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Review article

Causes of misdiagnosis of chronic obstructive pulmonary disease: A systematic scoping review

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ABSTRACT

Background: Chronic obstructive pulmonary disease (COPD) has serious implications at both the individual and the societal level. It is crucial that COPD is diagnosed correctly to ensure provision of the right treatment. However, the current diagnostic procedures may lead to misdiagnosis.
Aim: The aim of this scoping review was to disseminate knowledge about potential causes of misdiagnosis of COPD.
Methods: A systematic, comprehensive search was performed in PubMed, Embase and Cinahl.
Results: A thorough review produced a sample of 73 articles. The synthesis revealed five potential causes of misdiagnosis of COPD, including: the threshold for defining COPD (n = 36), errors made in primary care (n = 15), errors linked to the spirometry test (n = 13), differential diagnoses (n = 10), and patient-related factors (n = 8).
Conclusions: The causes of misdiagnosis of COPD are attributable mainly to spirometry and to the healthcare professional performing the diagnostic assessment. With a view to limiting misdiagnosis of COPD, future research should help clarify strategies for alternative objective tests for determining if a patient has COPD and explore how to better support primary care in the diagnosing of COPD.

Contents

Abbreviations: COPD, Chronic obstructive pulmonary disease; FEV1, Forced expiratory volume in 1 s; FVC, Forced vital capacity; GOLD, Global Initiative for Chronic Obstructive Lung Disease; LLN, Lower limit of normal.

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1. Background

Chronic obstructive pulmonary disease (COPD) is a major burden to society. Approximately 300,000 Europeans die of COPD annually [1], and COPD is predicted to become the third leading cause of death by 2020, worldwide [2]. It is estimated that approximately 5–10% of the adult population in Europe suffers from COPD [1]; yet, it is rather difficult to state the exact prevalence of COPD due to a high level of under-diagnosis [3–5].

COPD is a chronic condition that causes inflammation of the lungs, damages lung tissue, and narrows the airways. Patients suffering from COPD experience breathlessness, chronic cough, and chronic production of sputum [1,2]. During episodes of exacerbation, these symptoms can worsen quite acutely; and COPD can lead to disability, multiple hospital admissions, and even death [1]. It is crucial for the course of treatment that COPD is diagnosed correctly. Thus, a false positive diagnosis may lead to unnecessary and maybe even harmful treatment of people without COPD and a false negative diagnosis may imply that treatment is foregone in people who actually have COPD [6].

Today, it is recommended that a diagnosis of COPD be based on a combination of different diagnostic assessments. According to the Global Initiative for Chronic Obstructive Lung Disease (GOLD), a post-bronchodilator forced expiratory volume in 1 s (FEV1) to forced vital capacity (FVC) < 0.70 confirms the presence of COPD [2]. Hence, the spirometry test is considered a key element in the COPD diagnosing. However, this test is also the most challenging element in the diagnostic process. There is ongoing discussion about which spirometric criteria to use to diagnose COPD as the fixed threshold value of 0.70 is being criticized for leading to misdiagnosis [7,8]. The American Thoracic Society/European Respiratory Society proposes that in order to limit misdiagnosis of COPD, the determination of airflow obstruction should be based on the lower limit of normal (LLN) FEV1/FVC for the age and sex of the subject in question as an alternative to the fixed value proposed by GOLD [1]. Nevertheless, not only the spirometry test may lead to misdiagnosis. A misdiagnosis of COPD can be caused by a variety of other factors as well. According to the literature, these other causes of misdiagnosis of COPD arise, for example, when COPD needs to be differentiated from other diseases [9–11]. Moreover, misdiagnosis seems to occur more frequently when the diagnosis is carried out by a general practitioner or nurse in a primary care setting than when performed in a specialized secondary care setting [12,13]. Thus, a number of factors can influence the diagnostic process and possibly lead to misdiagnosis.

Another important part of the problem is the fact that many patients with COPD remain undiagnosed [3–5]. Patients often do not contact their doctor until the disease has reached a moderate or even a severe level [9]. Moreover, the lack of use of spirometry in the diagnostic assessment of COPD remains a major issue even though international guidelines clearly state that diagnostic confirmation of COPD commands the use of post-bronchodilator spirometry [2]. However, misdiagnosis occurs even in cases where the international guidelines are followed and post-bronchodilator spirometry is part of the diagnostic process [7,13,14]. Thus, misdiagnosis of COPD can be caused by lack of diagnosing as well as by errors in the diagnostic process. This scoping review will focus solely on the latter: misdiagnosis of COPD caused by errors in the diagnostic process.

A scoping review is an increasingly common, well-established approach for synthesizing research evidence relevant to health-related topics [15]. A scoping review addresses broad issues with a view to synthesizing, summarizing, and critically interpreting the conclusions of published literature [16]. A scoping review hence provides a broad overview of a given topic [17,18]. In contrast to systematic reviews of RCTs, scoping reviews map all evidence within a given topic, regardless of its quality. Thus, a quality assessment of the included articles is generally not performed in a scoping review [17]. Due to the inclusive nature of their approach [19], performing a scoping review is considered to be a valuable strategy for organizing knowledge [20]. Scoping reviews have previously been applied to explore various aspects of COPD interventions [21–23]. However, to our knowledge, the causes of misdiagnosis of COPD have not yet been reviewed. A multitude of factors may influence COPD diagnosis and possibly lead to misdiagnosis, and there would therefore seem to be a need for a review that explores and provides an overview of these factors. Responding to this need, the present scoping review aims to explore the causes of misdiagnosis of COPD in an effort to inform current practice and ultimately reduce the prevalence of COPD misdiagnosis.

2. Method

According to Green et al. (2006), scoping overviews are defined as comprehensive narrative syntheses of previously published information [16]. The present scoping review seeks to provide a systematic, comprehensive narrative synthesis of previously published information regarding the causes of misdiagnosis of COPD and may therefore be considered a systematic scoping overview [16]. Both the article by Green et al. (2006) and the PRISMA statement was used as a guideline throughout the review process [16,24].

2.1. Inclusion and exclusion

The scoping review includes articles that explain the causes of misdiagnosis of COPD. Original peer-reviewed articles published between 1 January 1994 and 20 January 2016 were included. No methodological restrictions were applied and review articles were allowed to be included. Publications in English, German, and the Scandinavian languages were included. Articles on misdiagnosis due to lack of use of spirometry in the diagnosing of COPD and articles on under-diagnosis of COPD due to lack of diagnosing were