Chronic Obstructive Pulmonary Disease: Official diagnosis and treatment guidelines of the Czech Pneumological and Phthisiological Society; a novel phenotypic approach to COPD with patient-oriented care

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PURPOSE and METHODS

Chronic Obstructive Pulmonary Disease (COPD) represents a serious condition that is continuously spreading worldwide. Currently, multiple treatment guidelines exist around the world. An Expert group has been commissioned by the Czech Pneumological and Phthisiological Society (CPPS) to suggest a draft recommendation guideline for the diagnosis and treatment of stable patients with COPD. The proposed document has been revised and further discussed at the National Consensus Conference (NCC). Revisions and NCC comments contributed to the establishment of the final version of the document. The authors aimed to place this entity into the context of the actual healthcare system and clinical practice in the Czech Republic where: a) majority of COPD patients are in the care of pulmonologists with unlimited access to the lung function testing and chest CT, b) all treatment options are available, and c) all residents have to be registered with one of several health insurance companies, d) a patient's health insurance covers most of the treatment expenses. The emphasis is placed on personalized care informed by and targeting the symptoms and phenotypes of each patient, considering severe comorbidities and types of medication used.

COPD DIAGNOSIS

COPD DIAGNOSIS according to European Respiratory Society (ERS) recommendations

The foundation of the modern approach to diagnosis of COPD lies within the evaluation of a patient's lung functions, symptoms, history of exacerbations and clinical phenotype(s). Validity of the diagnosis should always be checked using a spirometry assessment. The essential requirement for COPD diagnosis is the presence of a post-bronchodilator (post-BD) expiratory airflow limitation, which is defined, according ERS recommendations, as a decrease in the FEV_1/VC ratio below the lower limit of normal (LLN).

GOLD classification according to post-BD FEV1, CAT and acute exacerbation frequency

When evaluating the complexity of COPD, it is recommended, in addition to post-BD FEV1 value detection, to monitor symptoms (preferably using the CAT questionnaire, alternatively using the modified MRC dyspnea scale) and the number of acute exacerbation events presented during last 12 months. Using these parameters, it is possible to classify each patient into one of the four GOLD categories denoted A, B, C, D. Category A represents the early phase of the disease and can be sufficiently managed by general practitioners (GPs). However, category B deserves particular attention as it consists of patients with a substantial morbidity and mortality risk – mainly due to cardiovascular comorbidities and malignant diseases or severity of lung emphysema that does not correspond to the FEV1 value. Oligo-symptomatic patients, comprising category C, can be found in the general population, but are rarely seen in the pneumologist's care. The highest mortality risk is associated with category D (Fig.1).

Phenotypical classification according to medical history and disease course assessment

The most common clinical presentation of COPD is the sensation of breathing difficulties. COPD patients commonly experience a cough, which can be productive (3/3 of patients) or non-productive. The relatively stable course of COPD is intermittently interrupted in some subjects by attacks of acute deterioration, called acute exacerbations (AEs). A sizable proportion of patients suffer from simultaneously presented COPD and asthma (asthma and COPD overlap syndrome – ACOS). Some COPD patients are almost daily affected by purulent sputum expectoration with blood traces indicating a history of prolonged/recurrent airway infections (thorax CT can confirm the presence of bronchiectasis). Long-lasting COPD can lead to the development of pulmonary cachexia (Fig. 2). Therefore the CPPS defines six clinically relevant COPD phenotypes: bronchitic and emphysematous phenotypes, COPD + asthma (ACOS) overlap, COPD + bronchiectasis overlap, phenotype of frequent exacerbations and pulmonary cachexia phenotype (Fig. 2).



Figure 1: CPPS COPD classification is based on modified(*) GOLD and phenotype(s) assessment

A clinically apparent and visible phenotype can be found especially in B and D categories (less so in category C and very rarely in category A).



Figure 2: How to determine the COPD phenotypes (algorithm for specialists)

* It is useful to verify this by function assessment (TL_{co}, K_{co} < LLN, RV > ULN) for all non-A patients and by chest CT if you plan the targeted therapy of emphysematous phenotype

** FFMI assessment is not available in routine clinical practice, so we recommend simple use of BMI

*** COPD + asthma phenotype can be confirmed by the presence of two major criteria (bold) or one major plus two minor criteria





COPD TREATMENT

The main aims of COPD therapy are to reduce symptoms, avert the natural progression of the disease, improve quality of life, enhance physical activity, prevent complications and adverse consequences, and increase life expectancy. The keystone of successful COPD management is the elimination of total inhalation risks. Comprehensive therapeutic intervention in the COPD field comprises both pharmacological and non-pharmacological options. Treatment of COPD patients is thus generally determined by the functional impairment (post-BT FEV1), disease category (A-B-C-D) and the presence of phenotype(s) of the disease, while considering the presence of complications and comorbidities. CPPS treatment recommendations can be divided into four simple steps (1^{st} step – risk elimination, 2^{nd} – standard (mandatory) treatment, 3^{rd} – phenotypically targeted treatment and 4^{th} – treatment of respiratory failure and terminal COPD care) (Fig. 3, Fig. 4).

CONCLUSION and CLINICAL IMPLICATIONS

Optimal treatment of patients with COPD requires a tailored and multidisciplinary approach focused on the patient's symptoms, risks, needs and wishes. The treatment should consider the personal, and social factors of each patient (called personalized medicine). It should cover all aspects of this multi-organ syndrome simultaneously, its systemic consequences and associated comorbidities. It is essential that the treatment includes participation of the patient and the attending pulmonologist, but also involves the patient's family members and other healthcare professionals. The main components of therapy include the elimination of risk factors, standard treatment focused on reducing the symptoms and impact of the disease, together with an intervention of clinically relevant comorbidities and phenotype-specific treatment with potential therapy of respiratory failure. A necessary premise is the interaction between the patient and physician, and patient's continual education and training. If the disease develops as far as the terminal stage, it is advisable to further expand the relationship and to determine the future treatment care boundaries in time.

The new CCPS COPD Guideline aims to systematize the diagnosis and treatment of this multi-factorial, multi-organ disease to achieve optimal response in accordance with the principles of personalised medicine.

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Abbreviations:

AAT, Alpha-1 antitrypsin; AE, Acute exacerbation; ABT/ATB, Antibiotic therapy; BCT, Bronchial challenge test; BDT, Bronchodilator test; BMI, Body mass index; BVR, Bronchoscopic lung volume reduction; CAT, COPD Assessment Test; COPD, Chronic obstructive pulmonary disease; CPPS, Czech Pneumological and Phthisiological Society; CT, Computer tomography; Eo, Eosinophil; ERS, European Respiratory Society; ETS, Environmental tobacco smoke; FEV1, forced expiratory volume in 1 second; FeNO, Fractional exhaled nitric oxide; FFMI, Fat-free mass index; GERD – gastroesophageal reflux disease; GPs, General practitioners; HI-NIV, High-intensity non- invasive ventilation; ICS, Inhaled corticosteroid; IgE, Immunoglobulin E; K_{co} , Carbon monoxide uptake rate; LABA, Long-acting beta2-agonist; LAMA, Long-acting muscarinic antagonist; LLN, Lower limit of normality; LTOT, Long-term oxygen therapy; LuTx, Lung transplantation; LVRS, Lung volume reduction surgery; mMRC, Modified Medical Research Council dyspnoea scale; NCC, National Consensus Conference; PDE4i, Phosphodiesterase 4 inhibitor; SGRQ – St. George's Respiratory Questionnaire; TL_{co} , Transfer factor of the lung for carbon monoxide; ULN, Upper limit of normality; VC, Vital capacity; ↑, Rise; +, Light positivity; ++, Strong positivity