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Asthma Focus

World COPD Day
14 November 2012

It's Not Too Late

World COPD Day 2012
November 14, 2012

World COPD Day is a global effort to expand understanding of chronic obstructive pulmonary disease (COPD) and advocate for better care for patients. Organized by the Global Initiative for Chronic Obstructive Lung Disease (GOLD). World COPD Day 2012 will take place on Wednesday, November 14 around the theme "It's Not Too Late." This positive message was chosen to emphasize the meaningful actions people can take to improve their respiratory health, at any stage before or after a COPD diagnosis.

The 2011 revision of the global strategy of COPD (GOLD)

In 1998, the Global Initiative for Chronic Obstructive Lung Disease (GOLD) was formed. The aim was to bring more attention to the management and the prevention of COPD. In 2001, the GOLD programme released a consensus report, Global Strategy for the Diagnosis, Management, and Prevention of COPD. This document inspired and formed the basis for numerous clinical COPD guidelines all over the world.

Basic aspects of GOLD

It is important to realize that GOLD is not a clinical guideline and should not be read as such. From the beginning, the idea behind the GOLD document was to provide a strategy for the diagnosis and the management of COPD. This resulted in a global strategy document, and for this reason alone, the GOLD document cannot be regarded a clinical guideline. It is impossible to make the same guidelines for developing countries as for developed countries. GOLD is a non-governmental organization registered with the US tax office as a not-for-profit organization.

The 2011 revision

The aim of the 2011 revision has been to make a shorter, clearer and more easily usable document. We therefore wanted to propose a linked assessment and management scheme that would mirror the clinical situation better than the previous strategy that was seen to rely almost entirely on level of lung function.

Definition and diagnosis

Chronic Obstructive Pulmonary Disease (COPD), a common preventable and treatable disease, is characterized by persistent airflow limitation that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases. Exacerbations and comorbidities contribute to the overall severity in individual patients.

Diagnosis of COPD has not changed in the 2011 revision. GOLD still only works with a clinical diagnosis and still maintains that a post-bronchodilator ratio of forced expiratory volume in 1 s (FEV_1) over forced vital capacity < 0.70 is suitable as a diagnostic criterion for airflow limitation in the clinical setting. GOLD does not endorse screening for COPD but strongly encourages early detection through active case-finding or 'opportunistic screening'. We acknowledge that there is a risk of underdiagnosis in young adults and potentially a risk of over-diagnosis in the elderly but do not think that shifting to use of lower limit of normal will solve all issues around a clinical diagnosis of COPD. In the epidemiological setting, GOLD diagnostic criteria cannot directly be applied to epidemiology where airflow limitation is often used as a proxy for COPD.

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Table 1. Assessment of Chronic Obstructive Pulmonary Disease (COPD)

Assess symptoms:
GOLD recommends the use of the mMRC breathlessness scale or the COPD Assessment test
Assess degree of airflow limitation:
GOLD recommends using spirometry and using four grades split at 80%, 50% and 30% of predicted value.
Assess risk of exacerbations:
GOLD recommends using history of exacerbations and spirometry. Two exacerbations or more within the last year or an FEV1 < 50% of predicted value is an indicator of high risk.
Assess comorbidities:
Assess comorbidities and treat them appropriately. The most frequent comorbidities are CVD, depression and osteoporosis.

mMRC, modified Medical Research Council scale for breathlessness; FEV_1, Forced Expiratory Volume in 1 s; CVD, Cardiovascular Disease.

Importantly, spirometry is now required for making a diagnosis of COPD. It is well known that spirometry is often not part of the diagnostic pathway for COPD, and in many parts of the world, spirometry is not feasible for economic reasons. Misdiagnosis is frequent in patients diagnosed on symptom history alone and it is the opinion of GOLD that the use of spirometry can only be properly promoted if it is deemed necessary and not just helpful.

Assessment of COPD

This is the area in which the most profound changes have been made. When reading the previous version of the GOLD document, it is clear that symptoms matter. However, the notion of the previous document was that level of FEV_1 was decisive for assessing severity and treatment. When the 'COPD pyramid' based on the previous GOLD stages was suggested in 2001, there was little evidence to support this and an assessment scheme will only rarely be evidence based as few studies so far have tested different diagnostic criteria or modalities of assessment.

The revised document recommends assessment of symptoms, lung function, risk of exacerbations and comorbidities as shown in Table 1.

A systematic assessment of COPD is necessary to ensure sufficient quality in the management of COPD. Regarding symptoms, GOLD suggests the modified Medical Research Council (mMRC) or COPD Assessment test scales but other symptom scales can be used; e.g. the Clinical COPD Questionnaire. The crucial aspect is to consider whether the patient has only trivial symptoms or feels significantly limited by them.

For risk of exacerbations, a history of two or more exacerbations per year indicates a high likelihood of future exacerbations. Because of the impact of an exacerbation leading to hospital admission, one severe exacerbation requiring hospitalization will also indicate high risk.

The first three items in the assessment can be combined as illustrated in Fig. 1. The practical use of this is shown in Fig. 2. First, assess symptoms; next, assess risk of exacerbations.

This assessment does not include comorbidities. However, studies have shown that the prevalence of comorbidities is relatively independent of grade of airflow limitation and assessment of comorbidities should be done for all patients. However, it is likely that patients with many symptoms (B and D) will more frequently have comorbidities resulting in breathlessness, not least asthma and/or heart failure.

Management of stable COPD

Management should follow the patient categorization. In contrast to the assessment scheme, management recommendations need to be evidence based. Smoking cessation is strongly recommended for all smoking COPD patients.

The most important among the recommended non-pharmacological treatments relate to physical training and physical activity. All COPD patients with breathlessness when walking at their own pace on level ground benefit from rehabilitation and from maintenance of physical activity. In addition, rehabilitation shortly after an exacerbation has also been shown to be highly efficacious.

The recommendations for pharmacological treatment will mainly relate to choice of initial therapy. To date, there is a clear lack of trials informing us on treatment choices in case of lack of efficacy on first choice treatment; in the GOLD scheme, 'First choice' therapy is to be seen as initial therapy, whereas 'Second choice' treatments can be considered in patients not sufficiently managed on initial therapy. The GOLD first and second choice treatments are shown in Fig. 3.

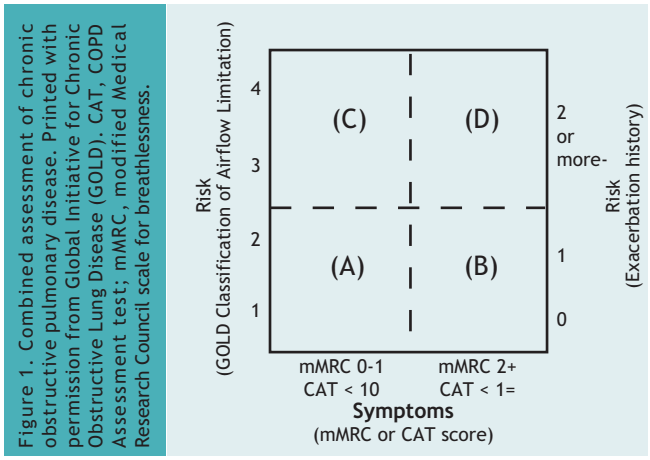

Figure 1. Combined assessment of chronic obstructive pulmonary disease. Printed with permission from Global Initiative for Chronic Obstructive Lung Disease (GOLD). CAT, COPD Assessment test; mMRC, modified Medical Research Council scale for breathlessness.

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There is little evidence to inform about interval needed for second and for subsequent assessments. GOLD suggests regular follow up to evaluate effects of initiated treatments, including smoking cessation where needed, and non-pharmacological as well as pharmacological treatment. The assessment suggested in Table 1 and Fig. 1 can also be used for follow up. For adjustment of management, however, it must be considered if improvement in a patient is associated with treatments; as an example, it would be foolish to stop treatment with a long-acting bronchodilator in a patient who as a response to treatment had moved from an mMRC score of 3 to a score of 2.

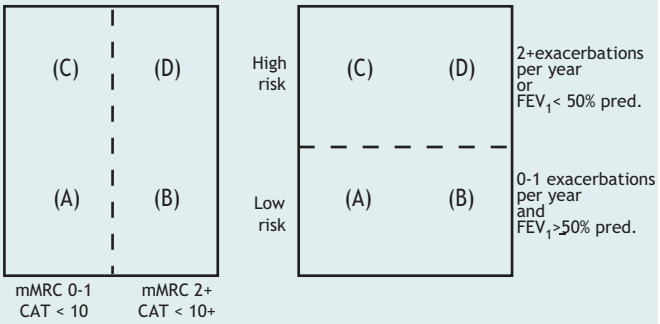
Management of exacerbations

An exacerbation of COPD is an acute event characterized by a worsening of the patient's respiratory symptoms that is beyond normal day-today variations and leads to a change in medication. Treatment with bronchodilators, systemic corticosteroids and antibiotics is presumably not controversial. More important are the recommendations on supplemental oxygen therapy and non-invasive mechanical ventilation (NIV). Regarding oxygen treatment, emphasis is on pulse oximetry for tracking and/or adjusting oxygen therapy as controlled oxygen should be titrated to improve the patient's hypoxaemia with a target saturation of 88%-92%. Once oxygen is started, arterial blood gases should be checked 30-60 min later to ensure satisfactory oxygenation without carbon dioxide retention or acidosis. Nonetheless, the indication of NIV for chronic hypercapnic failure is far from being elucidated.

Comorbidities in COPD

COPD often coexists with other diseases, comorbidities, and patients with complex comorbidities are growing in numbers. In COPD, comorbidities may have a significant impact on prognosis. The revised GOLD document has for these reasons included a new chapter giving simple advice to the clinician managing patients with COPD and comorbidities. Differential diagnosis may be difficult because comorbidities may mimic

Figure 2. (A) First step in the combined assessment COPD. (B) Second step in the combined assessment of COPD. Modified with permission from GOLD.
CAT, COPD Assessment test; mMRC, modified Medical Research Council scale for breathlessness; FEV_1, forced expiratory volume in 1 s.

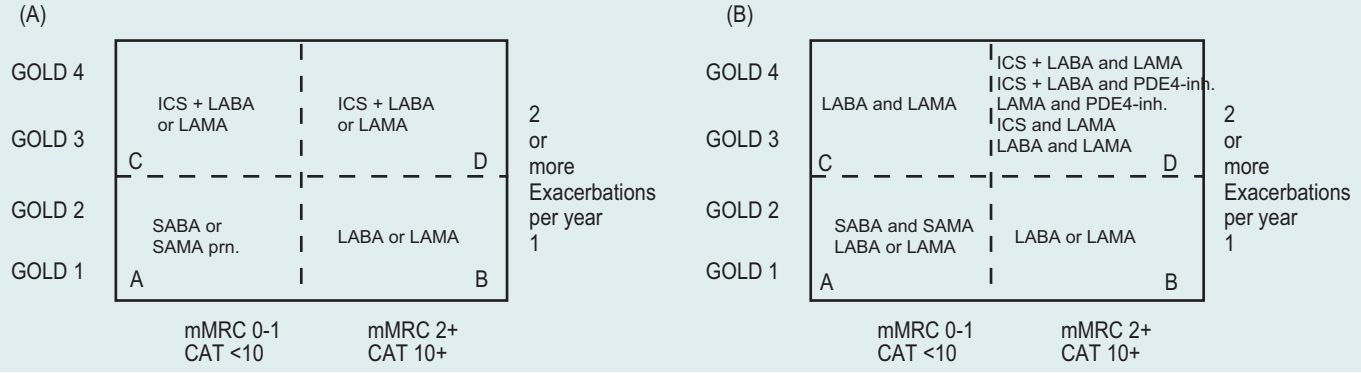


COPD symptoms. Cardiovascular diseases, osteoporosis, metabolic syndrome and anxiety/depression are major comorbidities in COPD. These diseases – all treatable – are often underdiagnosed, and they impact on both health status and prognosis. Lung cancer is frequently seen in patients with COPD and is the most frequent cause of death in patients with mild COPD.

In general, the presence of comorbidities should not alter COPD treatment, and comorbidities should be treated as if the patient did not have COPD. The latter is particularly true in heart failure where having COPD is a significant risk factor for insufficient use of beta-blockers. Cardio-selective beta-blockers are not contraindicated in COPD as the benefits of selective beta1-blockers are considerably larger than any potential risk associated with treatment, even in patients with severe COPD. Moreover, beta-blockers may reduce overall mortality and COPD exacerbations when added to established therapy for COPD, independently of overt cardiovascular disease and cardiac medication, and without adverse effects on lung function.

Ref: The 2011 revision of the global strategy for the diagnosis, management and prevention of COPD (GOLD) – why and what? Jørgen Vestbo, Suzanne S. Hurd and Roberto Rodriguez-Roisin. Clin Respir J 2012; 6: 208-214.

Figure 3. (A) First choice medications for the initial treatment of stable COPD. (B) Other medications for use in the treatment of stable COPD. mMRC, modified Medical Research Council scale for breathlessness; CAT, COPD Assessment test; SABA, Short-acting Beta-Agonist; SAMA, Short-acting Antimuscarinic Agent; ICS, Inhaled Corticosteroid; LABA, Long-acting Beta-Agonist; LAMA, long-acting Antimuscarinic Agent; PDE4-inh, Phosphodiesterase4-



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Antibiotics Relieve Acute Exacerbations of Mild to Moderate COPD

Antibiotics relieved acute exacerbations of mild to moderate chronic obstructive pulmonary disease (COPD) and delayed the time to further exacerbations in a recent trial. But because the placebo group also did very well, the researchers aren't ready to advocate for antibiotics.

Results indicate that treatment with amoxicillin/clavulanate is associated with a higher clinical success rate and a significantly longer period to the next exacerbation. However, up to 80% of patients were successfully treated with placebo. This percentage of clinical success among patients not treated with antibiotics is actually very high, and because of this, routine use of antibiotics among patients with COPD should not be encouraged.

In a randomized, double-blind, placebo-controlled trial amoxicillin/clavulanate or placebo were given to treat moderate exacerbations of mild-to-moderate COPD in outpatients.

The primary endpoint was clinical cure at the end of therapy visit at days 9-11. Secondary endpoints included clinical success at follow-up visit at day 20, change in peak expiratory flow (PEF), time until the next exacerbation, and the association of C-reactive protein (CRP) concentrations with clinical outcome in the placebo arm.

Just under three quarters of the antibiotics group (117/158, or 74.1%) was cured at the end of therapy, compared with 59.9% of the placebo group (91/152), a significant difference of 14.2% in favor of antibiotics.

Clinical success rates were also greater in the antibiotic group than in the placebo group. The median time to the next COPD exacerbation was significantly longer with vs without antibiotics (233 vs 160 days). Clinical success with placebo was best predicted by a CRP cut-off of 40 mg/L, below which 87.6% of patients had clinical success, but above which only 34.5% had clinical success.

In multivariate regression analysis, CRP above the cutoff level, placebo treatment, and the presence of coronary heart disease were independently associated with failure at days 9-11.

Although significantly more antibiotic-treated patients than placebo patients had adverse events (14.5% vs 7.9%), most adverse reactions were mild.

Am J Respir Crit Care Med 2012.

WHO Issues Guidance on N

The World Health Organization on Wednesday urged health workers ar who may have traveled to Saudi Arabia or Qatar and been exposed to a

The United Nations agency put out a global alert on Sunday saying a ne Saudi Arabia - where another man with an almost identical virus had di to the WHO's latest information as of Tuesday.

The WHO said on Wednesday no new case of acute respiratory syndro investigations continued. The WHO said it was working closely with S Mecca next month when millions of Muslims travel to the kingdom and

CLINICAL DEFINITION

Its clinical guidance to 194 member states said health care workers include fever (above 38 degrees C or 100.4 degrees F) and cough, rec found or in contact with a suspected or confirmed case within the prev

The virus, known as a coronavirus - also related to the common co Syndrome), which emerged in China in 2002. SARS infected 8,000 pe control. The WHO said it was identifying a network of laboratories that

It has not established whether the virus spread by human-to-human cor

Reuters Health Information

Enlarged Pulmonary Artery Signals Risk for COPD Exacerbation

The ratio of the diameter of the pulmonary artery to the diameter of the aorta is a metric that not only indicates arterial enlargement and possible pulmonary disease, it also identifies patients with chronic obstructive pulmonary disease (COPD) who are at risk of experiencing an exacerbation, a new study suggests.

A pulmonary artery:aorta (PA:A) ratio greater than 1 is significantly associated with a risk for future severe exacerbation; the association becomes stronger in patients with a high ratio plus a history of exacerbations, according to results presented here at the European Respiratory Society 2012 Annual Congress.

J. Michael Wells MD, from the University of Alabama at Birmingham, and colleagues reasoned that because cardiovascular disease is a component of advanced COPD, cardiovascular factors such as the PA:A ratio might be an indicator of exacerbations. The PA:A ratio can be determined with computed tomography (CT), which is already used to screen for and detect lung cancer in smokers.

Current or past smokers with 10 pack-years or more of smoking and GOLD stages II to IV COPD were eligible for the trial. Data from 3464 patients participating in the COPDGene trial with complete CT scan data were analyzed using multivariate logistic regression. Patients were 45 to 80 years of age.

A PA:A ratio greater than 1 was significantly associated with a patient's history of severe exacerbations, with an odds ratio (OR) of 4.78 (95% confidence interval [CI], 3.43 to 6.65; P < .0001), and had the strongest association to exacerbation of all variables examined.

N Engl J Med. 2012;367:913-921, 946-948.

A SCOOP

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lew Virus, Gears up for Haj

round the world to report any patient with acute respiratory infection new SARS-like virus confirmed in two people so far.

w virus had infected a 49-year-old Qatari who had recently traveled to ied.The Qatari remained critically ill in a hospital in Britain, according

me with renal failure due to the new virus had been reported but its Saudi authorities regarding health measures for the haj pilgrimage to then return to their home countries.

should be alert to anyone with acute respiratory syndrome that may quiring hospitalization, who had been in the area where the virus was ious 10 days.

ld - comes from the same family as SARS (Severe Acute Respiratory eople worldwide and killed 800 of them before being brought under could provide expertise on coronaviruses to countries.

ntact or just how it was transmitted.

Age and the Amount of Tobacco Smoked May Predict COPD Mortality

A patient's age and the number of cigarettes smoked over time can predict mortality in cases of chronic obstructive pulmonary disease, researchers say.

Spirometry results were not a predictor, they reported September 4 at the European Respiratory Society's annual meeting in Vienna, Austria.

As both age and the accumulated tobacco consumption are significant predictors of mortality, early detection of COPD is essential to provide smoking cessation interventions in the earlier stages of the disease.

Over the course of 10 years, researchers examined 208 patients with moderate to severe COPD. In that time, 104 patients died, and the median survival time was 10.4 years.

On multivariate analysis, statistically significant predictors of mortality, included age (p=0.005), pack years (p=0.02), and RA-910 (relative area of emphysema below -910 Hounsfield units) as measured by computed tomography (p=0.017).

Lung function tests, including forced expiratory volume in one second (FEV1), and the diffusing capacity of the lung for carbon monoxide (DLCO), were not statistically significant predictors.

That came as a surpris. However spirometry is important to establish the diagnosis and assess disease severity. The degree of emphysema assessed by CT correlates closely to the pathological extent of the disease, which might explain its prognostic superiority to lung function.

European Respiratory Society's annual meeting, 2012.

Lung Function Affected by a Single COPD Exacerbation

Changes in the parameters of lung function before and after just 1 exacerbation of chronic obstructive pulmonary disease (COPD) underscore the impact of such exacerbations on lung function decline.

COPD exacerbations are associated with high mortality, and the average patient with COPD is likely to experience 1 to 3 exacerbations a year. Although frequent COPD exacerbations are linked to a rapid decline in lung function and disease progression toward emphysema, few data exist on how much a single exacerbation affects the rate of decline. Furthermore, whether exacerbations are a cause or an effect of disease progression is a matter of debate.

To determine the annual rate of decline in lung capacity, a retrospective analysis of data from the 4-year Understanding the Potential Long-Term Impacts on Function With Tiotropium (UPLIFT) trial was performed. The decline was assessed by comparing measurements of pre- and postbronchodilator forced expiratory volume in 1 s (FEV1) and of forced vital capacity (FVC) before and after the first COPD exacerbation, which was defined as an increase in or the new onset of more than 1 respiratory symptom lasting 3 or more days that required treatment with antibiotics or systemic corticosteroids.

The mean age of the study population (n = 462) was 64 years, and 78% of patients were male. The mean annual rate of decline was determined using linear regression. The data demonstrated a significant decline in lung function after just 1 exacerbation.

Overall, a significant increase in the rates of decline before and after an exacerbation were seen in pre- and postbronchodilator FEV1.

The study confirms the importance of the occurrence of a single exacerbation. The ECLIPSE [Evaluation of COPD Longitudinally to Identify Predictive Surrogate Endpoints] study showed that a history of exacerbation is the best predictor of a future exacerbation. The UPLIFT study shows that each exacerbation may have deleterious effects on lung function.

European Respiratory Society (ERS) 2012 Annual Congress: Abstract 194OC.

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Practical aspects of inhaler use in the management of COPD

The management of COPD is often not optimal, and poor inhaler technique is one of the prime reasons for this. Physicians frequently prescribe inhaler devices based on available/preferred drugs, without considering whether the patient can effectively use them. Most COPD occurs in older adults who may have comorbid conditions, such as tremor, poor eyesight, arthritis, and cognitive problems that may aggravate effective inhaler device use. Therefore, device selection must be based on COPD severity and the patient's physical and cognitive abilities, as well as insurer and provider tiering, requests for prior authorization, and patient cost-saving requests.

Inhaler device misuse and adherence in the real-world setting

Several studies have demonstrated that errors in inhaler use are common among patients with COPD (Table 1).

Device issues

The pMDIs are known to be affected by a variety of problems, including lack of coordination, inadequate breath hold, overly rapid inhalation, and inadequate shaking/mixing (priming) of the inhaler before actuation. Some devices require upright storage, and priming recommendations are widely variable.

High- and low-temperature extremes such as those found in a car's glove compartment disrupt the delivery system and may inactivate the drug. Most pMDIs are fairly resistant to humidity and can be stored in a bathroom.

Common DPI errors include failure to hold the device upright, exhaling through the mouthpiece, shaking the device, failing to inhale forcefully, and inhaling with an open mouth/failing to maintain a tight seal. The capsule packets can be difficult to open, but because of humidity concerns should never be opened and emptied into another container for easier access.

In early COPD, all patients should use short-acting inhaled bronchodilators as needed. As the disease progresses, long-acting inhaled bronchodilators are added, requiring the patient to use two inhalers; these inhalers are likely to be of different types, since long-acting bronchodilators are available as pMDIs, DPIs, and SMIs in various jurisdictions. The need for multiple inhalers of different types and different inhaler techniques may confuse patients and impede correct inhaler use. The automatic substitution of similar long-acting inhaled bronchodilators in DPI format by pharmacists could produce even more confusion, with patients switching from self-contained blister pack DPIs to capsule-based DPIs without proper explanation or education. In severe to very severe COPD (grades 3-4), nebulized medications may also be added to the pMDI and one or more types of DPI or SMI, making therapy regimens complex and confusing.

Patient issues

Comorbidities, physical and mental capabilities, and inhaler preference or satisfaction will influence the patient's inhalation technique and should affect device selection. Physical issues, such as tremors, poor hand-eye coordination, poor dexterity, arthritis, poor eyesight, poor hearing, or low inspiratory flow rates can impair pMDI, DPI, and SMI use.

Cognitive and mood disorders can also impair a patient's ability to learn and remember inhalation techniques. Depression is frequent in patients with COPD, and may lead to nonadherence with proper and regular therapy use. Patients may also have health-literacy or language barriers inhibiting understanding of any inhaler instruction provided. Patient perceptions about their lung conditions and treatments can also affect treatment adherence (ie, underuse, overuse, and misuse). For example, patients may have negative beliefs that their disease is untreatable, that their physicians cannot help them, or that the treatment will be ineffective or cause side effects. Others save the medications for a time when they will "really need" them and lose the benefit of regular therapy. The level of support through family/caregivers may affect patient enthusiasm for treatment and adherence.

An important variation of improper inhaler use is failure to use the inhaler at all. Patient adherence in COPD is multifactorial and is influenced by the patient, the physician, and society.Nonadherence can be either intentional (patient does not like using the inhaler) or unintentional (patient likes and uses the inhaler, but has poor technique).

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Table 1 Critical inhaler errors

Critical error	pMDI	Multidose DPI HandiHaler/aerolizer	Single-dose DPI Diskus/turbuhaler
Failure to remove cap	X	X	X
Holding inhaler upside down	X	X	X
Failure to load dose		X	X
Failure to pierce capsule			X
Exhaling into device		X	X
Failure to make tight seal with lips		X	X
Failure to synchronize inhalation with device actuation	X		
Inhalation too weak or too slow		X	X

Abbreviations: DPI (Dry Powder Inhaler); pMDI (pressurized Metered-Dose Inhaler)

Physician and health-care professional issues

Many primary care as well as specialty physicians and nurses lack the awareness, knowledge, and training required to instruct patients in proper inhaler use.

Cost issues

Physicians must have information on inhaler costs to share with the patient.

Practical solutions

(1) For the chosen drug(s), what devices are available and what is the fewest number of device types that can be used?

Physicians usually prescribe from a wide variety of medications, and inhaler type is often a secondary consideration. Currently, there is a sufficient variety of drug–inhaler combinations to allow selection of desired drugs while attempting to limit the number of different devices required. It is also important to provide sufficient and repeated education about the anticipated benefits of therapy and the likely course of drug use over time. This information is particularly beneficial to patients who have unrealistic expectations and may stop using their inhaler because of perceived failure of their COPD treatment.

(2) What device is the patient likely to use properly (given the patient's age and ability)?

It is best to try to match available inhaler devices with the individual patient's ability to use the device effectively. Caregiver and family expectations, intelligence, reading ability, and emotional stability should also be addressed when assessing inhaler choice.

If the patient has already been prescribed an inhaler, request that he or she demonstrate how it is normally used, and correct for critical errors (Table 1).

For DPI selection, consider whether more than one type of DPI is needed and ensure that patients have the required PIF of >30 L/minute. Small PIF-testing devices are available at no cost or minimal cost. Alternatively, patients who can perform adequate spirometry can usually generate a sufficient PIF to operate most DPIs.

For pMDIs, observing use and repeated practice can improve the needed coordination of breathing with actuation. Use of a spacer can remove concerns about timing, but not the strength and dexterity required for actuation. Table 2 lists suitable inhaler device types based upon the patient's inhalation skills.

(3) How can I ensure that the correct inhaler technique will be taught to the patient?

Training and monitoring patients in correct inhaler use can help improve pMDI, DPI, and SMI use. Inhaler instruction, assessment, and monitoring should become an assigned and accountable clinical task, in the same way that assessing and recording smoking status has become a required vital sign. Combinations of devices should be avoided whenever possible, but if both DPIs and pMDIs are used, visual cues can be used.

(4) Patient preferences and affordability

a. Which devices are affordable/reimbursable for the patient?

Affordability may be the ultimate factor in patient preference. Health professionals need to know the cost implications when prescribing any drug and device.

b. Does the patient have a device preference?

The patient may have a preference for a particular device, based on familiarity or past experiences with specific inhalers. This may lead to better adherence and faster technique mastery, although whether this results in improved clinical outcome has never been proven.

c. Monitoring inhaler use and adherence

COPD occurs later in life, when a patient's physical and cognitive abilities are likely to decline over time; therefore, not only must the appropriateness of the drug be assessed and reassessed but also the device.

Table 2 Inhaler suitability based on patient breathing and coordination

Good breath actuation and coordination		Poor breath actuation and coordination	
Peak inspiratory	Peak inspiratory	Peak inspiratory	Peak inspiratory
flow . 30 L/minute	flow , 30 L/minute	flow . 30 L/minute	flow , 30 L/minute
Nebulizer	Nebulizer	Nebulizer	Nebulizer
pMDI	pMDI	pMDI + spacer	pMDI + spacer
DPI	DPI	DPI	DPI
SMIa	SMIa	SMIa	SMIa

Ref: Practical aspects of inhaler use in the management of chronic obstructive pulmonary diseasein the primary care setting. Barbara P Yawn,Gene L Colice,Rick Hodder. International Journal of COPD 2012:7 495-502.

Asthma Focus

Congratulations!!!

The Winners of Asthma Focus Quiz Competition

Vol. 8 No. 3

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Dr. A. S. M. Fakhrul Ahsan
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Chest Disease Clinic,
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Editorial Note

Dear Doctor,
We are happy to present you the 4th issue of "Asthma Focus" Newsletter, 2012. In this issue we have concentrated on "GOLD global strategy and Inhlaler use in COPD". We hope you will enjoy reading the publication!
We appreciate your comments and queries.
Please participate in Quiz competition & win prizes.

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