Progressive Dyspnea after use of Electronic Vaping

Taylor Studsrud M.D.,Morgan Zegers D.O., Gary Cook D.O., Narrani Kanapathippillai M.D, Hilton Alemar Hernandez M.D.

Introduction

- Electronic vaping associated lung injury (EVALI), is an acute or subacute respiratory illness that can be severe and life-threatening. This clinical vignette hopes to provide a reference for initial identification, treatment and management.
- As of February 18, 2020, a total of 2,807 hospitalized EVALI cases or deaths have been reported to CDC from 50 states, the District of Columbia, and two U.S. territories (Puerto Rico and U.S. Virgin Islands).[1]

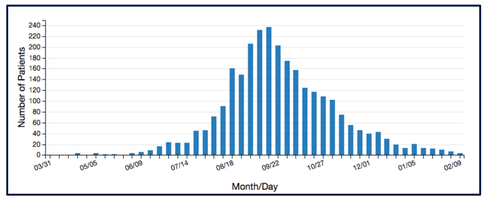

Figure 1. Dates of symptom onset and hospital admission for patients with EVALI- United States, March 31, 2019-February 15,2020[1]

Case Presentation

Patient is a 21-year-old male without significant past medical history who presented with increased shortness of breath and dry cough with pleuritic chest pain. The cough was progressive, leading to post-tussive emesis. The patient admits to a 7-month daily vaping history with marijuana and nicotine.

In the ER, temperature was 102.7ºF, pulse 141, blood pressure 117/56, respiratory rate 35 and an O2 saturation of 60%. He received methylprednisolone 125 mg, albuterol/ipratropium treatment, acetaminophen 1000 mg, and ceftriaxone 1 g. Chest x-ray (CXR) and CT showed dense reticular nodular parenchymal opacities involving all lobes of bilateral lungs. There was a combination of ground-glass with superimposed central lobular and interlobular septal thickening. Drug screen was positive for THC. His arterial blood gas in the ED revealed: pH 7.44, pO2 96, pCO2 35.2, bicarb 23.9 on 8 liters of oxygen via nasal cannula.

Patient was admitted to the ICU and placed on high flow nasal cannula due to worsening hypoxia. He was started on scheduled bronchodilators, steroids and empiric antibiotic coverage with ceftriaxone, vancomycin and azithromycin. A viral respiratory panel and HIV testing were negative. Mycoplasma IgM antibody was positive, although specificity is known to be poor. Ceftriaxone and vancomycin were stopped and he completed a 3 day course of azithromycin 500 mg daily. He was then started on IV steroids 60 mg q8 hours, tapered over 10 days, while being weaned off oxygen.

Imaging

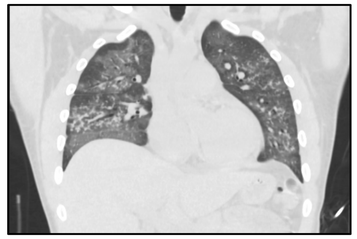

Figure 2. Anterior coronal section.

Figure 3. Superior transverse

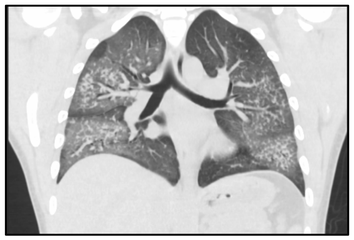

Figure 4. Mid-Coronal section

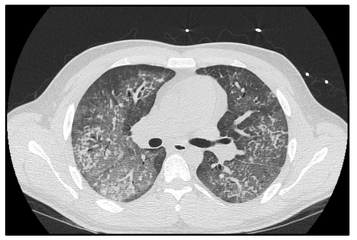

Figure 5. Transverse section

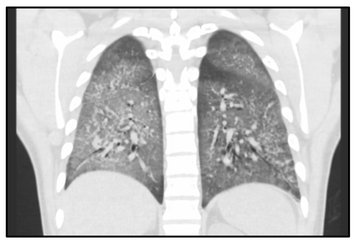

Figure 6. Posterior coronal section.

Figure 7. Inferior transverse section

Figure 2-7 show Chest CT of the patient with EVALI. Dense reticulonodular parenchymal opacities involving all lobes of both lungs. High-resolution scanning demonstrates a combination of ground glass opacity with superimposed interlobular and intralobular septal thickening

Discussion

- The key risk factor for EVALI is use of an e-cigarette or similar products.[1,2] E-cigarette, or vaping, products have evolved into a diverse class of inhaled aerosol devices. The U.S. markets for both nicotine- and THC-containing vaping products have dramatically expanded. There has been an increase in the use of nicotine-containing products by young people. Simultaneously, an increasing number of U.S. states have legalized marijuana use.
- In 2019, more than 5.2 million young people in the United States reported current use, including 27.5% of high school students and 10.5% of middle school students.[3,4] In contrast, current use among adults remained unchanged from 2014 to 2017, and in 2018, 3.2% of U.S. adults (8.1 million) reported current use of e-cigarettes, including 7.6% of adults 18 to 24 years of age (2.1 million).[4,5]
- Use of these products among young people is driven by multiple factors, including advertising, attractive flavors, and the availability of easily concealable devices that deliver high levels of nicotine.[6]

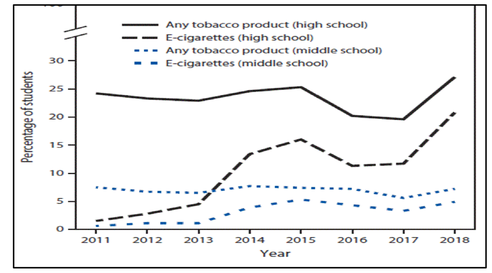

Figure 8. Percentage of middle and high school students who currently use e-cigarettes and any tobacco product— National Youth Tobacco Survey, United States, 2011–2018[6]

Conclusion

- With this case, our hope is to provide a clinical example of successful screening and treatment of EVALI. Practitioners should screen for other infectious entities that may be exacerbated by steroid therapy.[7,8]
- Patients discharged from the hospital after inpatient treatment for EVALI should have a follow-up visit within 1–2 weeks. The follow-up evaluation should include pulse-oximetry and consideration of a repeat CXR.
- Additional follow-up testing 1–2 months after discharge might include spirometry, diffusion capacity for carbon monoxide, and CXR.[9]
- Long-term effects and the risk for recurrence of EVALI are not known and will require further progressive studies.

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