

Severe lung injury associated with vaping algorithm

PATIENT SYMPTOMS

- shortness of breath
- cough
+/- chest pain
- nausea, vomiting
+/- diarrhea +/- fever



EXPOSURE HISTORY

- History of vaping in past 3 months



Consider 1-4 below if patient endorses any of the above symptoms or exposures

1 PERFORM IMAGING

- Chest X-ray and/or CT (as clinically indicated)



2 RULE OUT INFECTIOUS DISEASE

- Influenza test (PCR if available)
- Respiratory virus panel or respiratory pathogen panel (as clinically indicated and available)
- Legionella and Strep pneumonia urine antigen (as clinically indicated)
- Mycoplasma PCR (as clinically indicated and available)
- Blood culture if febrile
- CRP/ESR
- CBC with differential and platelets
- Other tests (as clinically indicated)



If BAL/biopsy performed (as clinically indicated)

- Gram stain and bacterial cultures
- Fungal stains/fungal cultures
- Acid-fast bacilli smear and mycobacterial cultures
- Respiratory virus or pathogen panel
- Pneumocystis PCR or pneumocystis specific stain (as clinically indicated)
- Lipid Oil Red stain (if available)
- Other tests as clinically indicated

3 TOXICOLOGY EVALUATION

- Urine drug testing (as clinically indicated*)



4 OTHER TESTING FOR PULMONARY PROCESSES (AS CLINICALLY INDICATED) **

- Rheumatologic, malignancy, cardiac, etc.

5 REPORT TO MDH

- For patients with abnormal radiographic findings - frequent findings are bilateral patchy infiltrates on X-ray or ground glass on CT
- If clinical specimens collected, retain earliest blood and urine
- Retain BAL or biopsy if performed

6 CONSIDER CORTICOSTEROIDS IF APPEARING TO BE VAPING LUNG INJURY

- Advise consultation with pulmonary specialist to determine need for corticosteroids and dosing
- If admitted, consider consultation with infectious disease specialist and further infectious disease workup that could include endemic mycoses and other pathogens
- Some clinicians have found it helpful to consult with an endocrinologist for patients prescribed high dose steroids for longer durations

7 CARE POST-DISCHARGE

- If outpatient, follow up with patient within 48 hours to see if symptoms have progressed
- When discharged, schedule follow up with patient; follow up with a pulmonologist may be helpful to assess recovery
- Many cases have nicotine and other substance addiction; in addition, many cases are noted to have anxiety and/or depression. Referral to specialists in these areas are an important part of treatment
- Patients with symptoms but who do not have evidence of disease on imaging should be counseled to return if symptoms progress

*Per CDC Recommendations; however given the limitations of the sensitivity and specificity of urine drug screen, should be left up to the clinician

** See back for reporting

Clinical presentation of patients with lung injuries associated with vaping, and other special considerations

Clinical presentation of patients with lung injuries associated with vaping has included shortness of breath, fever, cough, chest pain and gastrointestinal symptoms (nausea, vomiting, abdominal pain or diarrhea), typically with radiographic abnormalities, in the setting of recent or active use of nicotine or THC vaping. Other symptoms may include headache and weight loss. Symptoms generally progress over days to weeks. Severity of imaging results may be variable, but often chest radiographs demonstrate bilateral opacities and CT imaging demonstrates diffuse ground glass opacification. Inflammatory markers are typically elevated. Infectious, rheumatologic and other disease process evaluations are usually negative or do not fully explain the extent of lung disease otherwise seen. Patients often require hospital admission for hypoxia and some require ventilator support.

Close follow-up advised

Many patients seek care as an outpatient at least once prior to hospital admission. Because symptoms can progress without therapy, patients who do not appear to have a vaping-related lung injury at the time of initial clinical encounter or who are presenting early in the clinical course require close follow up. It is strongly recommended to follow up with these patients within 5 to 7 days. Consultation with specialists as needed is recommended.

Steroids and other treatment

Clinical improvement of patients has been reported with corticosteroid use. Currently there is insufficient outcome evidence to recommend use of steroids on a routine basis. The decision to use corticosteroids should be made based on risks and benefits and the likelihood of other etiologies. Aggressive supportive care is warranted, and the decision to use or defer corticosteroids may benefit from consultation with pulmonology and medical toxicology. Consider lung function testing at follow up or referral to a pulmonologist. Referral to addiction medicine should also be considered. Please consult with addiction specialists in your area.

- **Report suspected cases to MDH as soon as possible by one of these methods:
- Call 651-201-5878
- Fax to 1-800-267-1058 a Vaping Initial Case Report Form
<https://www.health.state.mn.us/diseases/lunginjuries/docs/vapecasereport.pdf>
- Use the online Vaping Initial Case Report Form
<https://redcap.health.state.mn.us/redcap/surveys/?s=K98LHDE7NK>
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