УДК [61+615.1] (043.2)
ББК 5+52.81
А 43
ISBN 978-985-21-1864-4

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CHRONIC OBSTRUCTIVE PULMONARY DISEASE: PATHOLOGICAL ASPECTS

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Chronic obstructive pulmonary disease (COPD) is a common and incurable respiratory condition that is largely preventable and treatable, pharmacologically and non-pharmacologically. It involves progressive and permanent damage to lung structures, leading to symptoms of breathlessness, cough, wheeze and sputum production. Early diagnosis and treatment allows patients to benefit from symptom-relieving treatment to maximise their quality of life.

The most important cause of COPD in the western countries is exposure to tobacco smoke – usually as a result of smoking cigarettes. However exposure to any irritant, noxious airborne particles (for example, organic and inorganic dusts) and chemical fumes that can be inhaled into the lungs present an underestimated risk of COPD.

COPD results from the combined processes of peripheral airway inflammation and narrowing of the airways. This leads to airflow limitation and the destruction and loss of alveoli, terminal bronchioles and surrounding capillary vessels and tissues, which adds to airflow limitation and leads to decreased gas transfer capacity. The extent of airflow limitation is determined by the severity of inflammation, development of fibrosis within the airway and presence of secretions or exudates. Reduced airflow on exhalation leads to air trapping, resulting in reduced inspiratory capacity, which may cause breathlessness (also known as dyspnoea) on exertion and reduced exercise capacity.

Characteristic symptoms of COPD include; shortness of breath upon exertion, persistent chronic cough with phlegm, persistent wheezing, frequent chest infections, and worsening symptoms with infections. Physical signs of a patient with COPD include; thin wasted body, hyperinflated chest, barrel chest, reduced cardiac dullness, pushed down liver, prolonged expiration, ronchii on ausculation, cyanosis and polycythaemia, oedema, cor-pulmonale.

COPD presents a high mortality rate because it causes organ damage and alters lung function. An imbalance between oxidants and antioxidants is a primary characteristic of COPD. Oxidative stress plays a critical role in the inflammatory response in the lungs, leading to the activation of transcription factors that amplify the inflammatory response with cell infiltration and activation and inflammatory mediators' production. Quitting smoking is the best way to prevent COPD progression and pathologies related to COPD, such as lung infections, lung cancer, and cardiovascular disease.