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Commentary

Vaping in Medicine: A Review of Vaping Associated Lung Pathology

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Abstract

Vaping is a new development within the field of radiology and medicine at large with respect to the development of Acute Respiratory Distress Syndrome (ARDS) from Tetrahydrocannabinol (THC) containing Electronic Nicotine Delivery Systems (ENDS). Similar to the initial marketing of cigarettes, vaping was advertized as being a safe product with limited ingredients. ENDS products were eventually touted as being superior to cigarettes because of the aforementioned limited ingredients compared to the numerous carcinogenic elements found in cigarettes. The four typical constituents are propylene glycol, vegetable glycerin, nicotine, and a flavorant. The variety of flavors is particularly marketable towards the youth and within the past year, an increasing volume of patients have been admitted secondary to respiratory symptoms associated with vaping. Four computed tomography (CT) patterns of vaping induced lung injury have been identified and include acute eosinophilic pneumonia, diffuse alveolar damage, organizing pneumonia and lipoid pneumonia. The field of radiology has therefore been at the forefront of disease recognition with the goal of initiating treatment expeditiously in those with lung pathology caused by a product that was initially marketed as a safe alternative to cigarette smoking.

Commentary

ARDS is a lung pathology associated with numerous etiologies [1,2]. When discussed in the setting of vaping, a chemical induced lung injury is responsible for the subsequent lung pathology and eventual hypoxia experienced by the patient [3]. ARDS is the feared complication of vaping use and is typically diagnosed in otherwise healthy individuals [4,5]. Medically, ARDS is diagnosed when hypoxia, alveolar destruction and hypercapnia occur simultaneously as a result of severe lung injury [1,2,4-9]. The role of imaging was therefore considered a supportive tool rather than diagnostic as long as the patient met the aforementioned physical exam criteria [8]. With advances in the field of radiology however, CT examinations can identify and prognosticate lung injury caused by vaping in the appropriate clinical setting [4,5,8].

Currently, there are four CT lung injury patterns classically associated with vaping [3-5]. These include acute eosinophilic pneumonia, diffuse alveolar damage, organizing pneumonia and lipoid pneumonia [3-5]. The inciting chemical injury propagated by vaping products is likely secondary to various vitamin E derivatives often found in these THC containing products [3]. All forms of vaping induced lung injury are associated with the provocation of a pulmonary inflammatory response that ultimately results in alveolar destruction through variable mechanisms thereafter [3-5,10,11].

Eosinophilic pneumonia is one of the lung injury mechanisms associated with vaping. Typically, eosinophilic pneumonia will manifest as scattered areas of groundglass opacification and pleural effusions on CT with associated eosinophilia [3-5]. Similarly, diffuse alveolar damage is also associated with disseminated groundglass opacification but progresses towards basilar predominant honeycombing and fibrosis [2-5,8,12-14]. Organizing pneumonia is unique in that it is associated with sporadic and migratory CT findings which may include subpleural and peribronchovascular opacification [3-5]. The migratory findings of organizing pneumonia are not typically seen in eosinophilic pneumonia or diffuse alveolar damage [3-5]. Lastly, lipoid pneumonia manifests as dependent consolidations within the lung parenchyma that occur secondary to fat or oil induced damage [3-5].

The role of imaging in the detection of vaping associated lung pathology is growing with increased emphasis on image findings [3-5,14]. CT enables radiologists to uncover components of a patient's medical history that are not classically considered a cause for the severe respiratory symptoms associated with ARDS [3-5,14]. Through early identification, respiratory support and monitoring can be initiated without delay [4,5]. When dependent opacities are visualized on the CT examinations of young and otherwise healthy patients, vaping should be considered as a differential [4,5,14]. ARDS classically presents in an early and late phase [3-5,14]. The early phase is characterized by bibasilar dependent lung changes [4,5,14]. The late phase is more variable and may depict nondependent changes [4,5,14].

Conclusion

Overall, the increased use of ENDS products is primarily seen amongst the youth and vaping associated lung injury should be considered as a differential when young patients present with severe respiratory symptoms in the appropriate clinical setting [3-5,15-17].

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A thorough substance use history should be obtained from all patients upon admission to the hospital; however direct questioning with respect to vaping products may need to be elicited because of the commonly dissociated perception of vaping as a type of drug use. With the identification and diagnosis of vaping associated ARDS, it is the hope that early medical intervention can be initiated, with subsequent psychosocial support provided for patients who struggle to quit vaping. This article proposes that the early identification of vaping induced lung pathology is paramount in the treatment of ARDS and that the prevention of such severe pulmonary disease is accomplished in part through pre-emptive patient education.

Conflict of Interest

The authors declare that they have no conflict of interest.

References

1. Bellingan GJ (2002) The pulmonary physician in critical care * 6: The pathogenesis of ALI/ARDS. Thorax 57: 540-546.
2. Bouros D, Nicholson A, Polychronopoulos V, Bois RD (2000) Acute interstitial pneumonia. European Respiratory Journal 15: 412-418.
3. Christiani DC (2019) Vaping-induced lung injury. N Engl J Med 382: 960-962.
4. Sakla NM, Gattu R, Singh G, Sadler M (2020) Vaping-associated acute respiratory distress syndrome. Emergency Radiology 27: 103-106.
5. Sakla NM, Wawrzusin PJ, Sadler SR, Sadler M (2020) Vaping and acute respiratory distress syndrome in interventional radiology. Journal of Imaging and Interventional Radiology 3: 1-2.
6. Gattinoni L, Quintel M (2016) Fifty years of research in ARDS why is acute respiratory distress syndrome so important for critical care? American Journal of Respiratory and Critical Care Medicine 194: 1051-1052.
7. Hopkins RO, Weaver LK, Orme JF, Chan KJ (2005) Two-year cognitive, emotional, and quality-of-life outcomes in acute respiratory distress syndrome. American Journal of Respiratory and Critical Care Medicine 172: 786-787.
8. Pierrakos C, Karanikolas M, Scolletta S, Karamouzos V, Velissaris D (2012) Acute respiratory distress syndrome: Pathophysiology and therapeutic options. J Clin Med Res 4: 7-16.
9. Rawal G, Yadav S, Kumar R (2018) Acute respiratory distress syndrome: An update and review. J Transl Int Med 6: 74-77.
10. Flower M, Nandakumar L, Singh M, Wyld D, Windsor M, et al., (2017) Respiratory bronchiolitis-associated interstitial lung disease secondary to electronic nicotine delivery system use confirmed with open lung biopsy. Respirology Case Reports 5: 00230.
11. Lerner CA, Sundar IK, Yao H, Gerloff J, Ossip DJ, et al. (2015) Vapors produced by electronic cigarettes and E-Juices with flavorings induce toxicity, oxidative stress, and inflammatory response in lung epithelial cells and in mouse lung. Plos One 10: 0116732.
12. Sharp C, Millar AB, Medford AR (2015) Advances in understanding of the pathogenesis of acute respiratory distress syndrome. Respiration 89: 420-434.
13. Talhout R, Schulz T, Florek E, Benthem JV, Wester P, et al. (2011) Hazardous compounds in tobacco smoke. Int J Environ Res Public Health 8: 613-628.
14. Zompatori M, Ciccarese F, Fasano L (2014) Overview of current lung imaging in acute respiratory distress syndrome. Eur Respir Rev 23: 519-530.
15. Centor RM, Rigotti NA (2019) Annals on call-weighing the potential benefits and harms of e-cigarettes. Ann Intern Med 170.
16. Lloyd SL, Striley CW (2018) Marijuana use among adults 50 years or older in the 21st century. Gerontology and Geriatric Medicine 4: 1-14.
17. Lestari KS, Humairo MV, Agustina U (2018) Formaldehyde vapor concentration in electronic cigarettes and health complaints of electronic cigarettes smokers in Indonesia. Journal of Environmental and Public Health 1-6.

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