A CASE OF VAPE-INDUCED LIPOID PNEUMONIA

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INTRODUCTION

- Vaping refers to using an electronic cigarette product.
- E-cigarettes include vapes, e-hookahs, electronic nicotine delivery systems (ENDS).
- They are battery-operated that work by heating a liquid to aerosolize the product.
- Other than nicotine, e-cigarettes are now increasingly being used to inhale cannabidiol (CBD), tetrahydrocannabinol (THC), and butane hash oils (dabs).
- Although vaping was thought to be safer than inhaling crude products like cigarettes or marijuana, the aerosol of e-cigarettes is not without harm.
- A national outbreak of e-cigarette, or vaping, prodigious-associated lung injury (EVALI) was seen across the United States, sharply increasing in August 2019 and peaking in September 2019.
- We report a patient with acute hypoxemic respiratory failure from acute lung injury, likely a result of acute exogenous lipoid pneumonia from vaping THC oil.

CASE PRESENTATION

- A 55 y/o M with no significant PMH presented with a 3-day history of subjective fevers, chills, nausea, non-bloody non-bilious vomiting, watery diarrhea, anorexia, and fatigue.
- He denied any recent travel, new medications or antibiotics. Denied any agricultural exposures such as cattle, rodents, birds or other animals.
- Social History
  - Welder by occupation, involved in welding metal frames for buildings.
  - 10-pack year cig. Smoking, Vaped marijuana thrice a day for few yrs.
  - Recently started using a new vape pen called “DANK” for few weeks.
- On Exam- Tachycardic with HR of 135/minute, afebrile, blood pressure was normal. His O2 saturation was 90% on ambient air. He had mild crackles on auscultation bilaterally.
- Lab work - Leukocytosis (21x10^3/L) with 95% neutrophils and 0% eosinophils, serum Na of 132 mmol/L, pro-calcitonin was elevated at 1.21 ng/mL, ESR and CRP - 116 mm/hr and 33 mg/dL respectively. His serum kidney and liver function tests, lactic acid, and cardiac enzymes were normal.
- CT scan of chest showed bilateral ground-glass opacities with a peripheral predominance (Fig 1).
- The patient was started on antibiotics for CAP. He spiked a fever of 102.5F overnight and developed worsening hypoxemia and respiratory distress requiring 60 L/min HFNC with FiO2 of 0.6.
- A repeat CXR on Day 2 revealed increased bilateral basilar predominant interstitial and hazy airspace opacities (Fig 2).
- He was electively intubated for bronchoscopy. BAL of RML was cloudy with 332 /cmm WBCs, neutrophilic predominant with 0% eosinophils.
- He was extubated to HFNC on Day 3.
- The BAL gram stain and bacterial cultures, legionella culture, AFB stain, fungal culture, aspergillus galactomannan antigen, and herpes viral DNA panel were negative.
- His blood cultures, nasal RVP, serum HIV, urine Histoplasma antigen, urine Strep. antigen, serum Q-fever Ab, tularemia Ab, mycoplasma Ab, chlamydia sp. Ab were negative. HP panel was negative as well.
- Transthoracic ECHO was within normal limits.
- Oil red-O stain smear on the BAL showed lipid-laden macrophages (Fig 3).
- He showed a rapid clinical improvement in his symptoms and oxygen requirements therefore, steroids were not initiated.
- Since the infectious work-up was negative, lipid-laden macrophages were found in the BAL, and clinical improvement was achieved, antibiotics were discontinued on Day 4.
- Follow up CXR showed improvement in opacities. The patient was weaned down to 8 L/min nasal cannula oxygen by Day 5 and discharged home on Day 9 without any supplemental oxygen.

IMAGING & BAL

- CT scan on Day 1: Extensive peripheral ground-glass opacities which appeared to be basilar predominant though also involved the upper lobes.
- The opacities spared the subpleural regions.

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DISCUSSION

- We believe that our patient’s AHRF was secondary to EVALI due to acute exogenous lipoid pneumonia (ELP) from vaping THC oil. This was based off his history of using a new kind of THC vape pen from an unknown source , the presence of lipid-laden macrophages on BAL, the relatively rapid improvement in his condition without further exposure, and a negative infectious work-up.
- ELP is a rare condition caused by inhalation or aspiration of lipid particles from outside. In case of vaping, tiny droplets of aerosolized lipids from the vape oil can be inhaled which can trigger an inflammation in the lungs.
- The presence of lipid-laden macrophages seen on oil red O staining is highly suggestive of ELP. The treatment of ELP is not clear. The mainstay of treatment includes supportive treatment and avoiding exposure to the cause.

- A variety of pneumonitis patterns have been reported in patients with EVALI such as acute eosinophilic pneumonia, diffuse alveolar damage, hypersensitivity pneumonitis, organizing pneumonia, giant-cell interstitial pneumonia, diffuse alveolar hemorrhage, and lipid pneumonia.
- Most of the CT patterns reported were basilar-predominant ground-glass opacity or consolidation, often with areas of sub-pleural or lobular sparing. Most of the patients did not manifest eosinophilia in the peripheral blood or BAL specimens.
- Laboratory data show that vitamin E acetate, an additive in some THC-containing e-cigarette, or vaping, products, is strongly linked to the EVALI outbreak.
- Vitamin E acetate should not be added to any e-cigarette, or vaping, products. Additionally, people should not add any other substances not intended by the manufacturer to products, including products purchased through retail establishments.
- CDC and FDA recommend that people not use THC-containing e-cigarette, or vaping, products, particularly from informal sources like friends, family, or in-person or online dealers.
- The presumption that vaping is a completely safe alternative to conventional cigarette or marijuana smoking now appears to be challenged by the outbreak of EVALI.

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