

Diagnosing EVALI in the time of COVID-19, A Case Report

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ABSTRACT: In 2019, E-Cigarette or Vaping Product Use-Associated Lung Injury (EVALI) was labeled a public health crisis in the United States. As of February 2020, more than 2,800 hospitalized EVALI cases and deaths were reported to the Centers for Disease Control and Prevention (CDC). Owing to the declining cases of EVALI and with the emergence of Coronavirus disease of 2019 (COVID-19) pandemic, updates on the CDC website were stopped in February. However, EVALI still exists. The purpose of this report is to highlight that the diagnosis of EVALI can be quite challenging and can

be easily missed in the time of COVID-19. COVID-19 may be masking the ongoing EVALI crisis and can complicate the care of patients with EVALI. Therefore, in the time of COVID-19, it remains essential to obtain careful vaping histories and consider EVALI, and any other lung diseases in the differential diagnoses in patients presenting with respiratory complaints.

Key Words: EVALI, COVID-19, E-Cigarette, Vaping induced Lung Injury, Ground-glass opacities

INTRODUCTION

In 2019, the United States experienced an outbreak of respiratory illnesses related to the use of e-cigarettes and vaping products (1). While attention is being focused on the COVID-19 pandemic, it is important not to forget that EVALI is still ongoing worldwide and can be a threat to the public health especially in the time of COVID-19 (2).

Case Report

A 22-year-old male presented to the emergency department with a few day history of fever, dry cough, shortness of breath and diarrhea. Medical history was only significant for essential hypertension. The patient reported occasional alcohol use but denied cigarette smoking or use of illicit drugs. He denied chest pain, shortness of breath, abdominal pain or nausea, he denies recent travel or any sick contacts. Initial vital signs showed a temperature of 101 degree Fahrenheit, blood pressure 176/75 mmHg, heart rate 102 beats per minute, respiratory rate of 12 breaths per minute and an oxygen saturation of 95% on room air. Physical examination was pertinent for tachycardia and decreased breath sounds on bilateral lung fields. Laboratory studies were significant for a white blood cell count of 20.13 cell/mm³, D-dimer 0.5 mg/mL and C-reactive protein 122 mg/L. Chest radiograph showed central pulmonary vascular congestion. Computed tomography (CT) of chest without contrast demonstrated extensive bilateral ground-glass opacities (Figure 1). Computed tomography angiography (CTA) of chest was negative for pulmonary embolism. The patient was admitted to inpatient unit for further management. Testing for SARS-CoV-2 assay using a nasopharyngeal swab was performed and the patient was placed on airborne isolation. He was started on symptomatic treatments and antibiotics with Ceftriaxone and Azithromycin. Testing for influenza A, B and Legionella were negative. Twenty-four hours later, COVID-19 result returned negative. However, the patient continued to have dry coughs and shortness of breath although fever and diarrhea had resolved. His oxygen saturation ranged from 86-88% on room air and 92-95% with 3 liters supplemental oxygen via nasal cannula. Routine laboratory study showed persistent leukocytosis. Blood cultures were negative. COVID-19 test was repeated and was again negative. Given clinical presentation and radiographic findings, a diagnosis of COVID-19 was highly suspected although the patient had two negative COVID-19 test results. As such, Acemra was administered as part of the hospital's COVID-19 treatment protocol. On hospital day five, a repeat

chest CT showed worsening of ground-glass opacities with interstitial thickening involving all lung lobes (Figure 2). Further discussion with the patient revealed that he has been using vaping products consistently for the past two years that were composed mainly of tetrahydrocannabinol oils and occasional crack cocaine mix. The patient was started on intravenous methylprednisolone 40 milligrams every eight hours. On hospital day ten, repeat chest CT showed improving ground-glass infiltrates compare to prior scans. The patient reported symptomatic improvements and was saturating adequately on room air. He was discharged home on tapering doses of oral steroids; he was counseled on the use of vaping products and was instructed to follow up outpatient.

Discussion

This case illustrates that the diagnosis of EVALI can be quite challenging in the time of COVID-19 and can be easily missed given the two disease entities share many overlapping features. Symptoms of COVID-19 present remarkably similar to that of EVALI with constitutional symptoms, cough, dyspnea or gastrointestinal symptoms with nausea, vomiting and diarrhea (3-5). Imaging patterns of EVALI are quite diverse and can demonstrate diffuse, multifocal, bilateral ground-glass opacities, however, such finding is nonspecific nor pathognomonic for EVALI as it is also seen in patients with COVID-19 infection, hence making the diagnosis of EVALI especially challenging (4,6). While both COVID-19 and EVALI can involve the lung periphery, one key radiographic feature that can be helpful in distinguishing the two conditions is the presence of sub-pleural sparing, which should prompt consideration for EVALI over COVID-19 pneumonia (6,7) (Figure 2). EVALI remains a diagnosis of exclusion; history of e-cigarette or vaping product use is also helpful in making the diagnosis with clinical correlation (2).

Many patients were treated initially as having COVID-19 despite having negative test results, such as the patient presented in the above case, largely due to the high false negative rates of current SARS-CoV-2 testing modalities. COVID-19 may be masking the ongoing EVALI cases and can complicate the care of patients with EVALI by confounding the diagnosis (8,9). Therefore, in the time of COVID-19, it is important not to forget that EVALI still exists; uncovering vaping history in the setting of respiratory deterioration and negative COVID-19 testing not only allows for illness-specific management, but also for effective vaping cessation counseling to prevent further reoccurrence.

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Figure Legends

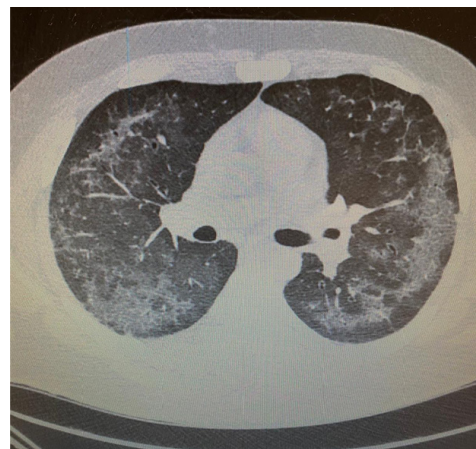


Figure 1: Initial non-contrast chest CT on admission demonstrates ground-glass opacities involving bilateral lung fields. area of sub-pleural sparing (red arrows)

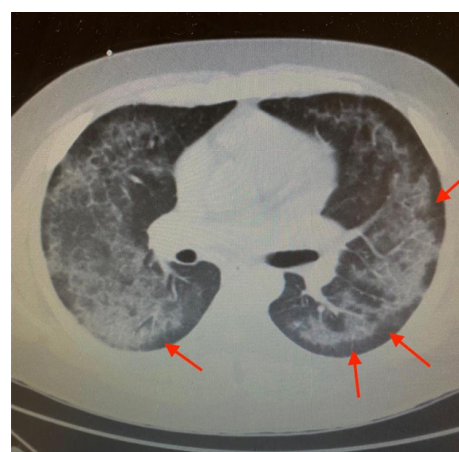


Figure 2: Repeat chest CT without contrast on hospital day five demonstrates worsening, more confluent diffuse scattered ground-glass opacities involving all lung lobes; there is a distinct area of sub-pleural sparing (red arrows)