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Health Alert
Vaping-Associated Pulmonary Injury

August 27, 2019

Key Messages

- Since June, 36 cases of vaping-associated pulmonary injury requiring hospitalization have been reported to the California Department of Public Health (CDPH). Most patients report vaping the cannabis compounds THC and/or CBD, and some patients also report vaping nicotine products, although the exact cause of illness is not yet known.
- Clinicians who identify cases similar to those described in this health alert are asked to report the cases to their local health department.
- Local health departments should report new cases or direct any inquiries to the CDPH Duty Officer dutyofficer@cdph.ca.gov or (916) 328-3605. Please also contact the CDPH Duty Officer when any vaping devices or supplies have been collected from a patient and can be turned over to CDPH for testing.

Current Situation

Physicians in California and at least 23 other states have documented over 200 cases of acute pulmonary disease associated with vaping over the past three months. Most patients in California report vaping cannabis products such as THC or CBD, and some report vaping nicotine-containing liquids as well. Some patients have reported using vaping products that they purchased from unlicensed, unregulated entities.

Patients typically present to the hospital with cough, difficulty breathing, fever, and sometimes vomiting and diarrhea. In many cases, the initial diagnosis was presumed to be infectious, but no evidence of infection or other process to explain the pulmonary disease was found. All cases in California have been hospitalized, with most requiring respiratory support with supplemental oxygen, high-flow oxygen, or bi-level positive airway pressure (BiPAP). At least ten patients had respiratory failure requiring mechanical ventilation. No deaths have been reported to date in California.

Local health departments are collecting information on vaping habits and products used from patients who are suspected of having vaping-associated pulmonary injury (VAPI).

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The numbers in California as of 8/27/2019:

Total: 36 cases (24 men, 12 women)

Ages: 14-70 (median age 27)

Total counties: 13 counties across the state

Information for Physicians and Hospitals

The clinical presentation of VAPI can initially mimic common pulmonary diagnoses like pneumonia, but patients typically do not respond to antibiotic therapy. High clinical suspicion is necessary to make the diagnosis of VAPI. In some cases, patients sought care at outpatient clinics in the days prior to hospital presentation and received antibiotics for presumed pneumonia or bronchitis, which did not improve their symptoms.

Action Items for Physicians:

- 1) Ask patients presenting with respiratory complaints in both outpatient and inpatient settings about their use of vaping or “dabbing” devices, especially patients who had an initial diagnosis of pneumonia or bronchitis that did not respond to antibiotics. For patients who do vape, ask these follow-up questions:
 - **Type of vape used**
 - Do you vape nicotine-containing substances?
 - Do you vape substances that contain cannabis or cannabinoid compounds like THC and CBD?
 - **Amount of use**
 - When was the last time you vaped?
 - How often do you vape?
 - How long have you been vaping?
 - **Source**
 - Where do you purchase your vaping supplies?
 - What brands are your vaping devices, cartridges, and oils?
- 2) Report suspected cases to the local health department within one business day.
 - An official from your local health department may interview the patient or family members.
 - The local health department will contact the hospital lab to arrange the transfer of biospecimens remaining from the patient to the public health lab. You do not have to order any specific cultures or tests on blood or urine that you would not normally request for the care of the patient.
 - The local health department may collect vape devices and cartridges from the patient or family for testing.

Clinical Information on Vaping-Associated Pulmonary Injury

Clinical course

Patients typically present for care within a few days to weeks of symptom onset. At the time of hospital presentation, patients are often hypoxic and meet systemic inflammatory response syndrome (SIRS) criteria, including high fever. In some cases, patients had progressive respiratory failure following admission, leading to intubation.

Time to recovery for hospital discharge has been from days to weeks.

Symptoms

Commonly reported symptoms include:

- Shortness of breath, cough
- Fatigue, body aches
- Fever
- Vomiting, diarrhea

Laboratory findings

- Non-specific laboratory abnormalities have been reported, including elevation in white blood cell count, transaminases, procalcitonin, and inflammatory markers.
- Negative infectious disease testing (influenza, respiratory viral panel, cultures, etc.).

Imaging

Imaging abnormalities are typically bilateral and may be described as:

- Chest x-ray: pulmonary infiltrates or opacities
- Chest CT: ground-glass opacities

Diagnosis

VAPI is a clinical diagnosis of exclusion when infectious, rheumatologic, neoplastic, cardiac, or other processes cannot explain an acute pulmonary illness in a patient known to vape cannabinoids and/or nicotine. The diagnosis is commonly suspected when the patient does not respond to antibiotic therapy, and testing does not reveal an alternative diagnosis.

Common documented hospital diagnoses for these patients have included: acute respiratory distress syndrome (ARDS), sepsis, acute hypoxic respiratory failure, pneumonitis, and pneumonia.

Treatment

Guidelines for treatment of VAPI are not yet available.

- Most patients require supplemental oxygen via nasal cannula, high-flow oxygen, bi-level positive airway pressure (BiPAP), or mechanical ventilation.
- Anecdotally, treating physicians have trialed the use of steroids with some possible benefit. Information on dosing and duration of steroids is not available.

Information for Local Health Departments

Background

Vaping refers to the increasingly popular practice of inhaling vapor from an e-cigarette device, which works by heating a liquid that can contain nicotine, marijuana, or other drugs. The long-term health impacts of vaping are unknown. Some individuals also use a different type of device to heat and extract cannabinoids for inhalation in a process called “dabbing.” Both vaping and dabbing have been associated with VAPI.

Case Definition for Vaping-Associated Pulmonary Injury (VAPI)

A case of VAPI meets the following criteria:

- Respiratory illness requiring hospital admission;
- History of vaping or dabbing within 90 days of symptom onset;
- Pulmonary infiltrates or opacities on chest radiograph or chest CT
- Clinical presentation is not explained by infectious or other alternate etiology.

Please see the attached case definition document for California's full working case definition, including criteria for confirmed versus probable cases. A revised national case definition may be issued in the coming days, and any resulting updates to California's case definition will be distributed at that time.

Suspected Cases

- Local health departments (LHDs) may use the attached "VAPI case intake form" as a guide for the data to collect from reporting clinicians in order to determine if an individual meets the case definition, and also as a template for use in reporting cases to CDPH.
- LHDs are asked to report suspected cases and direct inquiries to the CDPH Duty Officer dutyofficer@cdph.ca.gov or (916) 328-3605 within one business day. After-hours reporting is not expected. Please do not send protected health information (PHI) to the Duty Officer e-mail account.
- Upon reporting a case to the CDPH Duty Officer, you will be contacted by a member of the CDPH staff, who will gather additional details from the case intake form and provide you with a link to a standardized patient interview. We ask that a member of the LHD staff complete the questionnaire with the patient or family member. If the LHD is unable to do so, CDPH staff can provide assistance.
- Please attempt to collect any vaping devices, cartridges, and liquids from affected patients and contact the CDPH Duty Officer dutyofficer@cdph.ca.gov or (916) 328-3605 so that the product can be collected for testing. Keep samples sealed, stored in a secure manner, and ideally under refrigeration. Ensure samples are labeled with documentation that allows for identification of the case patient from which they were obtained and in a way consistent with the patient interview data collected on the standardized questionnaire.

Vaping-Associated Pulmonary Injury. California case definition - August 26, 2019.

Confirmed

Respiratory illness requiring hospitalization

AND

Using an e-cigarette (“vaping”) or dabbing* in 90 days prior to symptom onset

AND

Pulmonary infiltrate, such as opacities on plain film chest radiograph or ground-glass opacities on chest CT

AND

Absence of pulmonary infection on initial work-up: Minimum criteria include negative respiratory viral panel and influenza PCR or rapid test. All other clinically indicated respiratory ID testing (e.g., urine strep pneumo/ legionella/ mycoplasma, sputum culture if productive cough, BAL culture if done, blood culture, HIV-related opportunistic respiratory infections if appropriate) must be negative

AND

No evidence in medical record of alternative plausible diagnoses (e.g., cardiac, rheumatologic or neoplastic process).

Probable

Respiratory illness requiring hospitalization

AND

Using an e-cigarette (“vaping”) or dabbing* in 90 days prior to symptom onset.

AND

Pulmonary infiltrate, such as opacities on plain film chest radiograph or ground-glass opacities on chest CT

AND

Infection identified via culture or PCR, but clinical team** believes this is not the sole cause of the underlying respiratory disease process –**OR**– No evidence of pulmonary infection, but minimum criteria to rule out pulmonary infection not met (testing not performed)

AND

No evidence in medical record of alternative plausible diagnoses (e.g., cardiac, rheumatologic or neoplastic process).

Footnotes

* Includes using an electronic device (e.g., electronic nicotine delivery system (ENDS), electronic cigarette, e-cigarette, vaporizer, vape(s), vape pen, dab pen, or other) or dabbing to inhale substances (e.g., nicotine, marijuana, THC, THC concentrates, CBD, synthetic cannabinoids, flavorings, or other substances).

** Clinical team caring for the patient.