American Thoracic Society Journals

Am J Respir Crit Care Med. First published online 23 Mar 2016 as DOI: 10.1164/rccm.201512-2470OC

Pulmonary Abnormalities in Young, Light-use Waterpipe (Hookah) Smokers

Yael Strulovici-Barel, **Renat Shaykhiev**, **Jacqueline Salit**, **Ruba S Deeb**, **Anja Krause**, **Robert J Kaner**, **Thomas L Vincent**, **Francisco Agosto-Perez**, **Guoqing Wang**, **Charleen Hollmann**, **Vignesh Shanmugam**, **Ahmad M Almulla**, **Hisham Sattar**, **Mai Mahmoud**, **Jason G Mezey**, **Steven S Gross**, **Michelle R Staudt**, **Matthew S Walters**, and **Ronald G Crystal**

Corresponding Author: Ronald G Crystal, Email: geneticmedicine@med.cornell.edu

Abstract

Rationale: Waterpipe, also called hookah, is currently used by millions of people worldwide. Despite the increasing use of waterpipe smoking, there is limited data on the health effects of waterpipe smoking and no federal regulations to its use.

Objectives: Assess the effects of waterpipe smoking on the human lung using clinical and bio-logic parameters in young, light-use waterpipe smokers.

Measurements: Assess young, light-use waterpipe-only smokers in comparison to lifelong non-smokers using clinical parameters including cough and sputum scores, lung function, and chest HRCT, and biologic parameters including lung epithelial lining fluid (ELF) metabolome, small airway epithelial (SAE) cell differential and transcriptome, alveolar macrophage (AM) transcrip-tome, and plasma apoptotic endothelial cell microparticles (EMPs).

Main Results: Compared to nonsmokers, waterpipe smokers had more cough and sputum, and lower lung diffusing capacity, abnormal ELF metabolome profile, increased proportions of SAE secretory and intermediate cells, reduced proportions of SAE ciliated and basal cells, markedly abnormal SAE and AM transcriptomes, and elevated levels of apoptotic EMPs.

Conclusions: Young, light-use waterpipe-only smokers have a variety of abnormalities in multiple lung-related biologic and clinical parameters, suggesting that even limited waterpipe use has broad consequences on human lung biology and health. We suggest that large epidemiologic studies should be initiated on the harmful effects of waterpipe smoking.

Accepted March 22, 2016
Received December 21, 2015

http://www.atsjournals.org/doi/10.1164/rccm.201512-2470OC#.VwWMhKu8zzI