EUROPEAN JOURNAL OF BIOMEDICAL AND PHARMACEUTICAL SCIENCES
http://www.ejbps.com

ISSN 2349-8870
Volume: 9
Issue: 9
481-483
Year: 2022

E-CIGARETTE OR VAPING PRODUCT USE ASSOCIATED LUNG INJURY (EVALI): A CASE REPORT

Daniel Kasho Williams[1], Gulafshan Khatoon[2*], Bolude Oludele Oluwade[3], Mehwish Ajaz[4], Tolulope A. Babalola[5], Bann Qadoura[6] and Udochukwu Igweze[7]

[1]Windsor University School of Medicine, St. Kitts and Nevis.
[2]Eras Lucknow Medical College and Hospital, India.
[3]Lagos State University, College of Medicine, Nigeria.
[4]Fatima Jinnah Medical University (FJMU), Pakistan.
[5]New York Institute of Technology College Of Osteopathic Medicine. NewYork, USA.
[6]Kuwait University Health Sciences Center Faculty of Medicine (KU).
[7]Lugansk State Medical University, Lugansk, Ukraine.

***Corresponding Author: Gulafshan Khatoon**
Eras Lucknow Medical College and Hospital, India.

Article Received on 22/07/2022 **Article Revised on 11/08/2022** **Article Accepted on 01/09/2022**

INTRODUCTION

Vaping is a process that occurs by heating liquids containing substances such as nicotine, cannabinoids, and other additives like glycerol or vitamin E.[1] Most of the use is reported in the male population, with a male to female predominance of 2:1, and the majority of patients were reported to age less than 35 years.[2] E-cigarette or vaping product use-associated lung injury (EVALI), initially recognized in 2019, is becoming one of the leading causes of lung damage in the young adult population.[2] EVALI, a form of acute lung injury, presents pathologically as a spectrum of disease processes such as acute fibrinous pneumonitis, diffuse alveolar damage, or organizing pneumonia accompanied by bronchiolitis.[3] Most of the injury appears to be chemical in nature, and superadded viral or bacterial infections are rare as most of the testing of E-cigarettes fluids showed no bacterial contamination.[4] The tetrahydrocannabinol products are most commonly implicated in causing vaping-induced lung injury in almost 75 to 80% of the cases.[5] However, vitamin E and nicotine have also been found to be possible contributors to lung injury as well.[6] Most patients with EVALI present with respiratory symptoms, including shortness of breath and cough, along with constitutional symptoms of fever and chills. However, some patients have also presented with chest pain, hemoptysis, and gastrointestinal symptoms such as nausea and vomiting.[2,5] Here, we present a case of a young female who presented with EVALI after vaping tetrahydrocannabinol (THC).

Case Presentation

A 27-year-old female with a past medical history significant for hypothyroidism and active vaping THC ongoing for six months presented to the emergency department (ED) with complaints of fever, chills, and non-radiating midline lower abdominal pain, ongoing for three days with urinalysis concerning for a urinary tract infection. Blood and urine cultures were negative, and the patient was discharged home on levofloxacin. She returned to the ED after 5 days with complaints of palpitations and shortness of breath associated with a cough productive of brown sputum. On presentation, she was afebrile, tachycardic with a heart rate in 150s, tachypneic with oxygen saturation in the low 90s, requiring nasal canula. On the physical examination, she had labored breathing with decreased breath sound bilaterally. Labs were significant for mild WBC elevation, 11.3/uL. CT abdomen and pelvis to evaluate for underlying pyelonephritis or renal abscess was done. It was negative for any intrabdominal pathology but revealed bilateral pulmonary ground-glass opacities. Chest X-ray revealed multifocal bilateral pulmonary infiltrates or consolidations (figure 1). She was placed on empiric antibiotics and was admitted to the ICU in anticipation of respiratory decompensation given the continued respiratory distress and increased work of breathing. A computed tomography pulmonary angiogram (CTPA/CTPE) to evaluate for a pulmonary embolism was negative but showed extensive ground-glass bibasilar opacities with superimposed reticular changes (figure 2). Diagnosis of EVALI was established after ruling out lung infections with negative respiratory cultures and viral panel, urine legionella antigen, and negative workup for connective tissue and autoimmune disease. She was commenced on methylprednisolone,

which led to improvement in respiratory status, and she was eventually discharged on a prednisone taper.

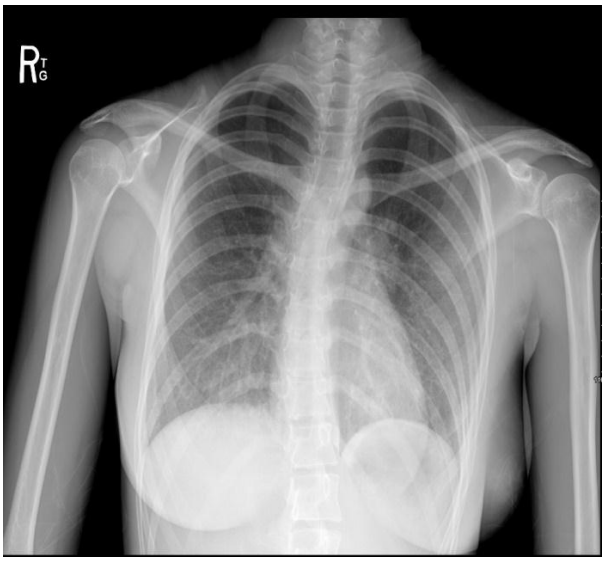

Figure 1: CXR showing bilateral infiltrates.

Figure 2: CT Chest showing extensive ground glass bibasilar opacities.

DISCUSSION

EVALI is primarily a diagnosis of exclusion requiring a thorough history.[7] Per CDC criteria, EVALI is a clinical diagnosis requiring the use of an e-cigarette in the past 90 days before symptoms onset, pulmonary infiltrates on chest x-ray or CT chest, and the absence of any other plausible explanation, including infectious or rheumatologic process.[8] Laboratory evaluation is done to exclude other potential causes, including but not limited to community-acquired pneumonia, COVID-19 pneumonia, and acute eosinophilic pneumonia.[9] Most patients presenting with THC-associated EVALI have mild leukocytosis, elevated inflammatory markers including C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR), and coagulation abnormalities including elevated prothrombin time.[10] The majority of EVALI patients have predominantly basilar lung involvement, appearing as consolidation and/or ground-glass opacities on imaging, often with areas of lobular or subpleural sparing.[9]

Treatment guidelines have not been well established due to the unknown efficacy of systemic glucocorticoids. Hospitalization is recommended for any patient who presents with the diagnosis of suspected EVALI with dyspnea, has reduced oxygen saturation, or has significant co-existing comorbidities.[11] Systemic steroids have been used in the majority of patients with EVALI based on individual assessments, and a short course is recommended with tapering over 5 to 10 days.[12] In our patient, as mentioned above, the respiratory status improved significantly with the introduction of IV steroids. An early diagnosis with thorough patient history, including the source of THC, initial workup ruling out other lung pathologies, and early start on systemic glucocorticoids can lead to reduced hospital duration and better outcomes.

REFERENCES

1. Gotts JE, Jordt SE, McConnell R, Tarran R. What are the respiratory effects of e-cigarettes? BMJ, 2019 Sep 30; 366: l5275.
2. Centers for Disease Control and Prevention (CDC). Outbreak of lung injury associated with the use of e-cigarette, or vaping, products. Available at: https://www.cdc.gov/tobacco/basic_information/e-cigarettes/severe-lung-disease.html#latest-information (Accessed on December 06, 2021).
3. Butt YM, Smith ML, Tazelaar HD, Vaszar LT, Swanson KL, Cecchini MJ, et al. Pathology of Vaping-Associated Lung Injury. N Engl J Med, 2019 Oct 31; 381(18): 1780–1.
4. Christiani DC. Vaping-Induced Acute Lung Injury. N Engl J Med, 2020 Mar 5; 382(10): 960–2.
5. Layden JE, Ghinai I, Pray I, Kimball A, Layer M, Tenforde MW, et al. Pulmonary Illness Related to E-Cigarette Use in Illinois and Wisconsin - Final Report. N Engl J Med, 2020 Mar 5; 382(10): 903–16.
6. Zulfiqar H, Rahman O. Vaping Associated Pulmonary Injury. [Updated 2022 Jan 7]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2022 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK560656/
7. Schier JG, Meiman JG, Layden J, Mikosz CA, VanFrank B, King BA, Salvatore PP, Weissman DN, Thomas J, Melstrom PC, Baldwin GT, Parker EM, Courtney-Long EA, Krishnasamy VP, Pickens CM, Evans ME, Tsay SV, Powell KM, Kiernan EA, Marynak KL, Adjemian J, Holton K, Armour BS, England LJ, Briss PA, Houry D, Hacker KA, Reagan-Steiner S, Zaki S, Meaney-Delman D; CDC 2019 Lung Injury Response Group. Severe Pulmonary Disease Associated with Electronic-Cigarette-Product Use - Interim Guidance. MMWR Morb Mortal Wkly Rep, 2019 Sep 13; 68(36): 787-790. doi: 10.15585/mmwr.mm6836e2. Erratum in:

MMWR Morb Mortal Wkly Rep, 2019 Sep 27; 68(38): 830. PMID: 31513561; PMCID: PMC6755818.

8. Blount BC, Karwowski MP, Morel-Espinosa M, Rees J, Sosnoff C, Cowan E, et al. Evaluation of Bronchoalveolar Lavage Fluid from Patients in an Outbreak of E-cigarette, or Vaping, Product Use-Associated Lung Injury - 10 States, August-October 2019. MMWR Morb Mortal Wkly Rep, 2019 Nov 15;68(45): 1040–1.
9. Henry TS, Kanne JP, Kligerman SJ. Imaging of Vaping-Associated Lung Disease. N Engl J Med, 2019 Oct 10; 381(15): 1486–7.
10. Kopsombut G, Ajjegowda A, Livingston F, Epelman M, Brown B, Werk L, et al. Clinical Findings in Adolescents Hospitalized With EVALI; Novel Report on Coagulopathy. Hosp Pediatr, 2022 Feb 1; 12(2): 229–40.
11. Siegel DA, Jatlaoui TC, Koumans EH, Kiernan EA, Layer M, Cates JE, et al. Update: Interim Guidance for Health Care Providers Evaluating and Caring for Patients with Suspected E-cigarette, or Vaping, Product Use Associated Lung Injury - United States, October 2019. MMWR Morb Mortal Wkly Rep, 2019 Oct 18; 68(41): 919–27.
12. Triantafyllou GA, Tiberio PJ, Zou RH, Lamberty PE, Lynch MJ, Kreit JW, et al. Vaping-associated Acute Lung Injury: A Case Series. Am J Respir Crit Care Med, 2019 Dec 1; 200(11): 1430–1.