific where two major recognised risk factors for COPD, tobacco smoking and indoor air pollution from domestic use of biomass fuel, remain highly prevalent.

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COPD is under-recognised and under-diagnosed.³ Published health statistics underestimate COPD as a cause of death due to the imprecise and variable diagnosis of COPD. COPD is more likely to be reported as a contributory rather than underlying cause of death or morbidity, or may not be reported at all. In elderly patients, most cases of COPD are undiagnosed, because they are attributed to old age or labelled as asthma. A past history of asthma is often elicited in patients with COPD, and is a recognised risk factor for COPD, but COPD and asthma as distinct co-existing diseases are seldom clinically recognised as such. In developing countries, past tuberculosis is also common, and recent studies support its role as a risk factor for COPD.

CLINICAL EPIDEMIOLOGY

In terms of *morbidity*, COPD results in disproportionately more numbers of physician visits, emergency department visits and hospitalisations than most other diagnoses. Among patients in Singapore, approximately two-thirds had at least one previous hospital readmission for acutely exacerbated COPD, and a half reported two or more previous hospital readmissions, some with 10 to 20 hospital admissions.⁴ The mortality rate of COPD patients within one year following hospital discharge was 17%.⁵

MEDICAL COMORBIDITY

More than three-quarters of hospitalised COPD patients have at least one co-morbid medical condition, commonly cardiovascular disease, hypertension, diabetes, osteoporosis, chronic kidney disease, cognitive impairment and depression.⁶ Current research suggest that a common underlying factor explaining the high medical co-morbidity of COPD is chronic systemic inflammation indicated by elevated levels of pro-inflammatory cytokines such as tumour necrosis factor (TNF)- α , interleukin-6, and C-reactive protein. In patients with COPD, elevated CRP levels have been found to be associated with reduced FEV₁, exercise capacity, metabolic and functional impairment, increased hospitalisation, all-cause and COPD mortality.^{7,8}

CLINICAL PROFILE

Studies of COPD inpatients in Singapore^{4,5} show that the majority of hospitalised patients were male (83%) and Chinese (81%). Significantly large proportions were divorced, widowed or single (32%), or lived in low end public housing apartments (1 to 3 rooms HDB) (46%). Almost all were either current or ex-smokers, because of diagnostic pre-selection (a diagnosis of COPD is preferentially made if the patient is a smoker). There were high prevalence of underweight (50% have BMI<18,

reflecting muscle wasting/ sarcopenia), depression (45% had HAD score ≥ 8), and use of psychotropic drugs was particularly high among frequently readmitted patients (13%). Inadequate or poor caregiver support is common (35% reported no caregiver support at all, and only 38% subjects reported fair to good care giver support).

Uptake of pulmonary rehabilitation was low at 13%. The large majority (88%) did not receive influenza or pneumococcal vaccination in the past one year. Male sex, longer disease duration (>5 years), poor pulmonary function ($FEV_1 < 50\%$ predicted) and use of psychotropic drugs were associated with frequent readmissions for AECOPD. Among hospitalised AECOPD patients who were followed up for one year after discharge, the presence of prior depressive symptoms identified during the index hospitalisation was shown to be associated with two times increased rate of mortality, more early and frequent readmissions, failed smoking cessation, worse symptom burden, poorer functional status and quality of life.⁵

POPULATION PREVALENCE AND RISK FACTORS

Increasing numbers of population studies worldwide in recent years have estimated the prevalence of COPD using standard diagnostic criteria recommended by Global Initiative for Chronic Obstructive Lung Disease (GOLD)³ based on post-bronchodilatation spirometry ($FEV_1/FVC < 0.70$). These show considerably high rates of COPD more than were traditionally reported based on physician diagnosis ($< 6\%$). The

Burden of Obstructive Lung Disease (BOLD) studies⁹ showed COPD ($FEV_1 < 0.70$) among adults aged 40 and over varied widely among 12 countries from 11.4% to 26.1%.

The Latin American Project for the Investigation of Obstructive Lung Disease (PLATINO)¹⁰ reported COPD prevalence among 5 Latin American cities to vary from 7.8% to 19.7%. Higher prevalence among men than women was reported in some studies, but no gender differences were observed in European countries.

Although the higher prevalence of COPD among smokers than non-smokers is well established by these studies, it is important to note that about 3 to 10% of non-smokers also have COPD, indicating that non-smoking risk factors are also important.¹¹ An estimated 25% to 45% of individuals with COPD have never smoked. Non-smoker risk factors include biomass fuel, occupational exposure to dusts and gases, history of pulmonary tuberculosis, chronic asthma, respiratory-tract infections during childhood, outdoor air pollution, and poor socioeconomic status.

Data from the Singapore Longitudinal Ageing Studies show similar prevalence and pattern of risk factors.¹² (Table 1) Of note, the prevalence of COPD was no higher in women than men, although hospital cases tend to comprise more men than women; greater prevalence with increasing age; considerably higher prevalence among current smokers, but note that 24% of non-smokers also show COPD; occupational exposure and history of asthma are non-smoking risk factors.

TABLE 1. PREVALENCE OF COPD ($FEV_1/FVC < 0.70$) AMONG 2479 CHINESE PARTICIPANTS AGED 55 AND ABOVE IN THE SINGAPORE LONGITUDINAL AGEING STUDIES.

Demographic characteristics	COPD %	P value
Overall	26.0	
Male Female	26.1 25.9	0.89
Age: 55-64 65 – 74 75+	20.9 29.6 34.8	< 0.001
1-3 Room public housing 4-5 Room public housing Private and Landed housing	34.4 25.4 18.6	< 0.001
Never Smoker Past Smoker Current Smoker	24.3 26.3 47.1	< 0.001
Past occupational exposure to dust, fumes or gases: No Yes	25.4 37.7	0.002
History of asthma: No Yes	25.1 52.6	< 0.001

Reducing the personal toll of COPD on patients and its social and economic burden on families and the health care system requires primary care and public health interventions. These include better diagnostic awareness in primary care, understanding the personal and clinical factors that influence clinical outcomes, and early modifications of environmental and lifestyle risk factors that predispose to the development of obstructive pulmonary disease.

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LEARNING POINTS

- **COPD results in disproportionately more numbers of physician visits, emergency department visits and hospitalisations than most other diagnoses.**
- **COPD is underestimated as a cause of death -- because COPD is more likely to be reported as a contributory rather than underlying cause of death or morbidity.**
- **Most cases of COPD in the elderly are undiagnosed – because their symptoms are attributed to old age or labelled as asthma.**
- **COPD is increasingly recognised to be accompanied by co-morbid medical conditions, cardiovascular disease, hypertension, diabetes, osteoporosis, chronic kidney disease, cognitive impairment and depression, due to systemic inflammation which impact on quality of life and survival.**
- **The prevalence of COPD among adults aged 40 and above varies widely from 8% to 26%.**
- **The most widely recognised risk factor for COPD is smoking.**
- **Non-smoking factors are also important - use of biomass fuel, occupational exposure to dusts and gases, history of pulmonary tuberculosis, chronic asthma, respiratory-tract infections during childhood, outdoor air pollution, and poor socioeconomic status.**

ABSTRACT

Chronic obstructive pulmonary disease (COPD) is a leading cause of disability and death. Prevalence rates are related to tobacco smoking and indoor air pollution, and are expected to rise as smoking rates continue to increase among women and in developing countries. By 2030, COPD is expected to represent the third leading cause of death. Caring for patients with advanced disease who experience frequent exacerbations places a significant burden on health care resources. Evidence on the natural history of COPD demonstrates early institution of long acting bronchodilator therapy slows the rate of lung function decline and reduces frequency of exacerbations that can lead to further functional decline. The goals of therapy are symptom control, reduce exacerbations, and maintain quality of life. Smoking cessation, pharmacotherapy with long acting bronchodilators, inhaled corticosteroids, pulmonary rehabilitation, and palliative care are important components. This review highlights current guidelines and management strategies for COPD.

Keywords:

Symptom control, Reduce exacerbations, Lung volume reduction surgery, Triple therapy, Lung function decline, Endobronchial valve

SFP2013; 39(2): 11-14

INTRODUCTION

COPD is characterised by airflow limitation and inflammation, resulting in progressive decline in respiratory function and quality of life (QoL). COPD affects proximal and peripheral airways, lung parenchyma and pulmonary vasculature.¹ It is punctuated by exacerbations that can be life-threatening and associated with worsening lung function, increased mortality and resource utilisation.^{2, 3} Comorbidity such as cardiovascular disease, diabetes mellitus and depression as well as weight loss and muscle dysfunction from inactivity and deconditioning add considerably to the overall burden of disease.⁴ COPD is preventable and treatable, however, despite its high prevalence and significant burden, it remains substantially underdiagnosed and undertreated. Undiagnosed early-stage patients if symptomatic are more likely to progress to a more severe form of COPD.⁵ Reports highlight gaps between guideline-recommended, actual treatment and follow-up care of COPD patients.⁶

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LUNG FUNCTION DECLINE

The progressive deterioration in COPD has traditionally been illustrated by the Fletcher-Peto curves which suggest smooth continuous accelerated decay in lung function over time.⁷ Such a gradual decay in forced expiratory volume in 1 s (FEV₁) implies that exacerbations do not alter this natural history. Results from Framingham cohort⁸ however demonstrate that annual FEV₁ decline rates are greater during the earlier disease stages, and symptomatic patients represent a susceptible group for progressive lung function decline, thereby reinforcing current thinking that multidimensional influences impact COPD progression and early diagnosis and intervention are critical. Exacerbation frequency also exerts a negative impact on lung function decline. Among a cohort of 109 COPD patients, frequent exacerbators show faster decline in FEV₁ (-40.1 mL/year) and peak expiratory flow (-2.9 L/min/year) compared with infrequent exacerbators (-32.1 mL/year and -0.7 L/min/year respectively).⁹

ROLE OF EXACERBATIONS

Exacerbation-prone individuals are negatively affected by decreased quality of life, increased hospitalisation, and premature deaths. Evaluation of COPD Longitudinally to Identify Predictive Surrogate Endpoints (ECLIPSE) initiative suggests that there is a frequent-exacerbation phenotype independent of disease severity. History of exacerbations is the single best predictor of future exacerbations,¹⁰ duration of exacerbation may be variable, its impact on COPD prolonged or permanent, and patients experiencing acute exacerbations remain at increased risk for subsequent exacerbations during the 8-week recovery period.¹¹ Besides impact on societal health is the staggering cost of treating acute exacerbations if severe and warrant hospitalisation. Notably, the total cost of caring for COPD in the United States is rapidly approaching US\$50 billion per year, and 70% relates to treating exacerbations.¹²

CURRENT APPROACH TO COPD MANAGEMENT**Pharmacological Interventions**

GOLD guidelines aim to increase awareness of COPD and to advise on management which is patient centered and step-wise depending on disease severity (Figure 1).¹ However GOLD guidelines are poorly implemented in both primary and secondary care settings¹³ as diagnosis is hampered by limited use of spirometry at the primary care level due to lack of access, cost, inaccurate interpretation of results and inadequately trained staff. In fact a recent study reported that only 30% of patients were diagnosed by spirometry,¹⁴ and drugs prescribed were not in accordance with recommendations based on severity.¹⁵

FIGURE 1. CURRENT APPROACH TO COPD ACCORDING TO DISEASE SEVERITY

I: Mild	II: Moderate	III: Severe	IV: Very severe
FEV ₁ /FVC <0.70 FEV ₁ ≥80% predicted	FEV ₁ /FVC <0.70 50% ≤FEV ₁ <80% predicted	FEV ₁ /FVC <0.70 30% ≤FEV ₁ <50% predicted	FEV ₁ /FVC <0.70 FEV ₁ <30% predicted, or FEV ₁ <50% predicted plus chronic respiratory failure
Active reduction of risk factor(s): influenza, pneumococcal vaccination Add short-acting bronchodilator (when needed)			
Add regular treatment with one or more long-acting bronchodilators (when needed); add rehabilitation			
		Add inhaled glucocorticosteroids if repeated exacerbations	
		Add long-term oxygen if chronic respiratory failure. Consider surgical treatment	

Short-acting bronchodilators (SABAs) can be used to relieve intermittent symptoms on top of maintenance therapy which comprises of medications administered regularly to improve symptoms not controlled by SABAs. These include long-acting antimuscarinic antagonist (LAMA), long-acting β_2 agonist (LABA), LABA-inhaled corticosteroid (ICS) combinations, and methylxanthines (e.g., theophylline). Twice daily LABA (salmeterol, formoterol) and once daily LAMA (tiotropium) are preferred drugs for maintenance treatment with bronchodilation achieved through different mechanisms.¹ Which agent to use first has not been evaluated but tiotropium has been shown to provide better bronchodilation and clinical outcomes than the twice-daily LABA.¹⁶ Initial treatment with LAMA is sensible since there is heightened cholinergic airway tone in COPD.¹⁷ LABA can be added to initiate an alternative pathway of bronchodilation without increased side effects.¹⁸ ICS is not recommended as monotherapy but its combination with LABA leads to reduced exacerbation frequency in patients with moderate to severe COPD, and those with history of exacerbations.¹⁹ Some ICS such as fluticasone are more likely to be associated with pneumonia than others (budesonide).¹⁸

“Triple therapy” (LAMA, LABA-ICS) may achieve better symptom control and quality of life in patients with severe COPD, improve lung function and reduce exacerbations however cost constraints may limit its use.²⁰ Methylxanthine (theophylline) is reserved as third-line option due to side effect profile, and only recommended for very severe disease.¹ At low doses they may enhance the anti-inflammatory effects of

corticosteroids and useful in combination regimens.²¹ Long-term oral glucocorticosteroid therapy is not recommended but may be necessary to treat exacerbations in patients with severe COPD.

Patients with viscous sputum may benefit from mucolytic therapy although routine use is not recommended. Other chronic therapies, such as antioxidants, carbocysteine, N-acetylcysteine, may reduce COPD exacerbations but evidence is conflicting.²² For inhaled drugs, inspiratory flow rate is important especially in patients with severe disease. Technique, delivery systems as well as patient adherence should be checked regularly since adherence declines over time contributed in part by the inhaler device.

Non-pharmacological Interventions

Optimal COPD management plans integrate both pharmacologic and non-pharmacologic interventions that include education, smoking cessation, oxygen therapy, exercise, vaccination, pulmonary rehabilitation and management of endocrine and cardiovascular diseases.²³ Pulmonary rehabilitation should be considered for all patients with COPD to overcome exercise deconditioning, muscle wasting, weight loss, social isolation and depression not adequately addressed by pharmacologic interventions as well as reduce recurrent exacerbations.

In a multicenter study, patients managed with tiotropium plus pulmonary rehabilitation experienced fewer exacerbations and

exacerbation days, and improvements in health-related QOL, relative to the tiotropium-only group.²⁴ Influenza and pneumococcal vaccinations should be recommended to all COPD patients as important risk reduction strategy.¹

Lung Volume Reduction

Lung-volume-reduction surgery (LVRS) was initially proposed as a palliative treatment for those with severe emphysema. The National Emphysema Treatment Trial (NETT) found a survival advantage among former smokers with upper lobe predominant emphysema and low baseline exercise capacity. Exercise capacity was improved by 10W in 28, 22, and 15% of LVRS patients at 6-, 12-, and 24-month follow-up versus 4%, 5%, and 3% of patients in the medical therapy group. The LVRS group also showed improved 6-minute walk distance, FEV₁% predicted, level of dyspnoea, and disease-specific and general quality of life (QOL) scores.

However overall mortality within 90 days was 7.9% (95% CI, 5.9–10.3) in the surgery group compared with 1.3% (95% CI, 0.6–2.6) in the medical therapy group ($P < .001$). A predictor of mortality was non upper lobe predominant emphysema. Morbidity was also higher among older patients, those with low FEV₁ (<20%) and DLCO (<20%). Post-operative complication rate within 30 days was 58.7% with arrhythmias, pneumonias, reintubations and persistent air leaks accounting for the majority. About 28% of patients remained in hospital, nursing home or rehabilitation facility for a month after LVRS.²⁵ LVRS may be beneficial for a subgroup of patients with severe COPD, but its risks outweigh the benefits and use of endobronchial blockers, bypass methods, valves and sealants have been attempted.²⁶

We reviewed endobronchial valve as it is available in Singapore. The intrabronchial valve (IBV, Spiration, Inc, Redmond, Washington, USA) and Zephyr endobronchial valve (EBV, Pulmonx, Inc, Palo Alto, California, USA) are one-way valves that limit air flow to the target lobe during inspiration but allow air to escape during expiration. In a multicenter trial of 91 patients with heterogeneous emphysema underwent bilateral IBV therapy. One patient died of tension pneumothorax, another had non-fatal myocardial infarction, 8 developed pneumothoraces, and 7 bronchospasm. Removal of IBV was necessary in 16 patients due to unresolving pneumonia, persistent bronchospasm and air-leak. FEV₁, 6 minute walk test and total lung volume did not change but better health-related QOL scores which could be explained by reduction of lung volume (without atelectasis) on CT, and better ventilation-perfusion matching.²⁷

A prospective, multicenter trial where 220 were randomised to EBV and 101 to medical therapy, all underwent pulmonary rehabilitation, high resolution CT (HRCT) used to score disease severity and interlobar fissure integrity before target lobe selection. Differences between 2 groups favouring EBV were 6.8% increase in FEV₁ and 5.8% in 6 minute walk test. These improvements were more marked in those with higher HRCT heterogeneity scores (>15% between targeted and adjacent

lobes) and presence of complete fissures. Lobar atelectasis was observed in less than 25% of patients undergoing EBV, but highly desirable as it led to physiologic improvements akin to LVRS.

Lobar occlusion and atelectasis is emerging as an important predictor of good outcome, which in turn depends on the presence of complete fissure on HRCT.²⁸ Collateral ventilation to the target lobe can be measured by a balloon catheter (Chartis System, Pulmonx, Inc, Palo Alto, California, USA) inserted through 2.8mm working channel of a flexible bronchoscope. The balloon is first inflated to seal the airway. This prevents air from entering the target lobe but allows air to escape through the central lumen of the catheter. Airflow resistance is calculated and represented in a graphic format. Higher values were found to correlate with lobar atelectasis with EBV. This device appears to be the only sensitive method of measuring collateral ventilation that is currently available.²⁹

NEW AND EMERGING DRUGS FOR MAINTENANCE THERAPY

New respiratory medications focus on once-daily agents as monotherapy or in combination. These include indacaterol (once daily LABA), and roflumilast (selective once-daily oral phosphodiesterase (PDE)-4 inhibitor).³⁰

CONCLUSION

To date only smoking cessation and oxygen therapy have been shown to alter the clinical course of COPD although improvements in dyspnoea and exercise capacity as well as reductions in recurrent exacerbations can be achieved through pulmonary rehabilitation. Identification of early-stage patients is crucial since emerging evidence supports early administration of pharmacotherapies which aim at slowing down lung function decline and reducing risk of acute exacerbations. Early recognition requires heightened COPD awareness among both patients and physicians, and proper use of spirometry. By helping to prevent, recognise, and appropriately treat acute exacerbations, clinicians can make a major impact on the course of COPD.

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LEARNING POINTS

- **The goals of therapy are symptom control, reduce exacerbations, and maintain quality of life. Smoking cessation, pharmacotherapy with long acting bronchodilators, inhaled corticosteroids, pulmonary rehabilitation, and palliative care are important components.**
- **To date only smoking cessation and oxygen therapy have been shown to alter the clinical course of COPD although improvements in dyspnoea and exercise capacity as well as reductions in recurrent exacerbations can be achieved through pulmonary rehabilitation.**
- **Identification of early-stage patients is crucial since emerging evidence supports early administration of pharmacotherapies which aim at slowing down lung function decline and reducing risk of acute exacerbations.**
- **Early recognition requires heightened COPD awareness among both patients and physicians, and proper use of spirometry.**
- **By helping to prevent, recognise, and appropriately treat acute exacerbations, clinicians can make a major impact on the course of COPD.**

ABSTRACT

The 2011 revision of the GOLD global strategy on COPD is a major paradigm shift in diagnosis and management of the disease. In particular, detailed assessment of current symptom control and future risk in terms of airflow limitation and exacerbation history, now allows more accurate categorisation of individual COPD patients. Pharmacological interventions are now directly linked to these categories. The recommendations for drug therapy in each of the 4 new categorical groups of COPD phenotypes reflect the accumulated knowledge base from literature. Bronchodilatation and anti-inflammatory drug therapy continue to be the main basis of drug choice and regimens.

Keywords: Chronic Obstructive Pulmonary Disease, pulmonary emphysema, inhaler, pharmacotherapy

SFP2013; 39(2) : 15-18

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is an evolving global health problem, and management of this disease has progressed from one of nihilism to that which highlights a disease that is preventable and treatable, as aptly included in the definition from the Global Initiative for Chronic Obstructive Lung Disease (GOLD)¹. The GOLD committee has, since 2001, published documents on strategy for diagnosis and management of COPD, based on the available evidence from literature. The 2nd five-year revision of the GOLD document was released in late 2011. This particular revision not only incorporated the state of current knowledge but also promoted a paradigm shift in opinion on various aspects of the disease, particularly in the approach to pharmacological intervention.

FOCUS ON SYMPTOM EVALUATION INTO 4 CATEGORY CLASSIFICATION

The latest GOLD method of assessment of COPD focuses on symptom evaluation, either by the modified Medical Research Council (mMRC) dyspnoea grade or the COPD assessment test (CAT) score. For the first time, a comprehensive validated multi-symptom score (i.e. CAT) is acknowledged for clinical use. Similarly important are the determination of airflow limitation via the traditionally familiar forced expiratory volume in 1st second

(FEV₁) and a new component of exacerbation history. Exacerbations are now recognised as crucial milestones in the natural progression of COPD. It is of such significance that determination of the number of exacerbations in the last 1 year has an equal severity impact in terms of future risk as that of FEV₁. Finally, screening for and managing comorbidities take a major role in the overall care plan. The goal of therapy is now two-fold; to gain current control of symptoms and reduce future risk, mainly that of exacerbations, disease progression and mortality.

With past GOLD management strategies, drug therapies were added in stepwise fashion with each increasing stage of the disease severity as defined by airflow limitation of FEV₁. However, with better understanding of the natural history of COPD, it is clear that the unidimensional nature of FEV₁, which was used as a staging criterion, does not fully reflect the complexity and heterogeneity of the individual COPD patient². The combination of symptoms, airflow limitation and exacerbation history is now merged into a 4-category classification and treatment matrix (Figure 1). Whereas in the past, severity of symptoms and number of exacerbations did not directly impact the choice of drugs, now clinicians can better correlate assessment to treatment decisions on an individual patient level. Experts have also agreed that the current categorisation is but an initial concept change, and that further refinement can be expected with widespread use of the approach.

MATCHING PHARMACOLOGICAL MANAGEMENT TO 4-CATEGORY CLASSIFICATION

As pharmacological management of COPD now matches each of the categories, clinicians are advised on the 1st choice drug therapy for each group, together with alternatives. This is a departure from earlier practice which emphasises a progressive and somewhat conservative approach to drug therapy in COPD. Although pharmacological treatment of comorbidities³ in COPD is an area very much in need of more research, its discussion is beyond the scope of this article.

The choice of pharmacological agents within each category group depends on drug availability, cost and the patient's response. The following discussion is based on each of the 4 groups (Figure 2).

Group A – Patient with low risk of future events and few symptoms

This is the patient who is of low risk of future events and has few symptoms. There is mild or moderate airflow limitation (GOLD grade 1 – 2) and 1 exacerbation per year or less and mMRC grade 0–1 or CAT < 10. At present, literature is not robust with evidence on the effectiveness of drug treatment for patients with mild airflow obstruction, that is FEV₁ >80% predicted⁴. Short-acting bronchodilators taken as needed, are recommended due to its well-known effect on dyspnoea and improvement in

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FIGURE 1. FOUR-CATEGORY CLASSIFICATION BY SYMPTOMS AND RISK

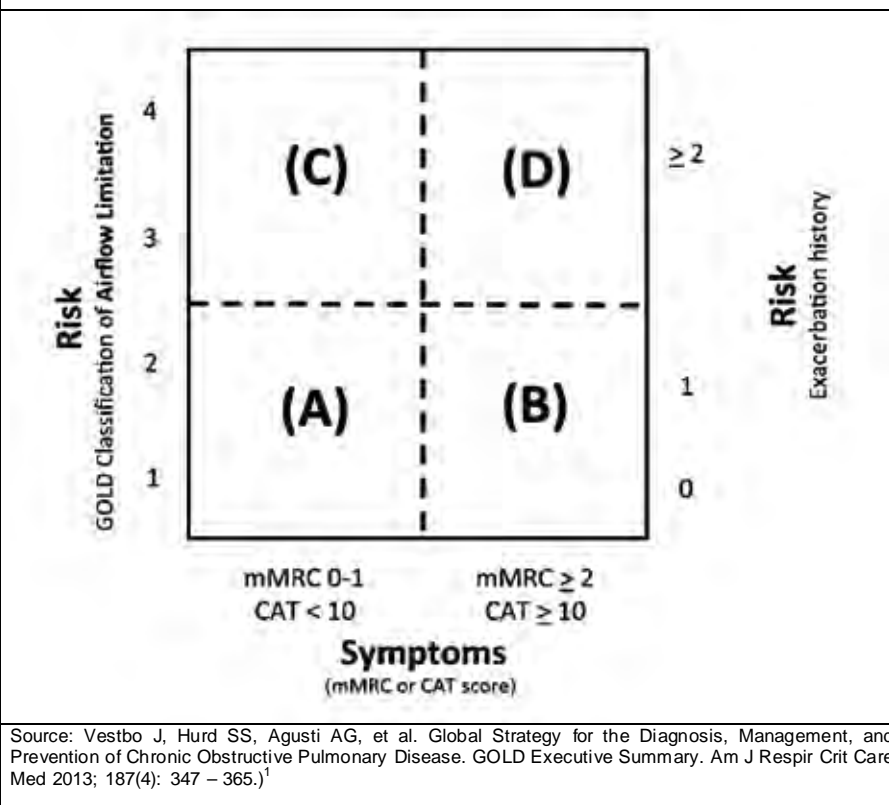
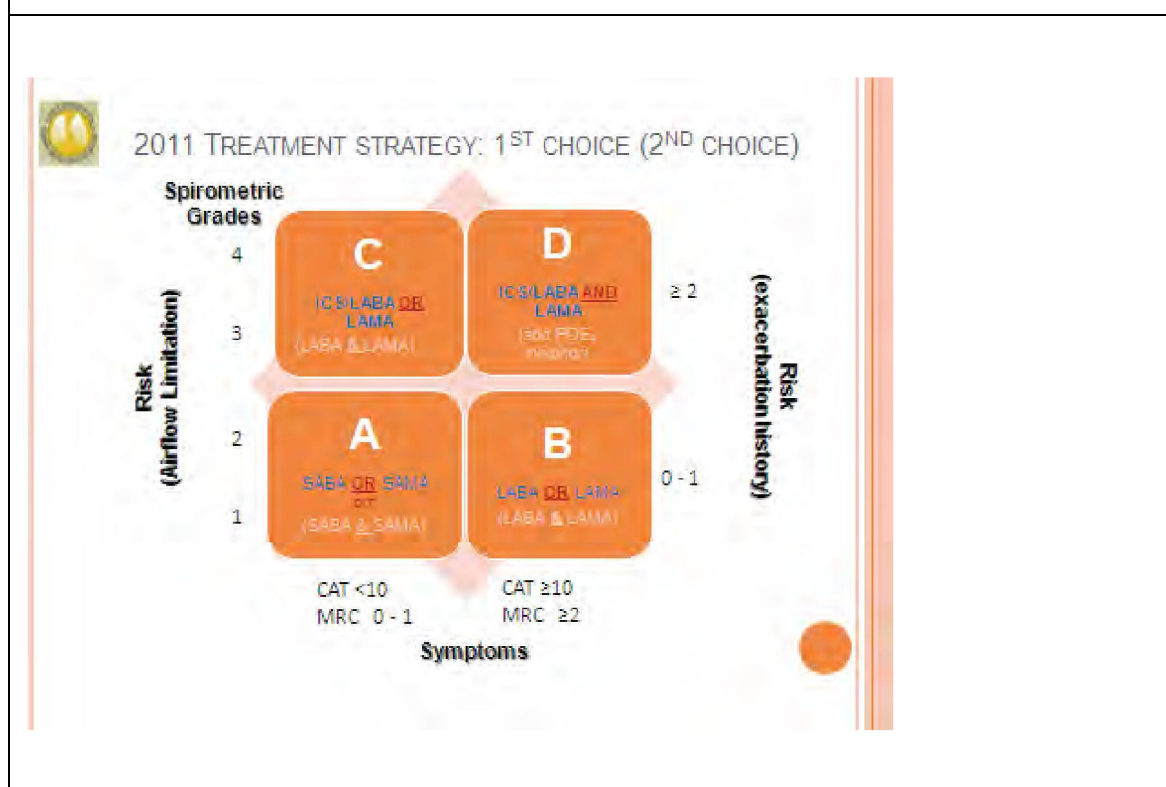


FIGURE 2. MATCHING PHARMACOLOGICAL MANAGEMENT TO 4-CATEGORY CLASSIFICATION



lung function. This can be in the form of short-acting beta-2 agonist (SABA) or short-acting anti-muscarinic agent (SAMA). The combination of the 2 classes either as separate inhalers or in a single inhaler is an alternative. The evidence for the using a long-acting bronchodilator is weak, as most studies on long-acting agents are done on subjects with at least moderate airflow limitation.

Group B – Patient with low risk but more symptoms

The patient with low risk but more symptoms (mMRC grade ≥ 2 or CAT score ≥ 10) may present frequently to healthcare professionals. Long-acting bronchodilators are recommended due to its superiority to short-acting bronchodilators⁵. Initial treatment can either be with a long-acting beta-2 agonist (LABA) or a long-acting anti-muscarinic agent (LAMA), with some early evidence favouring the latter^{6,7}. However, at present there is still no conclusive study to determine which the superior long acting bronchodilator is. In the end, the patient's perception of symptom relief may be the best deciding factor. The second choice of a combination of LABA and LAMA can be considered for those patients in this group with very severe dyspnoea. These are based on short-term studies and at least one recent meta-analysis⁸. Alternative choices include short-acting bronchodilators and theophylline, especially if long-acting bronchodilators are unavailable or unaffordable.

Group C – Patient has few symptoms and high risk of adverse events

Group C patients are typically challenging for clinicians in convincing to adhere to drug treatment. They have few symptoms but are at high risk of adverse events, including exacerbation and mortality. Patients are at GOLD grade 3 – 4 (severe or very severe airflow limitation) and/or have > 2 exacerbations per year and/or > 1 hospitalised exacerbation per year. Symptom scores are typically low with mMRC grade 0–1 or CAT score < 10 . Recommendation by GOLD is that of a LAMA or a combination of inhaled corticosteroid (ICS) with a LABA^{9–11}. The INSPIRE study¹² was the only one directly comparing these 2 treatment regimens, but did not show any difference in exacerbation rates. As a 2nd choice, the combination of LABA and LAMA is recommended as both drug classes reduce the risk of exacerbations, although good long-term studies are still lacking. A phosphodiesterase-4 inhibitor may be considered if the patient has characteristics of chronic bronchitis^{13–14}.

Group D – Patient has severe symptoms and high risk of poor outcomes

These are COPD patients at high risk of poor outcomes, with GOLD grade 3 – 4 (severe or very severe airflow limitation) and/or > 2 exacerbations per year / > 1 hospitalised exacerbation per year. They also have significantly severe symptoms (mMRC grade ≥ 2 or CAT score ≥ 10). Intuitively, this group of patients accounts for a considerable burden of healthcare resource and some are eventually transitioned to a palliative care approach¹⁵. Although the initial therapy maybe begin with that as for patients in group C, clinicians should consider the early use of a combination of all three classes of drugs (ICS + LABA +

LAMA)^{16–17} in order to reduce the risk of exacerbation. Again, evidence need to address the lack of long-term studies and cost-effectiveness analysis, and some inconsistent findings¹⁸. Similarly, in those with symptoms of chronic bronchitis, adding a phosphodiesterase-4 inhibitor is an option.

There is evidence that the phosphodiesterase-4 inhibitor roflumilast may reduce exacerbations for patients with chronic bronchitis, FEV₁ $\leq 50\%$ predicted, and frequent exacerbations that are not adequately controlled by long acting bronchodilators. This is a specific subset of COPD patients with chronic cough and sputum production. Roflumilast is an example of targeted therapy for COPD. Experience from Europe¹⁹ show a modest but sustained improvement in lung function and reduction in exacerbation rates in those with severe disease. Common adverse events were diarrhea, nausea, and headache, which usually subsided during continued treatment. However, roflumilast resulted in more withdrawals within the first 3 to 4 weeks of administration. Nevertheless, this class of drugs still hold promise as additional treatment in the most severe COPD patient.

ADVICE FROM GOLD 2011 UPDATE

The GOLD committee continues to provide general recommendations for pharmacological therapy¹. In particular, there is strong recommendation that LABA and LAMA are preferred over its short-acting counterparts; and inhaled bronchodilators are safer and more effective than oral bronchodilators. Weaker recommendations are listed for the combined use of SABA or LABA and antimuscarinics if symptoms are not improved with single agents. Of particular relevance in Asia, treatment with theophylline is not recommended based on evidence of relatively low efficacy and more side effects, unless LABA or LAMA are unavailable or unaffordable.

Strong recommendations are noted on corticosteroid usage. There continues to be no evidence for a short-term therapeutic trial with oral corticosteroids in patients with COPD to identify those who will respond to inhaled corticosteroids. Maintenance therapy with ICS is recommended for patients with FEV₁ $< 50\%$ predicted and/or frequent exacerbations that are not adequately controlled by long-acting bronchodilators. As such, optimal and maximal bronchodilatation still remains the cornerstone of COPD pharmacotherapy. Long-term monotherapy with oral corticosteroids is not recommended in COPD and long-term monotherapy with ICS is also not recommended in COPD because it is less effective than the combination of ICS plus LABA.

CONCLUSION

The revised GOLD strategy document places assessment of symptoms and future risk at the core of individualised therapeutic decision. Pharmacotherapy can now be targeted

toward the heterogeneity of COPD phenotypes to relieve symptoms, reduce exacerbations, improve exercise tolerance and health-related quality of life. Bronchodilatation is an essential therapy in all categories and anti-inflammatory therapy with ICS is effective for those at high risk. Although at present, none of the approved drug therapies are able to conclusively modify the long-term decline in lung function, there is hope that with every new GOLD standard, COPD sufferers and their caregivers can look forward to a better future ahead.

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LEARNING POINTS

- **The 2011 revision of the GOLD global strategy on COPD is a major paradigm shift in diagnosis and management of the disease – It places assessment of symptoms and future risk at the core of individualised therapeutic decision.**
- **Detailed assessment of current symptom control and future risk in terms of airflow limitation and exacerbation history, now allows more accurate categorisation of individual COPD patients into 4 categories.**
- **Pharmacological interventions are now directly linked to these 4 categories.**
- **Bronchodilatation and anti-inflammatory drug therapy continue to be the main basis of drug choice and regimens.**
- **Although at present, none of the approved drug therapies are able to conclusively modify the long-term decline in lung function, there is hope that with every new GOLD standard, COPD sufferers and their caregivers can look forward to a better future ahead.**

THE OVERLAP SYNDROME OF ASTHMA & COPD

Dr Ong Kian Chung

ABSTRACT

The asthma-COPD overlap syndrome presents itself in patients where the asthma is not controlled despite seemingly appropriate measures or a patient who is a smoker and treated as COPD but also has asthmatic features. The asthma-COPD overlap syndrome is more common in the elderly. Such patients are of importance to diagnose because they have a high disease burden compared to asthma alone or COPD alone. Patients with both asthma and COPD should be identified earlier, as these patients have an increased risk for frequent exacerbations and therefore their treatment and follow-up should be optimised before hospital discharge. Also rehabilitation immediately after an exacerbation has been shown to be safe and effective to prevent further exacerbations requiring hospitalisation.

Keywords: high disease burden, frequent exacerbations, hospitalisation, mis-diagnosis

SFP2013; 39(2): 19-20

INTRODUCTION

There is a group of patients where the “asthma” is not controlled despite seemingly appropriate measures. A common clinical scenario is an older former smoker with partially reversible or fixed airflow obstruction and evidence of atopy, demonstrating “overlap” features of asthma and COPD.

This asthma-COPD overlap syndrome becomes more prevalent with advancing age as patients respond less favourably to guideline-recommended drug therapy. These patients have similarities and differences in clinical characteristics between these disorders.

WHAT IS IT?

The asthma-COPD overlap syndrome (ACOS) is best envisaged as a clinical phenotype that has features of both the inflammatory conditions. (Athanasio, 2012; Carolan & Sutherland)^{1,2}

Both asthma and COPD results in airflow limitation but through different part of the airways:

- Asthma – causes reversible – bronchoconstriction – airway hyperactivity reaction (AHR)
- COPD – causes irreversible – small airway narrowing - small airway narrowing – alveolar destruction.

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Asthma as a disease of inflammation

- Affects all ages, including children
- Episodic course
- Inflammatory cells taking part in the reaction are: eosinophils, mast cells, CD4+ cells
- The inflammation is fully reversible.

COPD as a disease of inflammation

- Affects elderly, especially smokers
- Is slowly progressive
- Inflammatory cells taking part in the reaction are: neutrophils, macrophages, CD8+ cells
- Partially reversible.

Conceivably, the patient with Asthma-COPD Overlap “syndrome” has both the sets of reactions going on at the same time.

HOW BIG IS IT?

Overlap “syndrome” is common especially in the elderly. The overall prevalence is 17% in the US and 19% in UK. The prevalence rises from less than 10% in those under 50 years, 40% in those 60-69 years, and 60% in those 70-79 years. (Soriano et al, 2003)³.

WHY IS IT IMPORTANT?

The overlap “syndrome” is important because they are excluded from clinical trials of treatment. Clinically, they are either labelled as asthma or COPD and not its correct clinical phenotype of Asthma-COPD overlap syndrome (ACOS).

There is currently a controversy as to its pathogenesis:

- “British hypothesis” - 2 common (but distinct) conditions by chance overlapping.
- “Dutch hypothesis” - common risk factors leading from asthma to COPD which could be accelerated lung function decline in adulthood or incomplete lung growth during childhood.

The Dutch hypothesis further hypothesis that bronchial hyperactivity (BHR) may be a common risk factor for asthma and COPD.

- BHR is present in 10-20% of the population and the patients are frequently asymptomatic.
- BHR is associated with accelerated lung function decline in asthma.
- Asymptomatic BHR is a risk factor for development of respiratory symptoms & COPD

Bronchodilator reversibility testing

Preparation

- Tests should be performed when patients are clinically stable and free from respiratory infection.
- Patients should not have taken inhaled short-acting bronchodilators for 6 hours, long-acting bronchodilators for 12 hours, or sustained release theophylline for 24 hours prior to this test.

Spirometry

- FEV₁ should be measured before a bronchodilator is given.
- The bronchodilator should be given by metered dose inhaler through a spacer device or by nebuliser to be certain it has been inhaled.
- Possible dosage protocols are 400 mcg beta2-agonist, up to 160 mcg anticholinergic, or the two combined. FEV₁ should be measured again 10-15 minutes after a short-acting bronchodilator is given; 30-45 minutes after the combination.

Spirometry vs peak flow meter monitoring

- Spirometry can differentiate obstructive from restrictive lung disease.
- PEF_R does not correlate with FEV₁ very well (PEFR can be preserved till obstruction is very serious)
- PEF_R is more effort-dependent than FEV₁.

Other tests to differentiate asthma and COPD

- High resolution CT scan of the lungs.
- Diffusing capacity (DLCO).
- Evaluation of airway inflammation via induced sputum examination or tests of exhaled gas and vapours.
- Endobronchial biopsies.

HOW TO DEAL WITH IT?

Distinguishing between asthma and COPD: Does it matter?

Yes – for prognosis – patients with overlap “syndrome” have high hospital burden compared to asthma alone, or COPD alone. (Andersen et al, 2013, Zeki et al, 2011)^{4,5}.

Yes – for treatment – Patients with both asthma and COPD should be identified earlier, as these patients have an increased risk for frequent exacerbations and therefore their treatment and follow-up should be optimised before hospital discharge. Also rehabilitation immediately after an exacerbation has been shown to be safe and effective to prevent further exacerbations requiring hospitalisation. (Andersen et al, 2013, Zeki et al, 2011)^{4,5}.

CONCLUSION

- The asthma & COPD “overlap” is a definable entity that is common in the elderly.
- No standardisation of definition, pathogenesis & treatment yet.
- We should try to distinguish bronchial asthma from COPD & the overlap “syndrome”.

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LEARNING POINTS

- **The asthma-COPD overlap syndrome has both the features of asthma and COPD.**
- **The asthma-COPD overlap syndrome is more common in the elderly.**
- **Such patients have a high disease burden compared to asthma alone or COPD alone. Patients with both asthma and COPD should be identified earlier.**
- **Treatment and follow-up of such patients should be optimised before hospital discharge.**
- **Rehabilitation immediately after an exacerbation has been shown to be safe and effective to prevent further exacerbations requiring hospitalisation.**

ABSTRACT

Pulmonary rehabilitation identifies and treats the systemic effects of the disease and the positive outcomes are realised without demonstrable improvements in lung function. It is multidisciplinary, patient centred and provides a comprehensive assessment upon which the three components of exercise training, self-management education, and psychosocial/behaviour intervention are conducted over a period lasting 6 to 12 weeks. Pulmonary rehabilitation administered after hospital admission for an exacerbation was shown to be able to improve quality of life, improve exercise capacity, and also reduce re-exacerbation and hospital admission. Self-management education may promote long-term adherence to the exercise program.

Keywords: system effects, positive outcomes, lung function, exercise training, self-management education, psychosocial intervention

SFP2013; 39(2): 21-24

INTRODUCTION

Pulmonary rehabilitation has emerged as a standard of care for patients with COPD. Its use improves the wellbeing and quality of life of patients.

DEFINITION

Pulmonary rehabilitation is a multi-dimensional continuum of services directed to persons with pulmonary disease and their families, and usually delivered by an interdisciplinary team of specialists, with the goal of achieving and maintaining the individual's maximum level of independence and functioning in the community [National Institute of Health (NIH) Workshop on Pulmonary Rehabilitation Research].

Pulmonary rehabilitation leads to improvements in dyspnoea, exercise capacity, and health related quality of life. Table 1 shows the outcomes of pulmonary rehabilitation.

EFFECTS OF PULMONARY REHABILITATION

It needs to be pointed out that the beneficial effects of pulmonary rehabilitation are achieved without demonstrable effect to the forced expiratory volume in one second (FEV₁) – a variable used to measure severity of COPD. This paradox can be explained: pulmonary rehabilitation (PR) treats the systemic effects of

COPD and its comorbidities and in that way brings relief even though the FEV₁ remains unchanged.(Nici et al, 2010)³

- PR reduces peripheral muscle dysfunction that has accumulated from physical inactivity, systemic inflammation, and muscle wasting.
- Exercise training reduces lactate production and in that way decreases ventilatory burden.
- Reduction of ventilatory dyspnoea in turn allows the patient to breathe more slowly during exercise thereby reducing dynamic hyperinflation.
- When there is less exertional dyspnoea, the mood is uplifted, and the patient feels better.

Even though there is no change in FEV₁, there is improvement in the 6MWD test, and also improvement in VO₂. These have also been demonstrated in a small local study of 34 patients after completing a 3 month pulmonary rehabilitation programme (Ong et al, 2001)⁴. As is expected, FEV₁ did not change. The severity of COPD, including its symptom burden, is clearly influenced by more than air flow limitation alone.

FACTORS RELATED TO MORTALITY IN COPD

Six minute walking distance (6MWD). This distance is found to be related to 1 year survival based on a study of 198 patients with severe COPD. Those able to walk less than 100 metres in 6 minutes had 85% mortality, compared to 35% in those who can walk 201-300 metres, and 20% in those who can walk 401-500 metres (Pinto-Plata et al 2004)⁵. This test predicts mortality better than other traditional markers of disease severity.

Exercise capacity (Peak VO₂) and Health status. The Peak oxygen uptake (Peak VO₂) remains the gold standard measurement of exercise capacity and has been associated with survival in COPD. Health status can be measured by the Chronic Respiratory Disease Questionnaire (CRQ) or the St George's Respiratory Questionnaire (SGRQ) or Breathing Problems Questionnaire (BPQ).

Oga et al demonstrated the significant relationships of exercise capacity and health status to mortality in COPD patients, independent of FEV₁, or age. Laboratory exercise capacity using the cycle test could be the most significant predictor of mortality in COPD. With respect to health status, the ability of the CRQ to predict mortality was weaker than the SGRQ or BPQ. This study shows the multidimensional evaluation of the disease severity in COPD from the perspective of mortality can be potentially useful (Oga et al, 2003)⁶.

The BODE index. Chronic obstructive pulmonary disease (COPD) is characterised by an incompletely reversible limitation in airflow. A physiological variable - the forced

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expiratory volume in one second (FEV₁) - is often used to grade the severity of COPD. However, patients with COPD have systemic manifestations that are not reflected by the FEV₁. The BODE index is a multidimensional grading system that assessed the respiratory and systemic expressions of COPD and predicts outcome in these patients. Four factors were found to predict the risk of death in COPD: the body-mass index (B), the degree of airflow obstruction (O) and dyspnea (D), and exercise capacity (E), measured by the six-minute-walk test. These variables are used to construct the BODE index, a multidimensional 10-point scale in which higher scores indicate a higher risk of death (Celli et al, 2004)⁷. The BODE index predicted the risk of hospitalisation in patients with COPD (Ong KC et al, 2005)⁸.

THE PLACE OF PULMONARY REHABILITATION PROGRAMME

The optimal therapy of a COPD patient usually requires a combination of pharmacological and non-pharmacological therapies. Pulmonary rehabilitation is an important part of care in the patient who has moderate (Stage II) or more advanced disease.

PR provides a mode of integrating care, complementing otherwise standard medical therapy, and producing significant gains across multiple outcome areas of importance to the patient e.g. increase in the distance that the patient can walk in the 6MWD, subjectively also less dyspnoea, and a better sense of wellbeing. Pulmonary rehabilitation has also been shown to reduce further exacerbations and hospital admissions in the post-exacerbation COPD patient.

COMPONENTS OF PULMONARY REHABILITATION

Pulmonary rehabilitation begins with a comprehensive assessment. The following three components of pulmonary rehabilitation programme are then introduced:

- Exercise Training
- Self-management Education
- Psychosocial/ Behaviour Intervention

Although individual programmes vary widely, most outpatient programmes include 2-3 hours of education and exercise per session, three times weekly for 6-12 weeks.

Exercise Training

Exercise training is essential in pulmonary rehabilitation. COPD can be considered a disease with disease of the peripheral muscles as a co-morbidity. There is decreased mass, alterations in fibre-type distribution, and decreased metabolic capacity contributing to exercise intolerance. These abnormalities may be reduced by comprehensive exercise training (Nici et al, 2010)³.

The evidence based guidelines on exercise training in COPD

patients from the ACC/AACVPR1 are shown in Table 2. Exercise training is based on general principles of intensity (higher intensity produces greater results), specificity (only those muscles trained show an effect), and reversibility (cessation of regular exercise training results in a decrease in training effect).

Higher levels of exercise training are associated with a physiologic training effect, dose-dependent increases in oxidative enzymes in ambulatory muscles, and greater improvement in exercise performance. Although patients with COPD often have ventilatory limitations to maximal exercise, a physiologic training effect can be achieved if high training targets are used. Exercise intensity of 60 to 80 percent of the patient's peak work rate is often feasible.

Strength training is also an important component of exercise training and may yield additional benefits. Patients who cannot tolerate high levels of exercise training can also benefit from strength training. Maximising bronchodilation, interval training (i.e., alternating high and low intensities), and oxygen supplementation may allow for higher intensity exercise training in some patients.

The optimal duration of training depends on the progress of the individual patient. Guidelines from the Global Initiative for Chronic Obstructive Lung Disease state that six weeks (with three sessions per week) is the minimum duration of an effective program, but longer duration confers greater benefits.

Self-management education

Self-management education promotes self-efficacy and encourages active participation in health care. The objectives are to improve health status and reduce health care utilisation. It is provided both in small group settings as well as one-on-one. format. An initial evaluation helps determine educational needs, which are then reassessed during the course of the program. Discussion about early recognition and treatment of COPD exacerbations helps in self-management. Advance care planning should also be touched on at some time.

Psychosocial/behavioural intervention

Anxiety, depression, coping problems, and decreased self-efficacy contribute to the burden of advanced respiratory disease. There is evidence that PR results in small to moderate improvements in anxiety and dyspnoea (Nici et al, 2010)³. Psychosocial and behavioural interventions involve educational sessions or support groups that focus on coping strategies and stress management. Patients' family members and friends are also encouraged to participate in these support groups. Patients with substantial psychiatric disease should be referred for appropriate care.

TABLE 1. OUTCOMES OF PULMONARY REHABILITATION

Dyspnoea relief	Strong evidence, strong recommendation (ACCP/AACVPR) ¹ Evidence grade A (GOLD) ²
Improved exercise performance	Strong evidence, strong recommendation (ACCP/AACVPR) ¹ Evidence grade A (GOLD) ²
Improved health related quality of life	Strong evidence, strong recommendation (ACCP/AACVOR) ¹ Evidence grade A (GOLD) ²
Psychosocial benefits	Moderate evidence, weak recommendation (ACCP/AACVOR) ¹ Reduced anxiety and depression; evidence grade A (GOLD) ²
Reduced health care utilisation	Moderate evidence, weak recommendation ((ACCP/AACVOR) ¹ Evidence grade A (GOLD) ²
Survival	Insufficient evidence; no recommendation provided (ACCP/AACVOR) ¹ Evidence grade B – limited data (GOLD) ²
Source: Nici et al, 2010 ³ Footnote: (ACCP/AACVPR) ¹ = Ries et al, 2007 – ACCP = American College of Chest Physicians; AACVPR = American Association of Cardiovascular and Pulmonary Rehabilitation. (GOLD) ² = Global Initiative for Chronic Obstructive Lung Disease, 2010	

TABLE 2. EXERCISE TRAINING IN PATIENTS WITH COPD

Recommendation	Strength of evidence
Lower-extremity exercise training should be a mandatory component of pulmonary rehabilitation.	Strong evidence; strong recommendation
Lower-extremity exercise training performed at a high level of intensity produces greater physiologic benefits than lower-intensity training.	Moderate evidence; strong recommendation
Unsupported upper-extremity endurance training should be included in pulmonary rehabilitation exercise programs	Strong evidence; strong recommendation
Low- and high-intensity exercise training produces clinical benefits for patients with COPD.	Strong evidence; strong recommendation
Including a strength training component in a pulmonary rehabilitation exercise program increases muscle strength and muscle mass.	Strong evidence; strong recommendation
There is no evidence to support the routine use of inspiratory muscle training as an essential component of pulmonary rehabilitation.	Moderate evidence; strong recommendation
Source: Nici et al, 2010 ⁹ ; Ries et al, 2007 ¹	

POST-EXACERBATION REDUCTION OF EXACERBATIONS

Exacerbations of chronic obstructive pulmonary disease (COPD) are characterised by increased dyspnoea, reduced quality of life and muscle weakness. PR administered after hospital admission for an exacerbation was shown in a small study of 60 patients to be able to improve quality of life and exercise capacity and also reduce re-exacerbation and hospital admission. (57% admission in the usual care group compared to 7% in those receiving post-exacerbation pulmonary rehabilitation) (Seymour et al, 2010)⁹.

MAINTAINING BENEFITS AND INTEGRATING CARE

The positive outcomes from pulmonary rehabilitation tend to diminish over months to years after discontinuation of the program. Self- management education may promote long-term adherence to the exercise program. Although patient selection and assessment, exercise training, self-management education, and psychosocial support make up an interdisciplinary pulmonary rehabilitation program, these components should be integrated into lifelong COPD management for all patients. The primary care physician is in a vantage position to provide and coordinate this type of care by integrating care with the specialist, allied care people, patient and significant others.

CONCLUSION

- Pulmonary rehabilitation is now recognised as important and has increasingly emerged as a standard of care for patients with COPD.

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LEARNING POINTS

- **Pulmonary rehabilitation identifies and treats the systemic effects of the disease and the positive outcomes are realised without demonstrable improvements in lung function.**
- **It is multidisciplinary, patient centred and provides a comprehensive assessment upon which the three components of exercise training, self-management education, and psychosocial/behaviour intervention are conducted over a period lasting 6 to 12 weeks.**
- **Pulmonary rehabilitation administered after hospital admission for an exacerbation was shown to be able to improve quality of life and exercise capacity and also reduce re-exacerbation and hospital admission.**
- **The positive outcomes from pulmonary rehabilitation tend to diminish over months to years after discontinuation of the program.**
- **Self- management education may promote long-term adherence to the exercise program.**

COMMUNITY CARE: A TEAM BASED APPROACH TO MANAGING CHRONIC LUNG DISEASE

Dr Gerald Chua

ABSTRACT

Patients with COPD represent the ideal target population which stands to benefit from the Integrated Care Pathway (ICP) model of care. They are generally older and many suffer comorbid conditions which share common causative links to cigarette smoking. Hence their combined medical and social complexities represent a great challenge for the solo physician, whether in specialty or primary care, to deliver care comprehensively, consistently and efficiently. Effective management of patients with COPD thus requires the co-ordinated efforts of the hospital and the community to integrate care across the care continuum. In the COPD ICP Team approach, the execution of care is based on 5 interdependent tenets: (1) Every patient has a primary care physician; (2) Every patient's care should be delivered as a set, rather than individual components; (3) Every patient has a single health record; (4) Every care process must represent value to the patient; (5) Every patient must be helped to navigate care, and supported to remain in care. Of note is the care is supported by care managers, communication links for tracking response to therapy, IT support, and equipment support.

Keywords:

Integrated Care Pathway (ICP), care manager, co-ordinated care, comprehensive care, consistent care, efficient care, single health record

SFP2013; 39(2): 25-29

INTRODUCTIONCONCLUSION

MOH has identified COPD as one of 5 disease conditions amenable to intervention via an integrated care pathway (ICP). In 2010, COPD was the 7th principal cause of death in Singapore with about 440 deaths. COPD was also the 7th most common condition for hospitalisation with more than 10,000 admissions in 2010.

THE INTEGRATED CARE PATHWAY

Patients with COPD represent the ideal target population which stands to benefit from the ICP model of care. They are generally older and many suffer comorbid conditions which share common causative links to cigarette smoking. Hence their combined medical and social complexities represent a great challenge for the solo physician, whether in specialty or primary care, to deliver care comprehensively, consistently and efficiently.

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FIGURE 1: WHAT IS AN INTEGRATED CARE PATHWAY?

Deliberately planned processes whereby

- medical interventions,
 - services and
 - the people that provide them
- are wrapped around patients, such that the patients' needs are met in a
- cost-effective and
 - hassle-free manner,
- regardless of the
- disease severity and
 - location in the regional health system they first present to.

The key care elements of the COPD ICP are listed in Figure 2. To deliver the comprehensive care encompassed by the elements, an inter-professional team approach is needed. The team comprises respiratory medicine physicians, primary care physicians, case managers, smoking cessation counselors, physiotherapists, lung function lab technologists, medical social workers, and palliative care practitioners.

THE COPD ICP TEAM APPROACH

JurongHealth's team approach to the execution of care for our COPD patients is based on the 5 interdependent tenets. See Figure 3.

(1) Every patient has a primary care physician

In today's practice environment, the care of COPD patients is fragmented and uncoordinated, and results in safety risks and waste. A large portion of COPD patients, when in the early stages of disease, either remain undiagnosed or fail to receive consistent care; at the time they present to our hospital systems, usually during a moderate to severe acute exacerbation needing an inpatient stay, they have progressed to advanced disease (Group C & D), and will henceforth remain in specialty care. See Figure 4.

The COPD ICP attempts to address this problem by ensuring that all COPD patients have a primary care physician (PCP). For patients who are detected in primary care, we support their PCP's with direct access spirometry which is reported with a turnaround time of 1 hour, CAT scoring to aid classification, and a recommended set of interventions, based on the disease classification. See Figure 5.

For patients who are detected by the hospital system or specialty care, we aim to optimise the disease control in an expedient manner using a multi-faceted approach with the available resources in hospital based practice. Once our patients are in a

FIGURE 2: KEY CARE ELEMENTS OF THE COPD ICP

S/n	Key Elements of Care	Standards
1	Smoking prevention	People with COPD should be assessed for smoking status and advised not to take up smoking or avoid exposure to cigarette smoke.
2	Smoking cessation	People with COPD who smoke should be encouraged to stop and offered help to do so through smoking cessation counselling and programme.
3	Differential diagnosis	People with COPD should have appropriate investigations (e.g. at least one radiology assessment) to rule out other underlying lung conditions or alternative diagnosis.
4	Spirometry diagnosis	People with COPD should receive spirometry testing for diagnosis (new cases)
5	Patient education	People with COPD should be provided with education and counselling, including on inhaler technique and action plans for exacerbation and self-management.
6	Drug optimisation	People with COPD should have appropriate pharmacotherapy initiated.
7	Influenza vaccination	People with COPD should be offered influenza vaccination annually.
8	BMI assessment	People with COPD should have their BMI assessed annually.
9	Pulmonary rehabilitation	People with COPD, meeting appropriate criteria, are offered an effective pulmonary rehabilitation programme.
10	COPD Assessment Tool (CAT)	People with COPD should be assessed with CAT at every visit or minimum twice a year.
11	Acute ventilation (Non-invasive/ Invasive)	<ul style="list-style-type: none"> People with COPD at severe exacerbation should be considered for prompt Non-Invasive Positive Pressure Ventilation (NIPPV) treatment in a structured programme regardless of NIV consideration. People with COPD exacerbations with worsening conditions (i.e. severe dyspnoea, hypoxemia, hypercapnia and respiratory acidosis) that fail to respond to initial emergency therapy should be considered for integration to ICU/ MICU.
12	Supported Restructured Hospital/ Emergency Department discharge	<ul style="list-style-type: none"> People with COPD exacerbations should be managed with care paths in the emergency department and the inpatient setting, which should include provisions for direct discharge to home supported care (if clinically appropriate). People with COPD admitted for exacerbations should have discharge plans discussed with care coordinator/ COPD nurse, with proactive follow-up.
13	Home Oxygen	People with COPD should have home-based Long term Oxygen Therapy initiated, if indicated. Long Term Oxygen Therapy should be initiated by a specialist.
14	Advanced Care Planning	People with COPD at Stage III and IV should have advanced care planning initiated, if indicated.

FIGURE 3. INTERDEPENDENT TENETS IN COPD ICP TEAM APPROACH

- (1) Every patient has a primary care physician
- (2) Every patient's care should be delivered as a set, rather than individual components
- (3) Every patient has a single health record
- (4) Every care process must represent value to the patient
- (5) Every patient must be helped to navigate care, and supported to remain in care

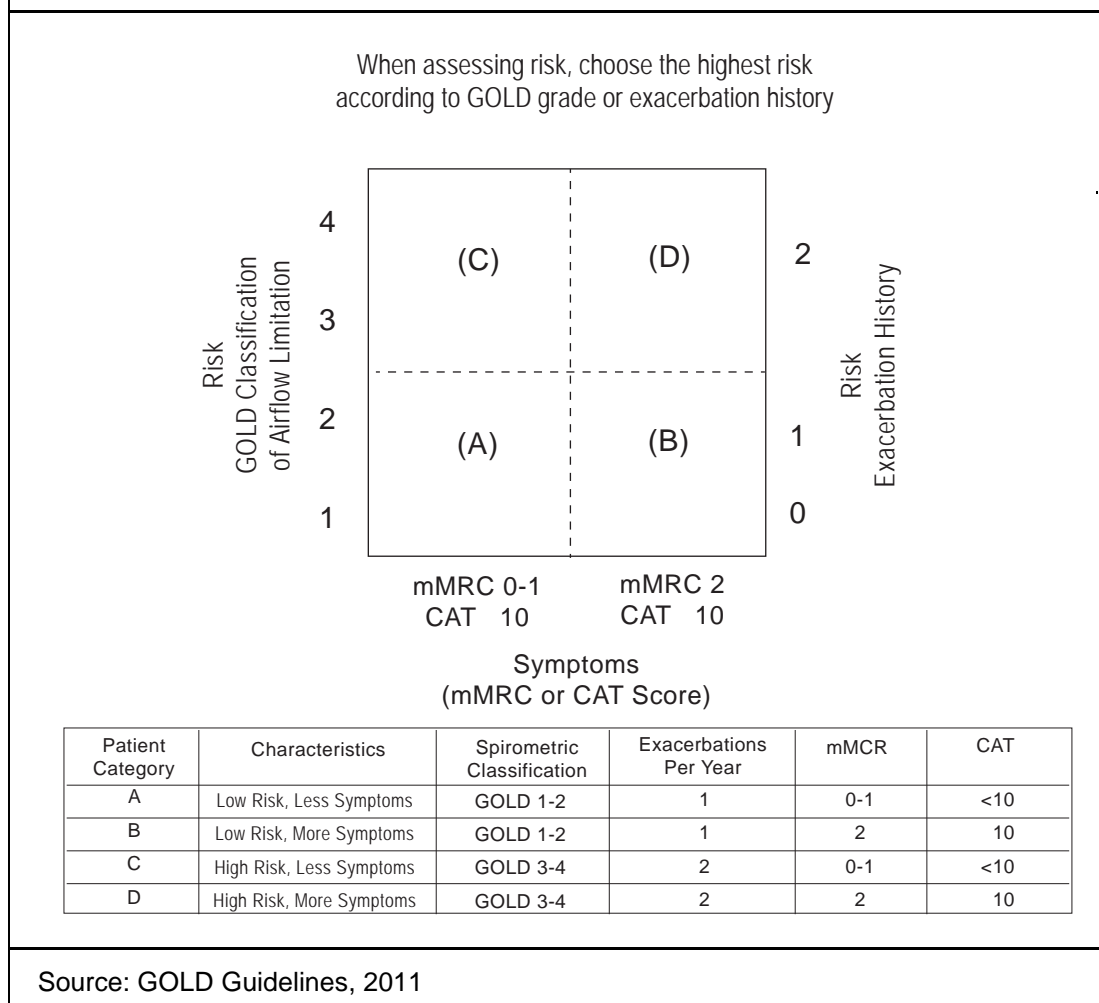
stable phase of the disease, we initiate a system of shared care with our PCP partners. A typical COPD patient in a stable phase of illness today is seen 3 to 4 times a year by hospital based specialty care. We target to share the care of these patients such that 1 to 2 of these visits remains with specialty care, with the balance of 2 to 3 visits with a regular PCP.

(2) Every patient's care should be delivered as a set, rather than individual components

To ensure quality and consistency of care both at specialty and

primary care, care bundles have been devised for each COPD group. Every element in the bundles has good evidence behind its efficacy, but when delivered collectively the resultant effectiveness is believed to be greater than the summation of the effectiveness of each individual intervention.

Consistent and complete adherence to the bundles is a big challenge for physicians working alone. The team approach greatly enhances bundle adherence, through shared responsibilities and the appropriate delegation of tasks to

FIGURE 4. GOLD 2011 CLASSIFICATION OF COPD

members of the healthcare team empowered to work at the top of their license. Automated prompts when care gaps are identified and pre-programmed order sets, when incorporated into the electronic health record (EHR), can assist all members of the team to deliver each element in the bundle to every patient, every time.

(3) Every patient has a single health record

In the practice environment of today, a COPD patient's clinical data may reside in several electronic databases, which at best only interface (rather than integrate) with each other. Even when on follow-up in restructured hospital based specialty care, important information is often not captured electronically and made visible to other members in the team. What results in duplication of care and gaps in care, leading to waste - inefficiencies, unnecessary costs - and risk - compromise of patient safety.

While cognizant that health IT projects are not inexpensive and require many man-hours to ensure robust ground implementation, we strongly believe that the investment will ultimately pay off for our COPD patients. Towards this end we

are working to develop an IT platform that will integrate information from specialty care, primary care, case management, pharmacy, pulmonary rehabilitation, smoking cessation services, medical social services, advanced care planning, and palliative care (when applicable). Such a platform will aid the subsequent genesis of a COPD patient registry, from which data can be mined for health services and outcomes research (HSOR) to enhance or upscale current services, and anticipate future trends and needs.

(4) Every care process must represent value to the patient

In the process of designing the ICP, the team critically examined preexisting processes in both the hospital and community sites. We eliminated steps in the care process which added to supply-chain costs but did not make care safer, more reliable or more accessible. An example of this is the provision of spirometry and smoking cessation counseling services in the community. Both these services, while essential for the management of COPD patients in the early stages of disease, were not within direct access of private practice PCP. Obtaining these services for their patients necessitated a referral to hospital-based specialty care. These additional steps in the care

process represented no value to the patient and their PCP, and acted as barriers to doing what was right. The opportunity to intervene on COPD patients in the early stages was lost: suspected patients remained unconfirmed, and smokers did not receive the expert help they needed to stop / reduce their cigarette smoke exposure.

We thus eliminated the necessary step of a specialty care referral for spirometry and smoking cessation. We also made these services available in a community site, thus reducing as best as possible the physical and logistic barriers to access. Spirometry was performed, read remotely by specialists, and if abnormal and confirmatory of expiratory airflow limitation not acutely reversible by bronchodilators, case managers on site would perform the CAT score, classify the patient's COPD, offer smoking cessation advice (if relevant), extract the key care elements required and submit all the information and recommendations back to the referring PCP. The case managers adhered to pre-defined ICP workflows, and were guided by off-site specialists. This represented an innovative model of respiratory care in Singapore, in which steps which added no value were eliminated, and steps that remained were appropriately delegated, automated and integrated into a workflow that ensured care was safe, reliable and appropriate at every step. See Figure 6.

(5) Every patient must be helped to navigate care, and supported to remain in care

COPD patients often need help to navigate the myriad of services that their physicians prescribe, and their age and comorbidities pose additional complexities. Many healthcare systems overseas have found that case management is the solution to overcome this. The team-approach to COPD ICP implementation is anchored by case managers. All qualified staff nurses, our team of case managers form that crucial link between patients and their PCP, specialists, MSW's, physiotherapists and smoking cessation counselors.

The support that case managers provide our COPD patients include

- Scheduled telephonic contact with patients 2 days and 1 week post hospital discharge
- Ad-hoc telephonic advice on execution of action plans previously prescribed by physicians
- Liaising with durable medical equipment providers for supply of home oxygen, home nebulizers
- Checking of inhaler technique during physician visits
- Telephonic tracking of response to therapy using serial CAT scores, and flagging patients for expedited physician review and early intervention when needed

FIGURE 5. CAT SCORING FOR COPD

		SCORE	
I never cough	0 1 2 3 4 5	I cough all the time	
I have no phlegm (mucus) in my chest at all	0 1 2 3 4 5	My chest is completely full of phlegm (mucus)	
My chest does not feel tight at all	0 1 2 3 4 5	My chest feels very tight	
When I walk up a hill or one flight of stairs I am not breathless	0 1 2 3 4 5	When I walk up a hill or one flight of stairs I am very breathless	
I am not limited doing any activities at home	0 1 2 3 4 5	I am very limited doing activities at home	
I am confident leaving my home despite my lung condition	0 1 2 3 4 5	I am not at all confident leaving my home because of my lung condition	
I sleep soundly	0 1 2 3 4 5	I don't sleep soundly because of my lung condition	
I have lots of energy	0 1 2 3 4 5	I have no energy at all	
<small>COPD Assessment Test and the CAT logo are trademarks of the GlaxoSmithKline group of companies. © 2009 GlaxoSmithKline. All rights reserved.</small>			TOTAL SCORE

FIGURE 6: CARE BUNDLES FOR COPD GROUPS A, B, C & D

Key Care Elements	At risk	Group A	Group B	Group C	Group D	In exacerbation
		Low risk, less symptoms	Low risk, more symptoms	High risk, less symptoms	High risk, more symptoms	
1. Smoking prevention	√					
2. Smoking cessation	√	√	√	√	√	
3. Differential diagnosis	√					
4. Spirometric diagnosis	√	18-24mthly or when clinician suspects patient grouping has changed				
5. Patient education		√	√	√	√	
6. Drug optimisation		√	√	√	√	√ (refer to pharmacotherapy table)
7. Influenza vaccination (yearly)		Only for Elderly (≥ 65 years old) & those with concomitant heart disease	√	√	√	
8. BMI assessment (yearly)		√	√	√	√	
9. Pulmonary rehabilitation			√	√	√	
10. COPD Assessment Tool		6-12mthly	6-12mthly	6-12mthly	3-4mthly	
11. Acute NIV (Invasive/ Non-invasive)						√
12. Supported Restructured Hospital/ Emergency Department discharge						√
13. Home Oxygen				√	√	
14. Advance care planning				√	√	

CONCLUSION

Implementation of the COPD ICP requires a team approach. The team's activities need to support both hospital-based and community-based physician practice. The ICP model represents an opportunity to redesign care that is:

- centred on the needs of our COPD patients, in terms of what they need, when they need it and where they need it,
- has an evidence-base for efficacy and safety,

- covers a comprehensive range of services spanning prevention to palliation,
- cost effective and streamlined through team members performing task at the top of their license, and
- delivered in bundled interventions, aided by integrated electronic health records that incorporate automated order sets and identification of care gaps.

LEARNING POINTS

- **Patients with COPD will benefit from the Integrated Care Pathway (ICP) model of care.**
- **The combined medical and social complexities of COPD patients represent a great challenge for the solo physician, whether in specialty or primary care, to deliver care comprehensively, consistently and efficiently.**
- **Effective management of patients with COPD requires the co-ordinated efforts of the hospital and the community to integrate care across the care continuum.**
- **In the COPD ICP Team approach, the execution of care is based on 5 interdependent tenets.**
- **COPD ICP Care is supported by care managers, communication links for tracking response to therapy, IT support, and equipment support; and care is delivered in bundled interventions, rather than by individual components.**

ASSESSMENT OF 30 MCQs

FPSC No : 53
MCQS ON CHRONIC LUNG DISEASE
Submission DEADLINE: : 25 JUNE 2013, 12 NOON

INSTRUCTIONS

- To submit answers to the following multiple choice questions, you are required to log on to the College Online Portal (www.cfps2online.org)
- Attempt ALL the following multiple choice questions.
- There is only ONE correct answer for each question.
- The answers should be submitted to the College of Family Physicians Singapore via the College Online Portal before the submission deadline stated above.

1. Among the top causes of death in 1990, what position did COPD occupy?
 - A. Sixth.
 - B. Fifth.
 - C. Fourth.
 - D. Third.
 - E. Second.
2. In Singapore, how many COPD patients had at least one previous hospital admission for an acute exacerbation of the disease?
 - A. One quarter.
 - B. One-third.
 - C. Half.
 - D. Two-thirds.
 - E. Three-quarters.
3. About the uptake of pulmonary rehabilitation amongst patients with COPD in Singapore, which of the following is CORRECT?
 - A. 10%.
 - B. 13%.
 - C. 16%.
 - D. 19%.
 - E. 22%.
4. Amongst patients with COPD but no smoking history, which of the following is an associated factor?
 - A. History of bacterial endocarditis.
 - B. History of pulmonary tuberculosis.
 - C. History of high blood pressure.
 - D. History of depression.
 - E. History of preeclampsia.
5. With regards to the prevalence of COPD among adults aged 40 and above, which of the following is CORRECT?
 - A. 20 to 40%.
 - B. 15 to 35%
 - C. 20 to 35%
 - D. 15 to 30%.
 - E. 8 to 26%.
6. In COPD patients with infrequent exacerbations, what is the rate of decline of FEV₁/year?
 - A. 17.1 ml.
 - B. 22.1 ml.
 - C. 27.1 ml.
 - D. 32.1 ml.
 - E. 37.1 ml.
7. In COPD patients with infrequent exacerbations, what is the rate of decline of the peak expiratory flow/year?
 - A. 2.4 L/min/year.
 - B. 1.7 L/min/year.
 - C. 1.4 L/min/year.
 - D. 0.7 L/min/year.
 - E. 0.4 L/min/year.
8. To date which of the following has been shown to alter the clinical course of COPD?
 - A. Long acting bronchodilators.
 - B. Inhaled corticosteroids.
 - C. Smoking cessation.
 - D. Pulmonary rehabilitation.
 - E. Antioxidants.

9. As a risk reduction strategy, which **ONE** of the following vaccinations should be recommended to all COPD patients besides a yearly influenza vaccination?
- Herpes zoster vaccination
 - Hemophilus influenza immunisation
 - Pneumococcal vaccination.
 - Pertussis vaccine
 - Rubella vaccine.
10. About pharmacotherapeutic agents for COPD, which of the following is a LABA that can be used as once daily medication?
- Tiotropium.
 - Roflumilast.
 - Salmaterol.
 - Formoterol.
 - Indacaterol.
11. With regards to major paradigm shift in the diagnosis and management of COPD, in which revision of the GOLD global strategy was this announced?
- 2011 revision.
 - 2010 revision.
 - 2009 revision.
 - 2008 revision.
 - 2007 revision.
12. In the symptom evaluation of a patient with COPD in order to categorise him or her for diagnosis and treatment, which of the following will be the **MOST APPROPRIATE** tool to use?
- COPD Assessment test (CAT) score.
 - Breathing Problems Questionnaire (BPQ).
 - Peak VO₂.
 - Peak expiratory flow rate.
 - BODE index.
13. In the assessment of the COPD patient for therapy, which of the following is the **BEST** combination to use to reflect the complexity and heterogeneity of the individual?
- Hospital admissions for pneumonia, airflow limitation and medication response.
 - Nocturnal symptoms, ability to work, and compliance to medications.
 - mMRC, exacerbation history, and medication response.
 - FEV₁ and medication response.
 - Symptoms, airflow limitation, and exacerbation history.
14. In a COPD categorised as Group A, which of the following therapeutic strategies is **CORRECT**?
- Long-acting beta2-agonist taken regularly.
 - Short-acting bronchodilator taken as needed.
 - Long acting antismuscarinic agent taken regularly.
 - Short-acting bronchodilator and theophylline.
 - No medication is required.
15. With regards to pharmacotherapy in COPD, which of the following is **CORRECT**?
- A trial of oral steroids is useful if in doubt.
 - Theophylline is useful because of its high efficacy and affordability.
 - Optimal and maximal bronchodilatation is the cornerstone of treatment.
 - Long-term monotherapy with oral corticosteroids is an alternative in the old patient.
 - Long-term inhaled corticosteroids (ICS) is as effective as ICS plus a LABA.
16. About the asthma-COPD overlap “syndrome”, in which of the population groups is it **MOST** common?
- Adolescents.
 - Young adult females.
 - Elderly.
 - Manual workers.
 - Patients with type 2 diabetes mellitus.
17. In a patient with COPD alone, which of the following clinical features is **LEAST LIKELY** to be present?
- People with a smoking history.
 - Slowly progressive disease.
 - Airway obstruction is partially reversible.
 - Financially needy patients.
 - Inflammatory cells taking part in the airway inflammation are eosinophils, mast cells, and CD4+ cells.
18. You have a patient whom you are preparing for a bronchodilator reversibility testing. The patient should not have taken inhaled short-acting bronchodilators for how many hours?
- 6.
 - 12.
 - 16.
 - 20.
 - 24.
19. In doing a bronchodilator reversibility testing, you intend to give an anticholinergic. What is the dosage that you will give?
- 100 mcg.
 - 160 mcg.
 - 200 mcg.
 - 320 mcg.
 - 400 mcg.

- 20. About pulmonary rehabilitation after an exacerbation in a patient with Asthma-COPD overlap syndrome, which of the following is CORRECT?**
- It is optional as there is no evidence that pulmonary rehabilitation helps.
 - It should be given 2 weeks after an exacerbation.
 - It should be given 3 weeks after an exacerbation.
 - It should be delayed for 6 weeks for the patient to be stable.
 - It should be given immediately after an exacerbation.
- 21. About the role of pulmonary rehabilitation in the COPD patient, what effects are identified and treated?**
- Social effects of the disease.
 - Emotional effects of the disease.
 - Respiratory effects of the disease.
 - Systemic effects of the disease.
 - Behavioral effects of the disease.
- 22. About the efficacy of pulmonary rehabilitation in resulting in dyspnea relief, what is the level of evidence as has been evaluated by the Global Initiative for Chronic Obstructive Lung Disease (GOLD)?**
- Evidence grade A.
 - Evidence grade B.
 - Evidence grade C.
 - Evidence grade D.
 - Evidence unknown.
- 23. About the effects of pulmonary rehabilitation after 3 months, which of the following is CORRECT?**
- No demonstrable improvement in peak VO₂.
 - No demonstrable improvement in 6 minute walking distance (6MWD).
 - No demonstrable improvement in peak VO₂ but improvement in 6MWD.
 - No demonstrable improvement in 6MWD but improvement in peak VO₂.
 - No demonstrable improvement in FEV₁.
- 24. About the gold standard measurement of exercise capacity for patients with COPD, which of the following is CORRECT?**
- FEV₁.
 - 6 Minute walking distance (6MWD).
 - Peak VO₂.
 - Chronic Respiratory Disease Questionnaire (CRQ).
 - BODE Index.
- 25. About measuring the health status of the patient with COPD, which of the following will be MOST APPROPRIATE?**
- FEV₁.
 - Spirometry.
 - Peak Expiratory Flow Rate.
 - St George's Respiratory Questionnaire (SGRQ).
 - Peak VO₂.
- 26. About the care bundle for a patient at risk of COPD, which of the following is NOT part of the care bundle?**
- Smoking prevention.
 - Advance care planning.
 - Smoking cessation.
 - Differential diagnosis.
 - Spirometric diagnosis.
- 27. In a COPD patient categorised as belonging to Group D, how often should the COPD Assessment Tool be administered?**
- 3-4 monthly.
 - 5-6 monthly.
 - 8-9 monthly.
 - 11-12 monthly.
 - As when needed.
- 28. In a COPD patient categorised as belonging to Group B, how often should a spirometric evaluation be repeated?**
- No need.
 - 18-24 monthly.
 - 12-17 monthly.
 - 9-11 monthly.
 - 5-6 monthly.
- 29. In the COPD IPC model of care implemented in JurongHealth, one of the interdependent tenets is health records. Which of the following is the BEST answer about health records?**
- Every patient has 3 records, one for medical care, one for nursing care, and one for the dietitian.
 - Every patient has 3 records, one for medical care, one for nursing care, and one for the occupational therapist.
 - Every patient has 3 records, one for medical care, one for nursing care, and one for the physiotherapist.
 - Every patient has a single health record.
 - Every patient has 2 records, one for medical care, and one for nursing care.
- 30. In the COPD ICP care model in JurongHealth, there is a scheduled telephonic contact provided for COPD patients post hospital discharge by the care manager. Which of the following scheduled arrangement is CORRECT?**
- Contact the patient 1 week post hospital discharge.
 - Contact the patient 2 weeks post hospital discharge.
 - Contact the patient 2 days and 1 week post hospital discharge.
 - Contact the patient 3 days and 1 week post hospital discharge.
 - Contact the patient 5 days and 2 weeks post hospital discharge.

FPSC No. 50
“Lifestyle Advice for Better Patient Outcomes”
Answers to 30 MCQ Assessment

1. A	11. C	21. C
2. D	12. E	22. B
3. E	13. B	23. A
4. C	14. E	24. B
5. B	15. D	25. E
6. D	16. B	26. D
7. B	17. B	27. C
8. C	18. A	28. B
9. D	19. C	29. A
10. B	20. E	30. B

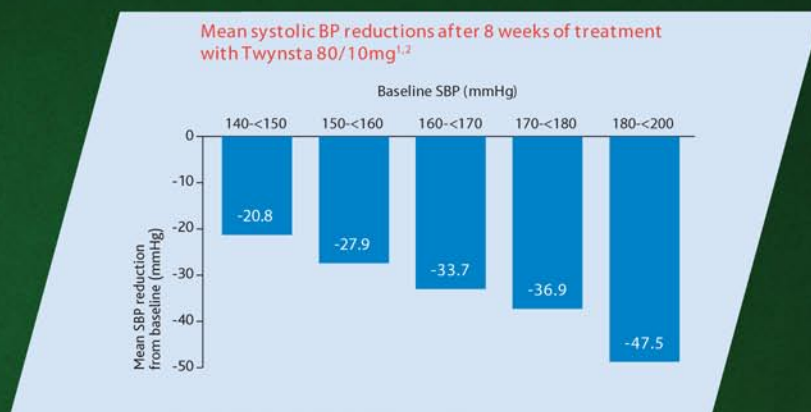
FPSC No. 51
“Schizophrenia”
Answers to 30 MCQ Assessment

1. A	11. A	21. E
2. D	12. A	22. B
3. B	13. E	23. E
4. B	14. B	24. C
5. E	15. C	25. D
6. D	16. C	26. B
7. D	17. E	27. A
8. C	18. A	28. B
9. C	19. A	29. D
10. E	20. D	30. C

FPSC No. 52
“Sexual Health”
Answers to 30 MCQ Assessment

1. E	11. A	21. D
2. E	12. B	22. C
3. D	13. E	23. B
4. D	14. B	24. D
5. A	15. D	25. A
6. A	16. C	26. C
7. D	17. A	27. B
8. E	18. B	28. C
9. E	19. E	29. A
10. C	20. E	30. C

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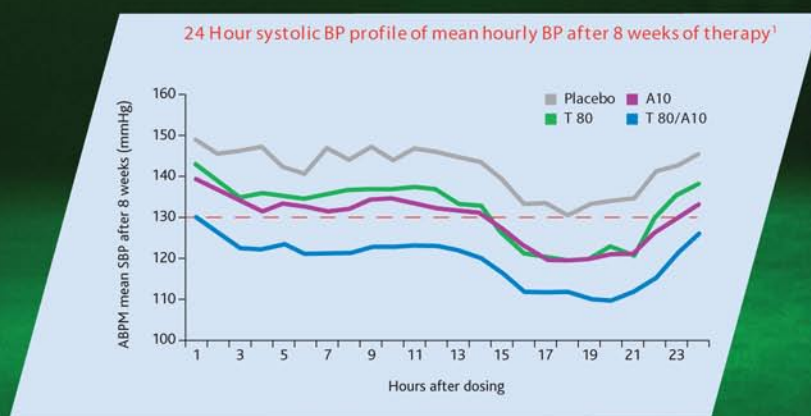
n=117 for baseline BP 140-180¹
n=379 for baseline BP 180-200¹

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Mean reduction from baseline in 24-hr BP significantly greater for Twynsta 80/10mg than amlodipine 10mg: -22.4/-14.6mmHg vs. -11.9/-6.9mmHg (P<0.0001).³

1. Suárez C. Drugs 2011;71(17):2295-2305.

2. Neutel JM et al. J Clin Hypertens (Greenwich) 2012;14:206-215.

3. White WB et al. Blood Press Monit 2010;15(4):205-212.



R E A D I N G S

A SELECTION OF TEN CURRENT READINGS ON TOPICS RELATED TO
CHRONIC LUNG DISEASE

A SELECTION OF TEN CURRENT READINGS ON TOPICS RELATED TO CHRONIC LUNG DISEASE

some available as free full-text and some requiring payment

Selection of readings made by A/Prof Goh Lee Gan

READING 1 – CARING FOR OLDER PERSON WITH COPD

Fried TR, Vaz Fragoso CA, Rabow MW. Caring for the older person with chronic obstructive pulmonary disease. JAMA. 2012 Sep 26;308(12):1254-63. PubMed PMID:23011715.

URL: <http://jama.jamanetwork.com/article.aspx?doi=10.1001/jama.2012.12422> -- Payment required

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ABSTRACT

Chronic obstructive pulmonary disease (COPD), a common disease in elderly patients, is characterized by high symptom burden, health care utilization, mortality, and unmet needs of patients and caregivers. Respiratory failure and dyspnea may be exacerbated by heart failure, pulmonary embolism, and anxiety; by medication effects; and by other conditions, including deconditioning and malnutrition. Randomized controlled trials, which provide the strongest evidence for guideline recommendations, may underestimate the risk of adverse effects of interventions for older patients with COPD. The focus of guidelines on disease-modifying therapies may not address the full spectrum of patient and caregiver needs, particularly the high rates of bothersome symptoms, risk of functional and cognitive decline, and need for end-of-life care planning. Meeting the many needs of older patients with COPD and their families requires that clinicians supplement guideline-recommended care with treatment decision making that takes into account older persons' comorbid conditions, recognizes the trade-offs engendered by the increased risk of adverse events, focuses on symptom relief and function, and prepares patients and their loved ones for further declines in the patient's health and their end-of-life care. A case of COPD in an 81-year-old man hospitalized with severe dyspnea and respiratory failure highlights both the challenges in managing COPD in the elderly and the limitations in applying guidelines to geriatric patients. PMID: 23011715 [PubMed - indexed for MEDLINE]

READING 2 – SMOKING CESSATION STRATEGIES IN COPD

Warnier MJ, van Riet EE, Rutten FH, De Bruin ML, Sachs AP. Smoking cessation strategies in patients with COPD. Eur Respir J. 2013 Mar;41(3):727-34. doi: 10.1183/09031936.00014012. Epub 2012 Aug 30. PubMed PMID: 22936706.

URL: <http://erj.ersjournals.com/content/41/3/727.long> -- Payment required

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ABSTRACT

Smoking cessation is the cornerstone of treatment of chronic obstructive pulmonary disease (COPD) patients. This systematic review evaluates the effectiveness of behavioural and pharmacological smoking cessation strategies in COPD patients. MEDLINE was searched from January 2002 to October 2011. Randomised controlled trials evaluating the effect of smoking cessation interventions for COPD patients, published in English, were selected. The methodological quality of included trials was assessed using the Delphi list by two reviewers independently. The relative risks of smoking cessation due to the intervention, compared with controls, were calculated. Eight studies met the inclusion criteria.

Heterogeneity was observed for study population, the intervention strategy, the follow-up period and the outcome. According to the Delphi list methodological quality scores, five studies were considered to be of acceptable quality. Pharmacological therapy combined with behavioural counselling was more effective than each strategy separately. In COPD patients, the intensity of counselling did not seem to influence the results, nor did the choice of drug therapy make a difference. This systematic review makes clear that in COPD patients, pharmacological therapy combined with behavioural counselling is more effective than each strategy separately. Neither the intensity of counselling nor the type of anti-smoking drug made a difference. PMID: 22936706 [PubMed - in process]

READING 3 – NUTRITIONAL SUPPORT IN COPD

Collins PF, Elia M, Stratton RJ. Nutritional support and functional capacity in chronic obstructive pulmonary disease: A systematic review and meta-analysis. *Respirology*. 2013 May;18(4):616-29. doi: 10.1111/resp.12070. PubMed PMID: 23432923.

URL: <http://dx.doi.org/10.1111/resp.12070> – Free full text

Faculty of Medicine, Institute of Human Nutrition, Southampton General Hospital, University of Southampton, Southampton, UK; Faculty of Health, School of Exercise and Nutrition Sciences, Queensland University of Technology, Brisbane, Australia.

ABSTRACT

Currently, there is confusion about the value of using nutritional support to treat malnutrition and improve functional outcomes in chronic obstructive pulmonary disease (COPD). This systematic review and meta-analysis of randomized, controlled trials (RCT) aimed to clarify the effectiveness of nutritional support in improving functional outcomes in COPD. A systematic review identified 12 RCT (n = 448) in stable COPD patients investigating the effects of nutritional support (dietary advice (1 RCT), oral nutritional supplements (10 RCT), enteral tube feeding (1 RCT)) versus control on functional outcomes. Meta-analysis of the changes induced by intervention found that while respiratory function (forced expiratory volume in 1 s, lung capacity, blood gases) was unresponsive to nutritional support, both inspiratory and expiratory muscle strength (maximal inspiratory mouth pressure +3.86 standard error (SE) 1.89 cm H₂O, P = 0.041; maximal expiratory mouth pressure +11.85 SE 5.54 cm H₂O, P = 0.032) and handgrip strength (+1.35 SE 0.69 kg, P = 0.05) were significantly improved and associated with weight gains of ≥2 kg. Nutritional support produced significant improvements in quality of life in some trials, although meta-analysis was not possible. It also led to improved exercise performance and enhancement of exercise rehabilitation programmes. This systematic review and meta-analysis demonstrates that nutritional support in COPD results in significant improvements in a number of clinically relevant functional outcomes, complementing a previous review showing improvements in nutritional intake and weight. © 2013 The Authors. *Respirology* © 2013 Asian Pacific Society of Respirology. PMID: 23432923 [PubMed - in process]

READING 4 – BEHAVIOR MEDICINE APPROACHES IN COPD

von Leupoldt A, Fritzsche A, Trueba AF, Meuret AE, Ritz T. Behavioral medicine approaches to chronic obstructive pulmonary disease. *Ann Behav Med*. 2012 Aug;44(1):52-65. doi: 10.1007/s12160-012-9348-7. PubMed PMID: 22351032; PubMed Central PMCID: PMC3612952.

URL: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3612952/> -- free full text

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ABSTRACT

BACKGROUND: Chronic obstructive pulmonary disease (COPD) is a prevalent respiratory disease and associated with considerable individual and socioeconomic burden. Recent research started examining the role of psychosocial factors for course and management of the disease. **PURPOSE:** This review provides an overview on recent findings on psychosocial factors and behavioral medicine approaches in COPD. **RESULTS:** Research has identified several important psychosocial factors and effective behavioral medicine interventions in COPD. However, there is considerable need for future research in this field. **CONCLUSIONS:** Although beneficial effects of some behavioral medicine interventions have been demonstrated in COPD, future research efforts are necessary to study the effects of distinct components of these interventions, to thoroughly examine promising but yet not sufficiently proven interventions, and to develop new creative interventions. PMID: PMC3612952 PMID: 22351032 [PubMed - indexed for MEDLINE]

READING 5 – INHALER USE IN COPD

Yawn BP, Colice GL, Hodder R. Practical aspects of inhaler use in the management of chronic obstructive pulmonary disease in the primary care setting. *Int J Chron Obstruct Pulmon Dis.* 2012;7:495-502. doi: 10.2147/COPD.S32674. Epub 2012 Jul 25. Review. PubMed PMID: 22888221; PubMed Central PMCID: PMC3413176.

URL: <http://dx.doi.org/10.2147/COPD.S32674> -- Free full text

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ABSTRACT

Sustained bronchodilation using inhaled medications in moderate to severe chronic obstructive pulmonary disease (COPD) grades 2 and 3 (Global Initiative for Chronic Obstructive Lung Disease guidelines) has been shown to have clinical benefits on long-term symptom control and quality of life, with possible additional benefits on disease progression and longevity. Aggressive diagnosis and treatment of symptomatic COPD is an integral and pivotal part of COPD management, which usually begins with primary care physicians. The current standard of care involves the use of one or more inhaled bronchodilators, and depending on COPD severity and phenotype, inhaled corticosteroids. There is a wide range of inhaler devices available for delivery of inhaled medications, but suboptimal inhaler use is a common problem that can limit the clinical effectiveness of inhaled therapies in the real-world setting. Patients' comorbidities, other physical or mental limitations, and the level of inhaler technique instruction may limit proper inhaler use. This paper presents information that can overcome barriers to proper inhaler use, including issues in device selection, steps in correct technique for various inhaler devices, and suggestions for assessing and monitoring inhaler techniques. Ensuring proper inhaler technique can maximize drug effectiveness and aid clinical management at all grades of COPD. PMID: PMC3413176 PMID: 22888221 [PubMed - indexed for MEDLINE]

READING 6 – PHARMACOLOGICAL INTERVENTIONS FOR ANXIETY DISORDERS IN COPD

Usmani ZA, Carson KV, Cheng JN, Esterman AJ, Smith BJ. Pharmacological interventions for the treatment of anxiety disorders in chronic obstructive pulmonary disease. *Cochrane Database Syst Rev.* 2011 Nov 9;(11):CD008483. doi: 10.1002/14651858.CD008483.pub2. Review. PubMed PMID: 22071851.

URL: <http://dx.doi.org/10.1002/14651858.CD008483.pub2> -- Payment required

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ABSTRACT

BACKGROUND: Chronic Obstructive Pulmonary Disease (COPD) is characterised by inflammation of the airways and

destruction of pulmonary tissue with post bronchodilator FEV1/FVC of <0.70 (forced expiratory volume in one second/forced vital capacity). Evidence indicates an increased prevalence of anxiety disorders in patients with chronic obstructive pulmonary disease (COPD), as compared with the general population and persons suffering from many other chronic illnesses. Anxiety in people with COPD has been shown to increase disability and impair functional status, resulting in an overall reduction in quality of life. As such, pharmacological interventions are commonly used to treat anxiety disorders in patients with COPD. **OBJECTIVES:** To assess the effect of pharmacological interventions on anxiety disorders in people with COPD, in terms of improvement of anxiety symptoms, quality of life, exercise tolerance, reduction in length of hospital stay and FEV1. We also evaluated adverse drug reactions. **SEARCH METHODS:** Two Cochrane Review Group Specialised Registers were searched (up to the 1st of June 2011) to identify trials for this review. Complementary searches of PsycINFO and the Cochrane Central Register of Controlled Trials (CENTRAL) were also carried out. We did not apply any language restrictions. **SELECTION CRITERIA:** We considered all randomised controlled trials (RCTs), cluster randomised trials and cross-over trials of pharmacological interventions for patients (age > 40 years) with COPD and co-existing anxiety disorders (as confirmed by recognised diagnostic criteria or a validated measurement scale) for the review. **DATA COLLECTION AND ANALYSIS:** Two of the three review authors individually evaluated each article and extracted data. Any conflicts that arose were resolved through discussion with a third party, if necessary. Trial investigators were contacted to obtain missing/raw data. Meta-analyses of continuous outcomes were performed using the random-effect model. **MAIN RESULTS:** Four studies met all of the inclusion criteria (with a total of 40 participants). Three subclasses of anxiety medications were used including selective serotonin reuptake inhibitors (SSRIs), tricyclic antidepressants (TCAs) and azapirones. Although two studies used SSRIs as the intervention (total of 21 participants), we were unable to meta-analyse the anxiety outcomes as one study had a standard deviation of zero for the control group. Included studies had relatively poor quality including small sample sizes and short follow-up periods. Due to the small number of included studies, we were unable to meta-analyse all the subclasses of medications. **AUTHORS' CONCLUSIONS:** Due to the sub-optimal quality of the trials and statistically non-significant results, it is not possible to draw any conclusions for treatment. This review highlights the paucity of data in this area. As such, there is a need for scientifically rigorous research trials to evaluate the role of pharmacological interventions for anxiety disorders in patients with COPD, using a sample size large enough to demonstrate meaningful clinical significance. PMID: 22071851 [PubMed - indexed for MEDLINE]

READING 7 – PULMONARY REHABILITATION

Nici L, Zuwallack R. Scope, background and definition of pulmonary rehabilitation. Eur J Phys Rehabil Med. 2011 Sep;47(3):465-74. Review. PubMed PMID: 21946404.

URL: <http://www.minervamedica.it/en/journals/europa-medicophysica/article.php?cod=R33Y2011N03A0465>
– full free text

ABSTRACT

Pulmonary Diseases, Providence VA Hospital, Providence, RI, USA. The optimal therapy of an individual with chronic respiratory disease usually requires a combination of pharmacologic and non-pharmacologic therapies. A case of a 68-year-old man with advanced chronic obstructive pulmonary disease is given to illustrate this point. He is a recent ex-smoker with severe chronic obstructive pulmonary disease by spirometric criteria, frequent exacerbations of this disease, considerable recent health care utilization, dyspnea with minimal activities, severe functional status limitation, prominent systemic effects of the disease (e.g., weight loss) and substantial comorbidities. The primary respiratory disease cannot be isolated from and treated independently of these important factors. Pulmonary rehabilitation is an important therapeutic option in situations like this, providing a mode of integrating care, complementing otherwise standard medical therapy, and producing significant gains across multiple outcome areas of importance to the patient. Pulmonary rehabilitation has been defined by the American Thoracic Society and European Respiratory Society as: "an evidence-based, multidisciplinary, and comprehensive intervention for patients with chronic respiratory diseases who are symptomatic and often have decreased daily life activities. Integrated into the individualized treatment of the patient, pulmonary rehabilitation is designed to reduce symptoms, optimize functional status, increase participation, and reduce health care costs through stabilizing or reversing systemic manifestations of the disease". Its components include comprehensive assessment, education, exercise training, and

psychosocial intervention. Outcomes assessment is usually performed for quality assessment. Pulmonary rehabilitation produces the greatest improvements of any available therapy in dyspnea, exercise capacity, and health-related quality of life. These gains are realized despite the fact that pulmonary rehabilitation has no direct effect on lung function. It works primarily through reducing the impact of the systemic manifestations of the disease and frequent comorbidity. Pulmonary rehabilitation also leads to substantial reductions in subsequent health care utilization, possibly through collaborative self-management strategies emphasized in the program. Although pulmonary rehabilitation has been utilized by astute clinicians for many years, its science has been developed over the past two decades. PMID: 21946404 [PubMed - indexed for MEDLINE]

READING 8 – REHABILITATION REDUCES ACUTE EXACERBATIONS

Burtin C, Decramer M, Gosselink R, Janssens W, Troosters T. Rehabilitation and acute exacerbations. Eur Respir J. 2011 Sep;38(3):702-12. doi: 10.1183/09031936.00079111. Epub 2011 Jun 30. Review. PubMed PMID: 21719481.

URL: <http://erj.ersjournals.com/cgi/pmidlookup?view=long&pmid=21719481> – Free full text

University Hospitals KU Leuven, Respiratory Rehabilitation and Respiratory Division, Leuven, Belgium.

Comment in Eur Respir J. 2011 Sep;38(3):514-5.

ABSTRACT

Recent evidence indicates that acute exacerbations of chronic obstructive pulmonary disease aggravate the extrapulmonary consequences of the disease. Skeletal muscle dysfunction, a sustained decrease in exercise tolerance, enhanced symptoms of depression and fatigue are reported. Avoidance of physical activities is likely to be a key underlying mechanism and increases the risk of new exacerbations. Pulmonary rehabilitation is an intervention targeting these systemic consequences. Exercise strategies need to be adapted to the increased feelings of dyspnoea and fatigue. This review aims to describe the systemic consequences of acute exacerbations and compiles evidence for the feasibility and effectiveness of different rehabilitation strategies to counteract these consequences during and/or immediately after the acute phase of the exacerbation. Resistance training and neuromuscular electrical stimulation have been applied safely in frail, hospitalised patients and have the potential to prevent muscle atrophy. Comprehensive pulmonary rehabilitation, including general exercise training, can be implemented immediately after the exacerbation, leading to a reduction in hospital admissions and an increase in exercise tolerance and quality of life. Self-management strategies play a crucial role in changing disease-related health behaviour and preventing hospital admissions. PMID: 21719481 [PubMed - indexed for MEDLINE]

READING 9 – LONG TERM SYSTEMIC ANTIMICROBIAL IN COPD

Berim I, Sethi S. The benefits of long-term systemic antimicrobial therapy in chronic obstructive pulmonary disease. Ther Adv Respir Dis. 2011 Jun;5(3):207-16. doi: 10.1177/1753465811398372. Epub 2011 Mar 4. Review. PubMed PMID: 21378062.

URL: <http://tar.sagepub.com/cgi/pmidlookup?view=long&pmid=21378062> – fee full text

University at Buffalo, SUNY, Buffalo, NY, USA.

ABSTRACT

Acute exacerbations of chronic obstructive pulmonary disease (AECOPD) are major contributors to the morbidity and mortality associated with this disease. Current approaches that likely reduce chronic obstructive pulmonary disease (COPD) exacerbations include smoking cessation, influenza and pneumococcal vaccinations, long-acting bronchodilator and inhaled corticosteroid therapy, pulmonary rehabilitation, and mucolytic drugs. However, with optimal treatment using all of these

modalities, we are only able to reduce exacerbations by about 40%. A significant proportion of COPD exacerbations are bacterial, therefore long-term antimicrobial therapy could have a role in preventing exacerbations. Long-term antibiotic treatment in COPD regimens that are being evaluated include low-dose macrolide therapy, pulsed fluoroquinolone administration and the use of inhaled antibiotics. Although initial results have been promising with significant reductions in exacerbations with these regimens, additional studies are required to identify the appropriate patient and regimen and elucidate the risk-benefit as well as cost effectiveness of long-term antibiotics in COPD. PMID: 21378062 [PubMed - indexed for MEDLINE]

READING 10 – COPD MANAGEMENT IN SWISS PRIMARY CARE: ROOM FOR IMPROVEMENT

Steurer-Stey C, Dallalana K, Jungi M, Rosemann T. Management of chronic obstructive pulmonary disease in Swiss primary care: room for improvement. Qual Prim Care. 2012;20(5):365-73. Review. PubMed PMID: 23114004.

URL: <http://www.ingentaconnect.com> – Payment required

Institute of General Practice, University of Zurich, Pestalozzistrasse 24, 8091 Zurich, Switzerland. claudia.stey@usz.ch

ABSTRACT

BACKGROUND: Information on the quality of care for patients with chronic obstructive pulmonary disease (COPD) in Swiss primary care is limited. **AIM:** To identify gaps and quality improvement potential in COPD primary care in Switzerland. **METHODS:** Pooled analysis of selected published data. Six international COPD guidelines (German, Swiss, United Kingdom, Canadian, Australian and New Zealand, and the global initiative on obstructive lung disease [GOLD] guidelines) were reviewed for care elements with a level of evidence rated II and higher in at least three of the six guidelines. We compared published data on COPD management in Swiss primary care with these recommendations and with published international benchmarks. **RESULTS:** Nine elements fulfilled the criteria for evidence level II or higher in at least three of six COPD guidelines. These were summarised in six key domains: diagnosis, smoking cessation counselling, influenza vaccination, pharmacological treatment, patient education and pulmonary rehabilitation (long-term oxygen and palliative care are not the focus of COPD primary care in Switzerland and outpatient exacerbation management was subordinated to pharmacological treatment and education). Swiss primary care data revealed spirometric confirmation of diagnosis in 55% of patients, smoking cessation counselling in 50% and influenza vaccination in 66%. Inadequate prescription of inhaled corticosteroids (ICS) was high at 38% in mild COPD and 43% in moderate COPD. Referral for pulmonary rehabilitation, even for patients with severe COPD, was low at 19% and data on patient education were rare. Diagnosis, patient education and referral for pulmonary rehabilitation revealed the highest, and influenza vaccination the lowest performance gap. **CONCLUSION:** Gaps between current care and recommended best practice exist in Swiss primary care COPD management. Promoting and implementing evidence-based frameworks for developing high quality care for patients with COPD are necessary. PMID: 23114004 [PubMed - indexed for MEDLINE]



PRISM SECTION

(Patients' Revelations as Insightful Studies of their Management)

- Managing a 14-year-old Female Teenager Presenting with a Sexually Transmitted Infection
- What are the Issues Involved?

MANAGING A 14-YEAR-OLD FEMALE TEENAGER PRESENTING WITH A SEXUALLY TRANSMITTED INFECTION - WHAT ARE THE ISSUES INVOLVED?

Dr Ong Shu Min

ABSTRACT

In Singapore, sexual intercourse with a minor is an offence. An individual, who has knowledge of such an offence, is legally obliged to inform the authorities. This case study involved a minor who suffered from a sexually transmitted disease (STD) after sexual exposure. With her approval, the attending primary care physician reported the offence to the police using an on-line service. The case study also serves to illustrate the ethical and legal issues relating to her management.

Keywords:

sex with minor; ethical; legal; reporting

SFP2013; 39(2): 44-48

PATIENT'S REVELATION: WHAT HAPPENED?

Miss N, a 14 year 8 month old Malay girl presented to a doctor at a public primary care clinic complaining of vaginal pain and discharge for three days. It was not associated with abdominal pain. She reported a consensual, unprotected vaginal sex two to three weeks ago with an 18 year old male friend. She was unable to recall the date of her last menstrual period. However, she had visited an emergency department of a government hospital a week earlier for a urinary tract infection and her urine pregnancy test was tested negative then.

Miss N's first sexual encounter was after she turned 14 years old. She has not had any other sexual partner. She is not sure if her male friend has had any other sexual partners apart from herself. She has not previously had any sexually transmitted diseases. She has not had any pregnancies before.

Miss N is currently a student in Secondary 2. She stays in a HDB flat with her parents and elder sister.

On examination, the genital area appeared red and inflamed. There were no genital ulcers. There were copious amounts of yellowish vaginal discharge coming from the vaginal introitus. The patient was unable to tolerate per vaginal examination as it was too painful. She did not have any tenderness or palpable masses in the abdomen. She was generally well looking and not pale.

Miss N was advised for a urine pregnancy test, which she declined.

She was diagnosed as having a vaginal infection, likely gonorrhea. In view of the recent history of unprotected sex preceding the onset of symptoms of vaginal infection, she was referred to the Department of Sexually Transmitted Infections Control the next day to exclude sexually transmitted infections.

The doctor informed Miss N that sex with a minor was considered an offence and that a report would have to be made to the police. She was initially not keen on having a police report filed as she did not want her partner to get into trouble or for her parents to find out about her sexual activity. She also did not want the doctor to contact her parents, and declined to return for a repeat consultation another day with her parents.

After discussion with senior doctors in the clinic, the doctor explained to the patient he was obligated by law to report the offence. The consultation was lengthy as the patient was given opportunity to ask questions and voice out her concerns. Eventually the patient agreed to the reporting of the offence. A police report was subsequently filed via the Electronic Police Centre the following day.

The doctor also contacted the Department of Sexually Transmitted Infections Control the next day and verified with the clinic staff that the patient had turned up for the consultation and was being followed up with the clinic's counsellor.

GAINING INSIGHT: WHAT ARE THE ISSUES?

This case raised the issue of whether the doctor should report the case to the authorities as the patient involved was a minor. This case illustrates how both legal and ethical implications have to be considered before reaching a decision on the course of action to be taken. There are also many social aspects to the case which need to be addressed by the doctor in charge.

I. Legal considerations

In Singapore, sex with a minor under 16 years of age has been classified as 'carnal connection' under Section 140¹ of the Women's Charter. There was previously no legal duty to report this offence to the police. However, according to the new Section 376A² under Chapter XVI of the Penal Code introduced during by the Penal Code (Amendment) Act 2007, sexual penetration of a minor below 16 years of age, with or without consent, is considered an offence, punishable by imprisonment for a term which may extend to 10 years, or with fine, or with both. Under the Criminal Procedure Code Act 2010³, it is classified as a significant offence (for which a police officer may arrest without a warrant).

Another legal term which general practitioners should

ONG SHU MIN

Medical Officer

SingHealth Polyclinics – Pasir Ris

familiarise themselves with is statutory rape, which is defined in Section 375⁴ under Chapter XVI of the Penal Code as offenders may be punished with imprisonment for a term which may extend to 20 years, and shall also be liable to fine or to caning.

Section 424⁶ of the Criminal Procedure Code states that “every person aware of the commission of or the intention of any other person to commit any sizeable offence punishable under Chapters VI, VII, VIII, XII and XVI of the Penal Code... shall, in the absence of reasonable excuse, the burden of proving which shall lie upon the person so aware, immediately give information to the officer in charge of the nearest police station or to a police officer of the commission or intention.”

In other words, the law has placed a legal responsibility on the doctor to report the case unless there are reasonable grounds not to.

In addition, there are also legal repercussions for intentional omission to give information of an offence, if a person is legally bound to do so. Section 202⁶ of the Criminal Procedure Code states that “whoever, knowing or having reason to believe that an offence has been committed, intentionally omits to give any information respecting that offence which he is legally bound to give, shall be punished with imprisonment for a term which may extend to 6 months, or with fine, or with both.”

II. Ethical considerations

Although doctors clearly have a legal duty to report, their decisions are often confounded by a barrage of ethical considerations: Would reporting the case constitute a breach of patient confidentiality - especially if the patient does not give consent to be reported? Would reporting the case result in greater harm to the patient, such as stopping her from seeking medical care, or driving her to desperate measures such as suicide? Is it necessary to inform the patient that the case would be reported to the police?

In general, all patients have a right to medical confidentiality. This includes adolescents. Doctors are obliged to respect their patients' confidentiality in matters pertaining to sexual activities, even if they are adolescents. However, the exception is when there is perceived obvious immediate danger to the patient, or if the patient's sexual activities are against the law, as in this case. The legal requirement of the law would override the doctor's obligation of patient confidentiality.

The main ethical principles to consider in this case are the principles of beneficence and non-maleficence. By notifying the police of the case, the doctor has acted in the patient's best interest as the police can carry out investigations to check if any circumstances of sexual abuse or exploitation have been occurring.

One may argue that the patient may choose to stop seeking medical attention for fear that she may get into trouble with the police. By reporting the case, the doctor may end up indirectly harming the patient if she were to have untreated sexually transmitted infections, or if she inflicts self harm upon herself, or

attempts suicide. If this were to happen, the ethical principle of non-maleficence would have been violated.

In general, there is no simple answer to such ethical conflicts. The pros and cons have to be weighed carefully on a case-by-case basis. If the patient expresses clear intent on self-harm, suicide or threatens not to seek further treatment, it may be argued that it would not be in the patient's best interest to report the case to the police.

STUDY THE MANAGEMENT: HOW DO WE APPLY IN OUR CLINICAL PRACTICE?

Doctors have a legal responsibility to report cases of sex with minors to the police. According to the Singapore Medical Council Ethical Guidelines⁷, under guideline 4.3.2.1, the principle of medical confidentiality may be over-ridden by legislation or court orders. This was the main credible source which the doctor referred to when trying to balance maintaining patient confidentiality against the legal duty to report. Reporting the case would thus not constitute an unethical breach of patient confidentiality.

The law does provide grounds for not reporting the case, but the onus is on the doctor to prove beyond doubt that there is 'reasonable excuse' for not reporting. There is no local guideline as to what circumstances would be deemed 'reasonable excuse' for not reporting the case to the authorities, but it would be necessary for appropriate documentation of any such circumstances in the case notes.

Although it is not legally required to inform the patient that a report will be made, it is good clinical practice to do so, so as to maintain the doctor-patient relationship. There is also no law stating that the parents of the minor have to be informed about the offence or the reporting of the offence to the police. If the adolescent is able to exhibit understanding of the situation and the consequences of engaging in underage sexual activity, the doctor is not obliged to inform the adolescent's parents. However, after establishing a good doctor patient relationship with the patient, the doctor should encourage the patient to tell her parents about the situation.

Police reports may be filed by the doctor either at the nearest police station, by calling '999', or filling up an online form at <http://www.spf.gov.sg/epc/ePCLinks.html>⁸. Information such as the victim's name, IC number, age and a brief outline of the case would be required. A pictorial guide to the key steps in submitting an online police report is shown in Figures 1-4⁸. There is no restriction as to how soon the reporting has to be done after the incident came to the doctor's attention.

As primary care physicians, holistic care is integral in the management of any patient. Screening for other sexually transmitted diseases eg. Hepatitis B, Human Immunodeficiency Virus (HIV), syphilis, should be carried out. Follow-up visits can be arranged to educate and counsel the patient further on the legal age for sex, advice on safe sex when she is of legal age, and options for contraception. Further education of the prevention

Figure 1: Electronic Police Centre Log-in Screen

http://www.spf.gov.sg/epc/ePCLinks.html Singapore Police Force Singapore Police Force / eP...

Terms and Conditions | FAQs | Help

Electronic Police Centre

Welcome to the Electronic Police Centre

With a demand for our police services to be consumed anywhere and anytime, this e-service serves as an online platform for reporting of lost properties or reporting of crime cases which do not require immediate police action.

To use this service, you must possess NRIC/IN, Date of Birth and a valid email address.

This e-Service will take about 15 minutes to complete.

To proceed, please choose from the following links:

- Login for Singapore Citizens, Singapore Permanent Residents, Employment Pass and Work Permit Holders
- Login for others

If you encounter any problems with this e-Service, please contact SPF Service Delivery Department (SDO) at the following address:
25 Irrawaddy Road New Phoenix Park Singapore 329560
Tel: 1800 - 358 0000 Fax: 6 256 1266

Figure 2: Filling In of Personal Particulars of Informant

Singapore Police Force / Electronic Police Centre - Lodging of Police Reports - Windows Internet Explorer

https://www.psi.gov.sg/NASApp/tmf/TMFServlet

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Electronic Police Centre

Step1: About Yourself Step2: Incident Step3: Properties Step4: Victims Step5: Suspects Step6: Brief Facts Step7: Confirmation

Please check and complete your particulars below:
*** Compulsory fields + At least one must be filled**

*** Name (As stated in NRIC):** [Text Field]

*** ID Type:** NRIC

ID No.: [Text Field]

Sex: ☒ Female ☐ Male

Age: [Text Field]

Nationality: [Select One]

Race: [Select One]

Second Race: [Select One]

*** Occupation:** [Select One]

If others, please state: [Text Field]

Institution/ School Name: [Text Field] (if you are a student)

*** Address**

Address Type: [Select One]

Block/House No.: [Text Field]

Street: [Text Field]

Building: [Text Field]

Floor-Unit No.: # [Text Field] - [Text Field]

Postal Code: [Text Field]

Contact

+ Telephone: [Text Field]

+ Mobile: [Text Field]

*** Email:** [Text Field]

*** Type to Reconfirm Email:** [Text Field]

[Large Blue Arrow Button]

95%

Figure 3: Filling In of Personal Particulars of Victim
Figure 4: Brief Summary of Case

of transmission of sexually transmitted diseases through abstinence or through the use of barrier methods could be advised. A urine pregnancy test should also be offered to screen for pregnancy. Ongoing follow-up would also help to build up the doctor-patient relationship, and with this trust in place, the patient can be slowly encouraged to tell her parents about the offence. Parents or other family members can then be recruited as sources of social support for the patient.

CONCLUSION

Teenagers who engage in sexual activity below the age of 16 are increasingly encountered in general practice. Doctors need to be aware of the various aspects involved when handling such cases. Most doctors would not have any problems dealing with the medical aspects of diagnosis, referrals and treatment. Equally important are the social aspects which involve enquiry into the patient's social background and family support, as well as advice on safe sex and contraception. Often forgotten or misunderstood are the legal implications of underage sex. Doctors need to keep themselves updated about the latest guidelines on the reporting of sexual offences, and be able to weigh their ethical considerations against their legal obligations to report. With so many issues to consider, and faced with a time constraint in a busy clinic, doctors need to be mindful to demonstrate empathy towards the patient, and schedule follow-up appointments to fully address all the issues involved.

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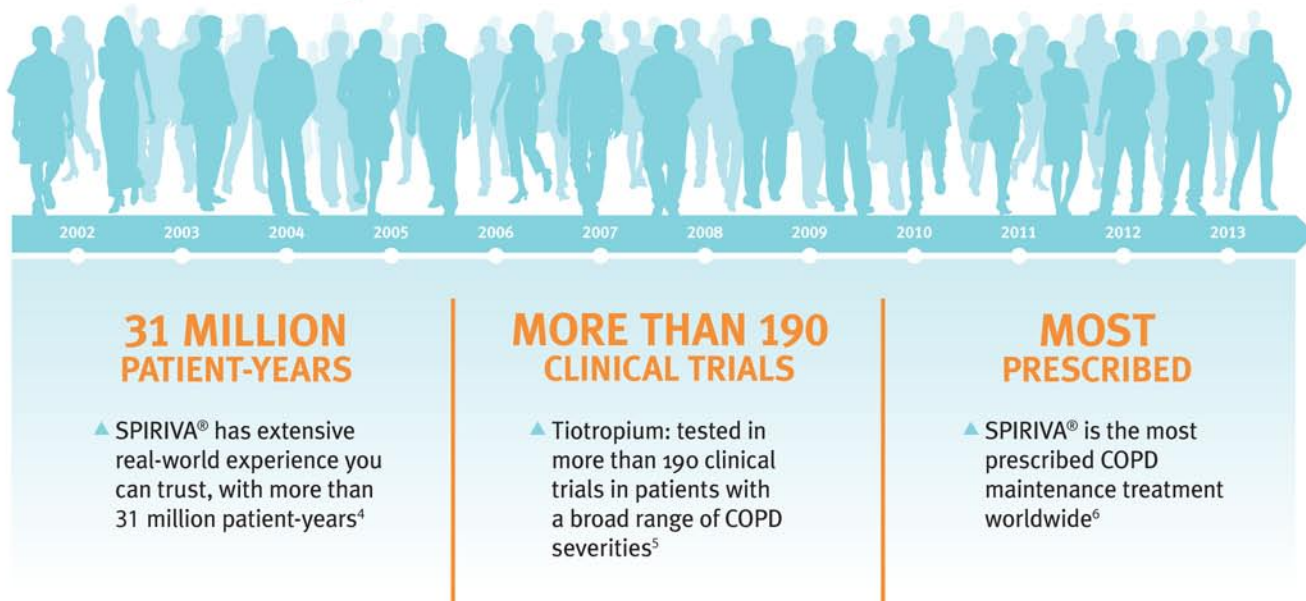
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References: 1. Tashkin DP, Celli B, Senn S, et al; for the UPLIFT Study Investigators. A 4-year trial of tiotropium in chronic obstructive pulmonary disease. *N Engl J Med*. 2008;359(15):1543-1554. 2. Data on file, Boehringer Ingelheim International GmbH. 3. Troosters T, Celli B, Lystig T, et al; for the UPLIFT® Investigators. Tiotropium as a first maintenance drug in COPD: secondary analysis of the UPLIFT trial. *Eur Respir J*. 2010;36(1):65-73. 4. National Institutes of Health. <http://clinicaltrials.gov/ct2/results?term=tiotropium+COPD&Search=Search>. Accessed February 21, 2013. 5. IMS Health Data, Q3 2012. Understanding Potential Long-term Impacts on Function with Tiotropium (UPLIFT®) was a randomised, double-blinded, multicentre trial that tested once-daily anticholinergic therapy (SPIRIVA®) vs control (placebo) in patients with COPD who were allowed to take all other types of COPD treatments (monotherapy or combination therapy, except other inhaled anticholinergics) for 4 years in 5,993 patients. *While SPIRIVA® 18 µg via HandiHaler® did not alter the rate of decline in lung function, a coprimary study endpoint in the UPLIFT® trial, it sustained greater improvements in lung function vs control (placebo).
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Example:

Tan and Ho. Treat-to-target approach in managing modifiable risk factors of patients with coronary heart disease in primary care in Singapore: What are the issues? Asia Pacific Family Medicine, 2011;10:12. doi:10.1186/1447-056X-10-12.

Authors may wish to familiarise themselves with the AMA style for the citing of references for BioMedical publications at www.amamanualofstyle.com.

Tables

Tables should be submitted on a separate page. Label them in roman-numeric sequence [I,II,III etc] and ensure they are clear and with explanatory legends as required.

Illustrations

- Illustrations must be submitted in a separate page, and should be provided whenever appropriate. Illustrations should be cited in the text. When required, it is the author's responsibility to obtain permission to reproduce illustrations. Authors need to ensure that photographs, illustrations and figures do not contain any information that will reveal the identities of the patients and authors. From 1 January 2012, all photographs and illustrations taken from any human subject must be accompanied by the respective endorsed consent form. Clear captions to the figures should be provided.

Anonymised Text

As the original article will be subjected to a double-blinded peer review process, all identification of names and institutions have to be removed from this version to facilitate the peer review process.

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RECOMMENDED FORMAT FOR PRISM (Patients' Revelations as Insightful Studies of their Management) SECTION

Authors planning to submit their case studies to the PRISM section should structure their article according to these headings:

Title

- The title should be framed into a question to define the key focus of the case study.

Patient's revelation: What happened?

- The author(s) will provide a concise description of the setting on which the subject raised his/her medical or psychosocial issue pertaining to their health or disease management. It should cover the background, encounter and interaction of patient with the healthcare professional (doctor, nurse or allied healthcare professional). Author(s) should conceal the identity of the subject and/or related or accompanying personnel: abbreviation should be used instead, if necessary.

Gaining insight: What are the issues?

- The issue(s) raised by the patient should be framed into question(s). The question(s) will constitute a problem list and will serve as a focus for the management of this subject.

Study the management: How do we apply in our clinical practice?

- This section covers the approach to the management of the subject by the author(s). The author(s) should provide a literature review of current evidence, if any, of the basis of the subject's management, or to highlight the gaps of knowledge if such evidence is lacking. The author(s) will suggest ways to apply the new knowledge in clinical practice or to highlight the limitations of its applications, if any.

Conclusion

- The author(s) will provide a concise summary of the lessons learnt from this case study.

The article submitted to the PRISM section should be written by not more than three authors. Each article should not exceed 2000 words. Photographs or charts may be included but should conform to the specific instructions for any other articles submitted to The Singapore Family Physician.

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Manuscripts may be returned to their respective authors for revision. This will be accompanied by an Editor's email for which comments and recommendations may be made. The authors are advised to read and to take note of these comments carefully and to revise their articles accordingly. The authors need to reply to the editor's email to outline their response before the resubmission of the revised manuscript. They should exclude the identity of the authors and their institutions, as the email may be redirected to the reviewers during the resubmission process. The resubmitted manuscripts should include the revised complete version, as well as the anonymised version as before.

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Circulation

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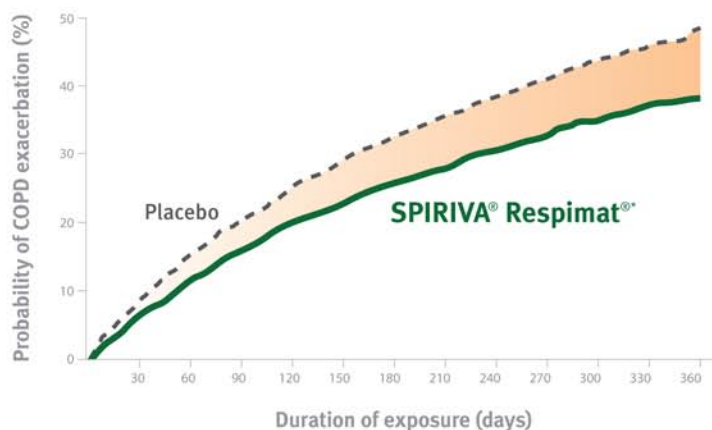
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[‡]Hazard ratio [H] = 0.69 [95% CI, 0.63-0.77].

References: 1. IMS Health Data, Q2 2011. 2. Bateman ED, Tashkin D, Siafakas N, et al. A one-year trial of tiotropium Respimat® plus usual therapy in COPD patients. *Respir Med*. 2010;104(10):1460-1472.



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