

Introduction

Hookah is a water-pipe, tobacco smoking instrument commonly used in the Middle East and South Asia and is becoming increasingly popular in the United States. The prevalence among young US adults who have ever used hookah is 10.1%, which is significantly higher from 2010.¹

Many smokers perceive hookah as harmless compared to cigarettes. However, studies suggest that hookah, like cigarette use, is similarly associated with many health issues², but has 100 times more smoke exposure than cigarettes.³ Here we report a case of acquired polycythemia caused by hookah smoking in a person without any history of cigarette use.

Case

A 34-year-old male with no past medical history presented with a chief complaint of abdominal pain for one day described as sharp, non-radiating and epigastric in location. He denied fever, chills, nausea, vomiting, and changes in bowel habit. The patient denied smoking cigarettes, however, admitted to smoking hookah and drinking alcohol every weekend for many years.

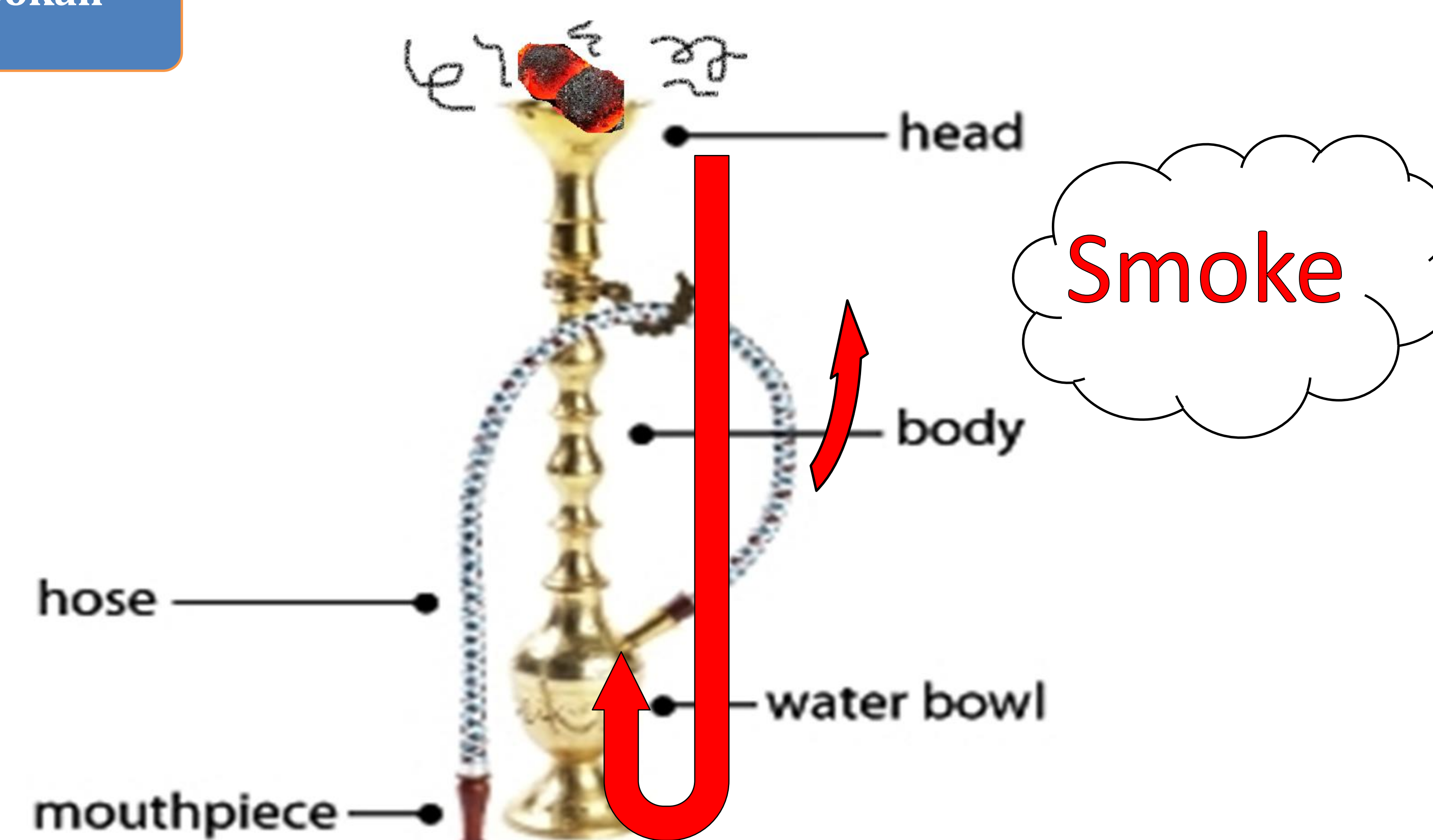
Physical examination was unremarkable except for mild epigastric tenderness. Initial routine blood tests were significant for polycythemia with markedly elevated hemoglobin level of 20 g/dl (14-18 g/dL), hematocrit of 57.8% (42-52%), and RBC count of 6.36 m/uL (4.5-5.9 m/uL), and a normal WBC count of 9.1 (4.8-10.8 K/uL). Ultrasound of the abdomen was normal. Arterial blood gas was remarkable for PaO₂ of 75 (80-100 mmHg) and carboxyhemoglobin level of 2.2% (0-1.5%). Further workup revealed an elevated erythropoietin level, while JAK-2 mutation analysis was negative, ruling out polycythemia vera.

A diagnosis of secondary polycythemia due to hookah smoking was made given the elevated carboxyhemoglobin levels and environmental exposure. Serial therapeutic phlebotomy was done until target hematocrit was reached at 45%. The patient's symptoms significantly improved and he was discharged with a comprehensive plan for hookah smoking cessation.

References:

1. Soulakova, J. N., Pham, T., Owens, V. L., & Crockett, L. J. (2018). Prevalence and factors associated with use of hookah tobacco among young adults in the U.S. *Addictive Behaviors*, 85, 21-25. doi:10.1016/j.addbeh.2018.05.007
2. El-Zaatari, Z. M., Chami, H. A., & Zaatari, G. S. (2015). Health effects associated with waterpipe smoking. *Tobacco Control*, 24(Suppl 1), i31-i43. <http://doi.org/10.1136/tobaccocontrol-2014-051908>
3. World Health Organization (Tobacco Free Initiative) Advisory Note Waterpipe Tobacco Smoking: Health Effects, Research Needs and Recommended Actions by Regulators. 2005.
4. Eissenberg T, Shihadeh A. Waterpipe Tobacco and Cigarette Smoking Direct Comparison of Toxicant Exposure. *American journal of preventive medicine*. 2009;37(6):518-523. doi:10.1016/j.amepre.2009.07.014.
5. https://www.cdc.gov/tobacco/data_statistics/fact_sheets/tobacco_industry/hookahs/images/hookah_pipe.jpg

How does hookah work?



Water is filled in the bowl. Tobacco is placed in the head covered with foil on top. Hot coals are placed on top of the foil sheet which causes the tobacco in the head to heat and smoke. Sucking through the hose using the mouthpiece, draws the smoke down through the body into the water bowl. The smoke then rises above the water into the hose until it reaches the smoker's mouth.

Discussion

Hookah smoking carries many of the same health risks as cigarette smoking but carries significantly higher exposure to the noxious byproducts of smoking. In a study performed by Eissenberg et al, it was found that hookah has 10 times greater carbon monoxide (CO) exposure than cigarettes, and carboxyhemoglobin concentrations three times higher than in cigarettes.⁴

Chronic CO exposure results in a leftward shift of the oxyhemoglobin dissociation curve and impaired tissue oxygen delivery. The reduced oxygen delivery to the kidneys triggers the increased production of erythropoietin, resulting in polycythemia. This diagnosis is confirmed only when CO exposure is stopped with subsequent return of blood values to normal levels.

Our report highlights the underappreciated health burden of hookah smoking and should enhance awareness of the threat of hookah smoking and guide health professionals to consider this form of substance abuse when evaluating polycythemia.