Chronic Bronchitis in Chronic Obstructive Pulmonary Disease

Magnifying Why Smoking Cessation Still Matters Most

Sharon R. Rosenberg and Ravi Kalhan

Asthma and COPD Program, Northwestern University Feinberg School of Medicine, Chicago, Illinois

ORCID ID: 0000-0003-2443-0876 (R.K.).

Chronic obstructive pulmonary disease (COPD) is a complex clinical syndrome. Although airflow limitation is the central component defining the disease, identifying clinical phenotypes has proven central to approaching evaluation and treatment of COPD (1). One of the longest-recognized COPD phenotypes is that of chronic bronchitis, defined as cough and sputum production for at least 3 months per year for at least 2 consecutive years (2). Chronic bronchitis is closely linked to active cigarette smoking (3, 4). The negative health effects have been well documented (5–7); however, the stability of the chronic bronchitis phenotype is less certain.

In this month's issue of *AnnalsATS,* Kim and colleagues (pp. 1016–1025) investigate the development and remission of chronic bronchitis. Using the robust data afforded by the COPDGene cohort, they derive four groups of patients characterized by persistent absence, persistent presence, the development, or the resolution of chronic bronchitis on assessment at the time of two study visits separated by 5 years (8).

Cessation of smoking from visit 1 to visit 2 was significantly associated with resolution of chronic bronchitis between visits, whereas resumption of smoking between visits was associated with the development of chronic bronchitis. Persistent smoking was associated with the highest odds ratio for persistent chronic bronchitis. These data indicate that chronic bronchitis is not a stable phenotype in people living with COPD. Furthermore, individuals who developed chronic bronchitis between visits (a condition frequently associated with resumption or continuation of cigarette smoking) had the greatest declines in health-related quality of life and breathlessness (8).

The notion that chronic bronchitis is influenced by smoking is not new (3, 4), nor is the documentation of a negative association between chronic bronchitis and health status in COPD. There are myriad reasons to pay attention to symptoms of chronic bronchitis in COPD beyond smoking, not the least of which is that these symptoms may indicate an additional pathological process such as bronchiectasis or the presence of an atypical or resistant respiratory pathogen (9). The role that ascertainment of chronic bronchitis plays in evaluating patients with COPD has taken on enhanced importance in the context of reducing the risk for COPD exacerbations. In fact, some therapies are documented to reduce exacerbations of COPD exclusively in individuals who have ongoing symptoms of chronic bronchitis (10, 11). Objectively assessing respiratory symptoms, therefore, has emerged as a key factor in determining approaches to evaluating and treating COPD (12).

The current study of Kim and colleagues expands on this approach by indicating that symptoms of chronic bronchitis should be evaluated throughout the course of the disease. These findings reinforce those of a recent prospective British birth cohort study, which documented that smoking-related chronic bronchitis often resolves after smoking cessation (13). In clinical practice, then, repeated evaluation for the presence or absence of the chronic bronchitis syndrome could have great implications for an individual patient's prognosis, generate suspicion for new comorbid conditions or complications, and raise the possibility of new environmental exposures or intensification or resumption of cigarette smoking. Certainly, the inconsistency (recurrence and/or resolution) of chronic bronchitis should not be contextualized simply as "a normal part of having COPD," as perhaps has been done historically.

The most important implication of the work by Kim and colleagues from a public health perspective revolves around the effect of smoking cessation (or resumption) on chronic bronchitis. Those with persistent or new chronic bronchitis were more likely to have continued or resumed smoking, respectively. Dyspnea and quality-of-life scores worsened between assessments in the new chronic bronchitis group and improved in the resolved chronic bronchitis group. Those with chronic bronchitis had worse lung function, worse 6-minute-walk test distance, a greater exacerbation frequency, more severe exacerbations, and greater anxiety and depression scores and body mass index–obstruction–dyspnea–exercise indices than those who never had chronic bronchitis.

Smoking cessation is the single most effective (and cost-effective) treatment for COPD, yet in the most recent estimate of the prevalence of COPD in the United States derived from the Behavioral Risk Factor

(Received in original form May 11, 2015; accepted in final form May 19, 2015)

Supported by the National Heart, Lung, and Blood Institute R01 HL122477.

Correspondence and requests for reprints should be addressed to Ravi Kalhan, M.D., M.S., Asthma and COPD Program, Northwestern University Feinberg School of Medicine, 676 N St Clair St, Suite 1400, Chicago, IL 60618. E-mail RKalhan@nm.org

Ann Am Thorac Soc Vol 13, No 7, pp 999–1000, Jul 2016

DOI: 10.1513/AnnalsATS.201605-360ED
Internet address: www.atsjournals.org

Surveillance System, 38.7% of individuals self-reporting COPD were active smokers (14). Among the six leading causes of death in the United States, COPD was the only one that experienced an overall increase in death rate from 1969 through 2013 (15). Given recent population data that quitting smoking between ages 45 and 64 years results in 4–6 years of life gained (16), and the fact that smoking cessation programs for patients with COPD are associated with significant reductions in mortality (17), developing interventions that improve on long-term rates of smoking cessation in patients with COPD would have a major effect on the societal burdens posed by the disease.

Furthermore, successful abstinence from smoking has important short- and long-term patient-centered effects by reducing symptoms and improving lung function (4, 8, 18, 19). Although virtually all approved therapies for smoking cessation have been shown to be effective in achieving short-term (3–6 mo) abstinence rates in the COPD population, between 80% and 90% of patients with COPD are unable to achieve sustained abstinence during a 1-year follow-up period (18, 20).

In a period of tremendous optimism regarding individualizing and enhancing care for people with COPD, preventing exacerbations, and improving quality of life, the work of Kim and colleagues provides an important reminder of just how important it is to commit clinical resources to the "old fashioned"-appearing concept of smoking cessation. We strongly advocate for studies of novel interventions to improve on sustained smoking abstinence interventions specifically targeting people living with COPD. ■

Author disclosures are available with the text of this article at www.atsjournals.org.

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