

Kirtan Patel, DO¹, Iris Lu, OMS4², Hayley Myles, OMS4², Lenny Weinstein, DO³

¹Department of Family Medicine, Good Samaritan University Hospital, ²New York Institute of Technology College of Osteopathic Medicine,

³Department of Infectious Disease, Good Samaritan University Hospital

INTRODUCTION

E-cigarette or vaping product use-associated lung injury (EVALI) is a respiratory disorder that presents similarly to other etiologies such as SARS-CoV-2 (COVID-19). We highlight the importance of an accurate diagnosis to allow for rational treatment based upon body unity, self-regulation, and the interrelationship of structure and function.¹

CASE DESCRIPTION

Chief Complaint: Shortness of breath

History of Present Illness: A 23-year-old female presented to the Emergency Department (ED) with six days of fever, dyspnea, and non-productive cough. She was previously evaluated in our ED three days prior where she tested negative for COVID-19, Influenza A/B, and RSV, had an unremarkable chest radiograph (Figure 1), and maintained an SpO₂ of 94% with ambulation. She returned due to SpO₂ of 70% in the outpatient setting, worsening dyspnea, and new-onset diarrhea.

Past Medical History: Polycystic Ovarian Syndrome, Hypothyroidism, Bipolar Disorder, Anxiety

Home Medications: Oral birth control

Social History: Two year history of vaping and marijuana use

Physical Exam:

Vitals: BP 110/64, HR 147, RR 22, T 98.8°F and SpO₂ 68% on room air

General: non-toxic appearing

Pulmonary: Diffuse rales bilaterally, accessory muscle use

Cardiac: Tachycardia

LABORATORY STUDIES

WBC 20.72 x10⁹/L

High sensitivity CRP >180 mg/L

Quantitative D-dimer 0.68 mg/L

Procalcitonin 143.72 ng/mL

Lactic acid 2.5 mmol/L

Urine cannabinoid positive

COVID-19 PCR negative

IMAGING

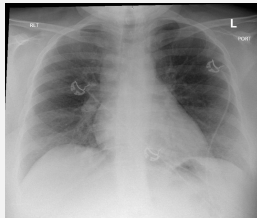


Figure 1. Chest radiograph on initial presentation showed no acute cardiopulmonary disease.

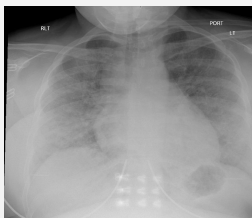


Figure 2. Chest radiograph on second visit showed bilateral infiltrates with progression.



Figure 3. Chest computed tomography angiography showed extensive diffuse bilateral mixed ground glass and consolidative airspace disease.

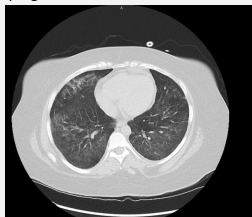


Figure 4. Chest computed tomography without contrast four days after admission showed significant improvement.

REFERENCES

¹DiGiovanna, E. L., Amen, C. J., & Burns, D. K. (2021). An osteopathic approach to diagnosis and treatment. Wolters Kluwer.

²Kligerman S, Raptis C, Larsen B, Henry TS, Caporale A, Tazelaar H, Schiebler ML, Wehrl F, Klein JS, Kanne J. Radiologic, Pathologic, Clinical, and Physiologic Findings of Electronic Cigarette or Vaping Product Use-associated Lung Injury (EVALI): Evolving Knowledge and Remaining Questions. *Radiology*. 2020 Mar;294(3):491-505. doi: 10.1148/radiol.2020192585. Epub 2020 Jan 28. PMID: 31990264.

³Jonas AM, Raj R. Vaping-Related Acute Parenchymal Lung Injury: A Systematic Review. *Chest*. 2020 Oct;158(4):1555-1565. doi: 10.1016/j.chest.2020.03.085. Epub 2020 May 19. PMID: 32442559.

DISCUSSION

The patient was initially given 10 mg of dexamethasone and placed on supplemental oxygen via non-rebreather (NRB) with improvement of her SpO₂ to 96%. She was admitted for acute hypoxic respiratory failure and treated with IV methylprednisolone, piperacillin-tazobactam, and azithromycin for empiric hospital acquired pneumonia coverage after her chest radiograph on current visit showed bilateral infiltrates (Figure 2). However, given that the patient revealed a two year history of vaping, further testing revealed a negative respiratory pathogen panel, urine legionella, and mycoplasma IgG/IgM, and a chest computed tomography (CT) angiogram showed diffuse bilateral mixed ground-glass and consolidative airspace disease (Figure 3), EVALI was suspected and antibiotics were stopped. The patient improved clinically with reduction in inflammatory markers and a chest CT without contrast four days after admission showed improvement (Figure 4). She was weaned off supplemental oxygen, transitioned to an oral steroid taper, and advised on cannabis and vaping cessation upon discharge.

According to the tenets of osteopathy, rational treatment depends on understanding body unity, self-regulation, and the interrelationship of structure and function.¹ In the majority of cases of EVALI, organizing pneumonia and diffuse alveolar damage can be seen on imaging and pathology.² With the understanding that structure and function are interrelated, this altered lung structure likely affects oxygenation. This case also exemplifies the value of an adequate social history in guiding clinical decision making. As EVALI remains a diagnosis of exclusion, ruling out other etiologies to establish an appropriate diagnosis and treatment regimen is crucial in supporting the body's self-regulatory mechanisms.^{2,3} Prompt initiation of glucocorticoid therapy reduces inflammation and promotes self-healing which is essential in minimizing morbidity and mortality.^{2,3}