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Jordan Minov[1]*, Jovanka Karadzinska-Bislimovska[1], Kristin Vasilevska[2], Saso Stoleski[1], Dragan Mijakoski[1] and Aneta Atanasovska[1]

[1]Institute for Occupational Health of R. Macedonia, Skopje, WHO Collaborating Center, Macedonia
[2]Institute of Epidemiology and Biostatistics, Skopje, R. Macedonia

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***Corresponding author:** Jordan B Minov, MD, PhD, Institute for Occupational Health of R. Macedonia, WHO Collaborating Center and GA2LEN, Collaborating Center, II Makedonska Brigada 43, 1000 Skopje, R. Macedonia, Tel: + 389 2 2461 387; Fax: + 389 2 2621 428; E-mail: minovj@hotmail.com

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Case Report

Asthma-COPD Overlap Syndrome Developed in Herbal Tea Processor with Sensitizer-Induced Occupational Asthma – A Case Report

Abstract

Asthma-COPD overlap syndrome (ACOS), a clinical syndrome common in routine practice, is still not fully defined entity characterized by features of both asthma and chronic obstructive pulmonary disease (COPD). In the present article a case with clinical syndrome of chronic airways disease sharing characteristics of asthma and COPD is described. In a 57-year old man working in herbal tea manufacture the diagnosis of sensitizer-induced occupational asthma (OA) was established at the age of 45 by recommended diagnostic work-up. After the diagnosis was established he was removed from the offending workplace exposure, the pharmacological treatment with inhaled corticosteroid was started and he was advised to quit smoking. He stopped use of the recommended medications after about two years and did not quit smoking. We saw the patient about 10 years after his last visit and he reported cough with sputum production and exertional dyspnea in the past one to two years. The spirometric findings indicated persistent airflow obstruction with positive response to bronchodilator. The features of COPD in the previously diagnosed asthmatic suggested overlap between two chronic airways diseases, i.e. the diagnosis of ACOS. Pharmacological treatment with combined therapy (inhaled corticosteroid and long-acting β2-agonist) was started and he was advised to attend the programme for smoking cessation.

Introduction

A significant proportion of patients with chronic airways disease have features of both asthma and chronic obstructive pulmonary disease (COPD). Several terms (e.g. Asthma-COPD phenotype, Mixed asthma-COPD or Mixed COPD-asthma, Asthma with fixed airflow limitation or COPD with asthmatic component, Eosinophilic COPD phenotype, Hyper-reactive COPD phenotype, etc.) were applied to such patients but the term Asthma-COPD Overlap Syndrome (ACOS) was widely accepted. ACOS is still not fully defined clinical syndrome and there is a need of further investigations for clarification of its diagnostics in the routine clinical practice. Patients with ACOS are usually characterized by increased reversibility of airflow obstruction, eosinophilic bronchial and systemic inflammation and increase response to inhaled corticosteroids compared with COPD patients. From the perspective of COPD, a diagnosis of ACOS is based on presence of asthmatic characteristics in COPD patients. In contrast, from an asthma perspective, the identification of characteristics of COPD is not so clear, especially in never smokers with asthma. Namely, an asthma patient cannot be diagnosed having ACOS only based on the incomplete reversibility of airflow obstruction, i.e. on the value of post-bronchodilator ratio between forced expiratory volume in 1 second and forced vital capacity (FEV_1/FVC) less than 0.7. In the cases of never-smoking patients, they should be classified as having severe or not completely reversible asthma, while in the cases of daily smokers or ex-smokers the diagnosis of ACOS is more reliable [1-3].

There is evidence that patients with ACOS experience frequent exacerbations, have poor quality of life, a more rapid decline in lung function, and high mortality than asthma or COPD alone [4-6]. The proportion of patients with both asthma and COPD is unclear and influenced by the used inclusion criteria. However, according to the results of several studies, prevalence rate varies between 15 and 55% [7,8].

As it is mentioned above, ACOS is still controversial entity the diagnosis and management of which is based on the recommendations of the consensus document entitled *Diagnosis of Diseases of Chronic Airway Limitation: Asthma, COPD and Asthma-COPD Overlap Syndrome (ACOS)*. The consensus document is based on the Global Strategy for Asthma Management and Prevention and the Global Strategy for the

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Diagnosis, Management and Prevention of Chronic Obstructive Pulmonary Disease and published in 2014.

The aim of this case report is to present a history of smoking patient with sensitizer-induced asthma due to occupational exposure in herbal tea manufacture in whom a persistent airflow limitation was developed over time.

Case Report

The patient is a 57-year old man in whom sensitizer-induced asthma was diagnosed at the age of 45. At the time of diagnosis he worked as herbal tea manufacturer for 10 years. The patient had a positive family history of asthma, he was active smoker for about 25 years, smoking 20-25 cigarettes per day. The patient suffered from cough with shortness of breath and wheezing that was more pronounced during and after work shifts with symptom-free periods during weekends and holidays. The symptoms occurred approximately two years after he has started working as herbal tea processor. Before referring to the Institute, he was diagnosed as chronic bronchitis and treated with antibiotics, inhaled short-acting β_2-agonist and/or oral theophylline during the periods of the symptoms worsening. At the time of diagnosis we found normal values of spirometric parameters, positive skin prick tests to grass mixed, *Dermatophagoides pteronyssinus*, and dog hair and negative skin prick tests to available workplace allergens. The diagnosis of asthma was confirmed by positive histamine challenge. The diagnosis of sensitizer-induced occupational asthma (OA) was confirmed by serial peak expiratory flow rate (PEFR) measurement and by serial non-specific bronchoprovocation testing following criteria of the American College of Chest Physicians (ACCP). Specific inhalation challenge was not performed and the causative agent of the disease was not detected. After the diagnosis of sensitizer-induced OA was established, the patient was removed to the workplace in which he was not exposed to herbal tea dust (guardian in the administrative unit), pharmacological treatment was started (regular use of inhaled corticosteoid as monotherapy and short-acting β_2-agonist as needed) and he was advised to quit smoking. Over the first two years after the diagnosis of sensitizer-induced OA was established the patient underwent control checkups reporting regular use of recommended controller and improvement of the symptoms but he did not quit smoking. In addition, spirometric findings during this period were within their referrent values [9,10].

The patient was again reffered to the Institute approximately 10 years after the last control checkup. As he said, he felt good and stopped use of the controller for 8-9 years. In addition, he still worked as guardian in the administrative unit of the tea manufacture and did not quit smoking. In the last one to two years he experienced cough with sputum production and exertional dyspnea the expression of which was variable. The native (pre-bronchodilator) spirometry showed airflow limitation ($FEV_1/FVC = 0.64$). We registered positive response to bronchodilator (post-bronchodilator increase in FEV_1 was greater than 12% and 200 mL) suggesting reversible airflow limitation, but the post-bronchodilator value of FEV_1/FVC did not reach the value of 0.7 ($FEV_1/FVC = 0.67$) that indicated persistent airway obstruction. Pre- and post-bronchodilator values of spirometric parameters are shown on Table 1.

The chest X-ray showed signs of hyperinflation, and the high resolution CT scan (HRCT) signs of air trapping and increased bronchial wall thickness (diagnosis of bronchiectasis was ruled out). The patient showed some features of both asthma and COPD suggesting the diagnosis of ACOS according to the actual recommendations. Pharmacological treatment with moderate dose of inhaled corticosteroid and long-acting β_2-agonist was initiated. In addition, he was reffered to an organized programme for smoking cessation.

Discussion

Many elder patients with chronic airways disease characterized by features of both asthma and COPD are frequently seen in everyday clinical practice. A typical example is an older patient with a history of asthma accompanied or not with seasonal allergies, a current or past smoking history and progressive symptoms of acute-on-chronic dyspnea who demonstrates fixed airflow obstruction or partially reversibility on spirometric measurements. Does such patient have COPD with bronchial hyper-reactivity (BHR), remodeled asthma progressed to partially reversible or persistent airflow obstruction or ACOS? Further question should be whether some degree of airflow obstruction is related to natural aging of the lung and should it be treated. There are many dificulties in differentiating asthma from COPD in current or former smokers especially in elderly patients. In addition, this is associated with certain treatment implications, including compliance, drugs side effects and variable response to drug therapy with advanced age [11-14]. From these reasons, i.e. to minimize the risk of miss-diagnosis and inadequate treatment of the patients sharing characteristics of both asthma and COPD, the Scientific Committees of both Global Initiative for Asthma (GINA) and Global Initiative for Chronic Obstructive Lung Disease (GOLD) developed document based on current evidence and consensus [1].

In the present case report we described the diagnostic work-up and initial treatment option in an elderly patient with a smoking history of over 30 years in whom the diagnosis of sensitizer-induced OA due to herbal tea dust exposure was established 10 years before the actual diagnosis. After the diagnosis of sensitizer-induced OA was established, the patient was removed to another workplace free of herbal tea dust exposure, the monotherapy with inhaled corticosteroid was started and he was advised to quit smoking.

Table 1: Pre- and post-bronchodilator values of spirometric parameters

Spirometris parameter	Pre-bronchodilator value	Post-bronchodilator value
FVC (L)	3.65	3.98
FEV_1 (L)	2.34	2.67
FEV_1/FVC ratio	0.64	0.67
MEF_{25-75} (L/sec)	1.47	1.61

FVC: forced vital capacity; L: liter; FEV_1: forced expiratory volume in one second; MEF_{25-75}: maximal expiratory flow at 25-75% of FVC; L/sec: liter in second.

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The patient was re-assessed more than 10 years after initial diagnosis. He reported that as he felt good, he stopped use of recommended therapy many years ago, but he still smoked. The diagnostic work-up followed the step-wise approach recommended by the GINA/GOLD consensus-based document which includes five steps: identification of chronic airways disease; syndromic diagnosis of asthma, COPD or ACOS; spirometry; commencing initial therapy and specialized investigations to exclude alternative diagnosis. OA is still a field of many controversies and uncertainties [15,16]. Despite to our knowledge in the existing evidence a case with ACOS developed on the basis of sensitizer-induced OA is not reported, we considered the diagnosis of ACOS as the patient had similar number of features of both asthma and COPD [1,17]. The development of COPD in atopic and asthmatic patient could be explained by a long history of smoking. As the results of the assessment suggested ACOS, the initial treatment included an inhaled corticosteroid in a moderate dose and a long-acting β_2-agonist [1,13]. In addition, the treatment also included smoking cessation which should be realized by attending the specialized programme [1,8].

Conclusion

In conclusion, we described a case with mixed airways disease and smoking history of over 30 years developed about 10 years after diagnosis of sensitizer-induced OA due to occupational exposure to herbal tea dust had been established. The diagnostic work-up and the initial treatment option were based on the recommendations of the actual GINA/GOLD consensus-based document. Our report indicates the importance of this document for diagnostics and management of patients sharing features of both asthma and COPD in routine clinical practice. Our report also indicates a need of further research in order to clarify still existing controversies and uncertainties regarding this issue.

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