LUNG INJURY ASSOCIATED WITH VAPING

These clinical presentation details come from extensive review of medical records and collaboration with Wisconsin clinicians who have treated cases. This is meant to be a tool to assist in case recognition and clinical evaluation but is not intended to substitute clinical judgment.

PATIENT PRESENTATION

HISTORY

- **History of vaping THC or nicotine products**
- The majority of patients report vaping THC products, but some report only vaping nicotine; some initially deny using THC
- THC products are often flavored, pre-filled THC cartridges obtained from black-market sources
- Take a detailed history on products, devices, and vaping methods
- Ask about other environmental and occupational exposures

TIME COURSE

- **Acute presentation of respiratory distress or gastrointestinal (GI) symptoms**
- **Subacute constitutional and GI symptoms often present days to weeks before acute presentation**
- Median duration of symptoms prior to presentation is 6 days
- Although an indolent course is common, many patients decompensate very quickly

EPIDEMIOLOGY

- **More than two-thirds of Wisconsin patients are male**
- **Age range of patients is 15–67 years (median 20)**
- **About a quarter of patients have a history of asthma and about half of patients have a history of a mental health disorder**

SIGNS AND SYMPTOMS

- **Typical chief complaint: shortness of breath and cough with pleuritic chest pain**
- **Constitutional symptoms: weight loss, fatigue, and fever/chills**
- **GI symptoms: nausea, vomiting, diarrhea, and abdominal pain**
- **Hypoxemia and tachypnea**
- Present with SIRS criteria
- Half of admitted patients initially present to outpatient care with milder lower respiratory and/or GI symptoms

DIAGNOSTICS, IMAGING, AND LABS

IMAGING FINDINGS

- **Chest X-ray (CXR): bilateral opacities**
- **Computed tomography (CT): bilateral, relatively symmetric, and extensive ground-glass opacities predominantly at the bases with subpleural sparing**
- CXR may be clear early in the course (~1 in 5 patients)
- All CT scans to date have had bilateral findings
- Not all CT scans show subpleural sparing or predominance at the bases
- Other CT findings may include: bilateral lung consolidation, centrilobular ground-glass attenuation nodules, pleural effusion (typically small)

LAB FINDINGS

- **Neutrophilic leukocytosis**
- **Elevated C-reactive protein (CRP) and erythrocyte sedimentation rate (ESR)**
- Elevated transaminases (AST/ALT) and lactate dehydrogenase (LDH) have been reported in some patients

ADDITIONAL DIAGNOSTIC CONSIDERATIONS

- **There is no specific test for lung injury associated with vaping**
- **Work-ups have focused on excluding infectious causes**
- **Consultation with specialists is often needed**
- **Evaluate and treat for other possible causes (e.g., rheumatologic, neoplastic, cardiac) as appropriate**
- Infectious screening typically includes respiratory virus panel, influenza, *Streptococcus pneumoniae*, *Legionella pneumophila*, *Mycoplasma pneumoniae*, HIV, *Blastomyces, Histoplasma*, and blood cultures
- If bronchoscopy is performed, BAL fluid testing for: gram stain, fungal cultures, acid-fast bacilli, PJP; consider BAL fluid staining using Oil Red O
- Urine drug screening

DIFFERENTIAL DIAGNOSIS

- **Atypical pneumonia**
- Acute pulmonary pathology such as pneumothorax, pulmonary embolism, etc.
- Gastroenteritis, appendicitis, or other acute GI processes

TREATMENT

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- **Treatment has focused on supportive care**
- **Some patients improve with corticosteroids, but they should be used on a case-by-case basis**
- **Encourage vaping cessation**
- Patients have required: supplemental oxygen, mechanical ventilation, extracorporeal membrane oxygenation (ECMO), antibiotics for secondary infections
- Bronchospasm has been observed; consider bronchodilators
- Hospitalizations have ranged from 1–24 days

FOLLOW UP

- **Outpatient pulmonology follow-up should be considered**
- **Patients typically discharged on a corticosteroid taper and bronchodilators**
- **Can offer nicotine replacement or other cessation therapies**
- There have been reports of some patients' pulmonary function tests not returning to baseline at follow-up
- Ensure routine vaccination for influenza; consider pneumococcal vaccine if indicated according to guidelines

If you suspect that your patient may have lung injury associated with vaping, please report this to your local health department. Visit dhs.wisconsin.gov/outbreaks/vaping.htm for reporting details.