E-cigarette or Vaping Product Use Associated Lung Injury (EVALI): A Case Report and Review of the Literature

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INTRODUCTION

- E-cigarette, or vaping: inhaling an aerosol by heating a wax or liquid containing nicotine, flavoring and additive.
- Gaining popularity among adolescents with the sweet and fruity smell.
- As of February 2020, there are over 2800 cases of e-cigarette or vaping product use associated lung injury (EVALI)
- Although vitamin E acetate, an additive in some THC-containing product, is strongly associated with EVALI outbreak, there are insufficient evidence to rule out the contribution of other potentially toxic compound.
- As the industry of e-cigarette continue to thrive, practitioners should be aware of presentation of EVALI.
- In this case, we present a 19-year-old young man who suffered from acute hypoxic respiratory failure secondary to EVALI.

CASE PRESENTATION

A robust 19-year-old male had a chief complaints of fever, abdominal pain and diarrhea.

Six day prior to admission, he started to have profuse watery diarrhea up to 5 times a day, associated with cramping abdominal pain, nausea and poor appetite. Later, he developed dry cough with pleuritic chest pain and intermittent shortness of breath. Upon arrival in the emergency department, he was found to have high fever and tachycardia. Initial exam showed bibasilar crackles and diffuse tenderness on his abdomen.

- Laboratory test was unremarkable except for neutrophilia.
- X-ray of chest showed bilateral lower lung consolidation. (Figure 1)
- He began receiving ceftriaxone and azithromycin as empirical treatment for community acquired pneumonia, but poor response after 48 hours was observed.
- Computed tomography (CT) of chest revealed extensive diffused bilateral lung consolidation. (Figure 2)
- Bronchoscopy showed no evidence of purulent secretion or endobronchial lesion.
- Cytology from bronchoalveolar lavage specimen showed lipid-laden macrophages which consistent with EVALI.
- Infectious workup was negative including respiratory viral panel, blood culture, respiratory tract culture for bacteria, acid fast bacilli, and fungi.
- After careful interrogations of his social history, he endorsed that he had been using cannabidiol vaping product. He was treated with taper steroid under the diagnosis of EV ALI.
- Repeat CT of chest six weeks later showed resolution of previous airway disease. (Figure 2)

DISCUSSION

- According to previous cohort study, patients presented with a combination of respiratory, gastrointestinal and constitutional symptoms, including shortness of breath (85%), cough (85%), fever (84%), nausea (66%) and vomiting (61%). In addition, patient usually has a sepis-like presentation with tachycardia, tachypnea, fever, neutrophil predominant leukocytosis and elevated erythrocyte sedimentation rate. 83% of the patient had abnormal chest x-ray.
- Symmetrical ground glass opacity is characteristic finding on CT. As a result, it is impossible to distinguish atypical pneumonia from EVALI with clinical features at presentation.
- Physician should be alert when treating previously healthy adolescent with community acquired pneumonia requiring hospitalization. To date, there is no specific test to diagnose EVALI. EVALI remains to be diagnose by exclusion.
- Centers for Disease Control and Prevention (CDC) developed an outbreak surveillance case definition which include vaping or dapping without 90 days, pulmonary infiltrate on imaging studies, absence of pulmonary infection (including respiratory viral panel, influenza PCR and sputum culture). CDC also developed management algorithm as shown in Figure 3.
- Werner et. al. analyzed the nationwide cohort of 2558 of non-fatal cases and 60 fatal cases. They found that age, asthma, cardiac disease, mental health condition, and obesity were associated with higher risk of death.

CONCLUSIONS

- Lung injury from e-cigarette could mimic community acquired pneumonia.
- High level of suspicion for non-infectious disease is warranted in high risk patient.
- Gastroenterology symptoms including abdominal pain, diarrhea and nausea should raise the concern for toxic inhalation pneumonitis.

REFERENCES


Figure 1. Initial Chest X-ray

Figure 2. Initial CT scan of the Chest and repeated CT scan of the chest in 6 weeks.

Figure 3. CDC’s management algorithm for EVALI

Photo credit: CDC