



EVALI
A NEW ENTITY IN
INTERSTITIAL LUNG
DISEASE

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INTRODUCTION

- "Vaping" is the process of inhaling an aerosol that is created by heating a liquid or wax containing various substances, such as nicotine, cannabinoids (eg, tetrahydrocannabinol, cannabidiol), flavoring, and additives (eg, glycerol, propylene glycol)
- EVALI was described for the first time in 2019, as acute or subacute respiratory illness that can be severe or even life threatening

DEVICES USED IN VAPING

Electronic Cigarettes or Vaping Products



PATHOGENESIS AND RISK FACTORS

- Pathological finding: acute fibrinous pneumonitis, diffuse alveolar damage, or organizing pneumonia, usually bronchiolocentric and accompanied by bronchiolitis
- Individual pathological finding: acute eosinophilic pneumonia, diffuse alveolar hemorrhage, lipoid pneumonia, and respiratory-bronchiolitis interstitial lung disease
- The key risk factor for EVALI is use of an e-cigarette or similar product.

PATHOGENESIS AND RISK FACTORS

- In BAL taken from affected patients, **THC** and **Vitamin E acetate** were found in the majority.
- Also, in BAL were found nicotine, CBD oils and other substances like coconut oil or limonene

CBD VS **THC**

CBD

- Cannabidiol
- NON-Psychoactive
"NO HIGH"
- Contains 0.3% THC
(or less)

THC

- Tetrahydrocannabinol
- Psychoactive
"GETS YOU HIGH"
- Contains more than
0.3% THC

CLINICAL FEATURES

- Respiratory symptoms: shortness of breath (85 %), cough (85 %), chest pain (52 %), pleuritic chest pain (36 %), and hemoptysis (8%)
- Constitutional symptoms: fever (84%), chills (60%)
- Gastrointestinal symptoms: nausea (66%), vomiting (61%), diarrhea (44%), and abdominal pain (34 %)
- Physical examination: fever 33%, tachycardia 63%, and tachypnea 43%.
- Approximately 58 percent were hypoxemic, with a pulse oxygen saturation ≤ 88 percent.

DIAGNOSIS

Confirmed cases:

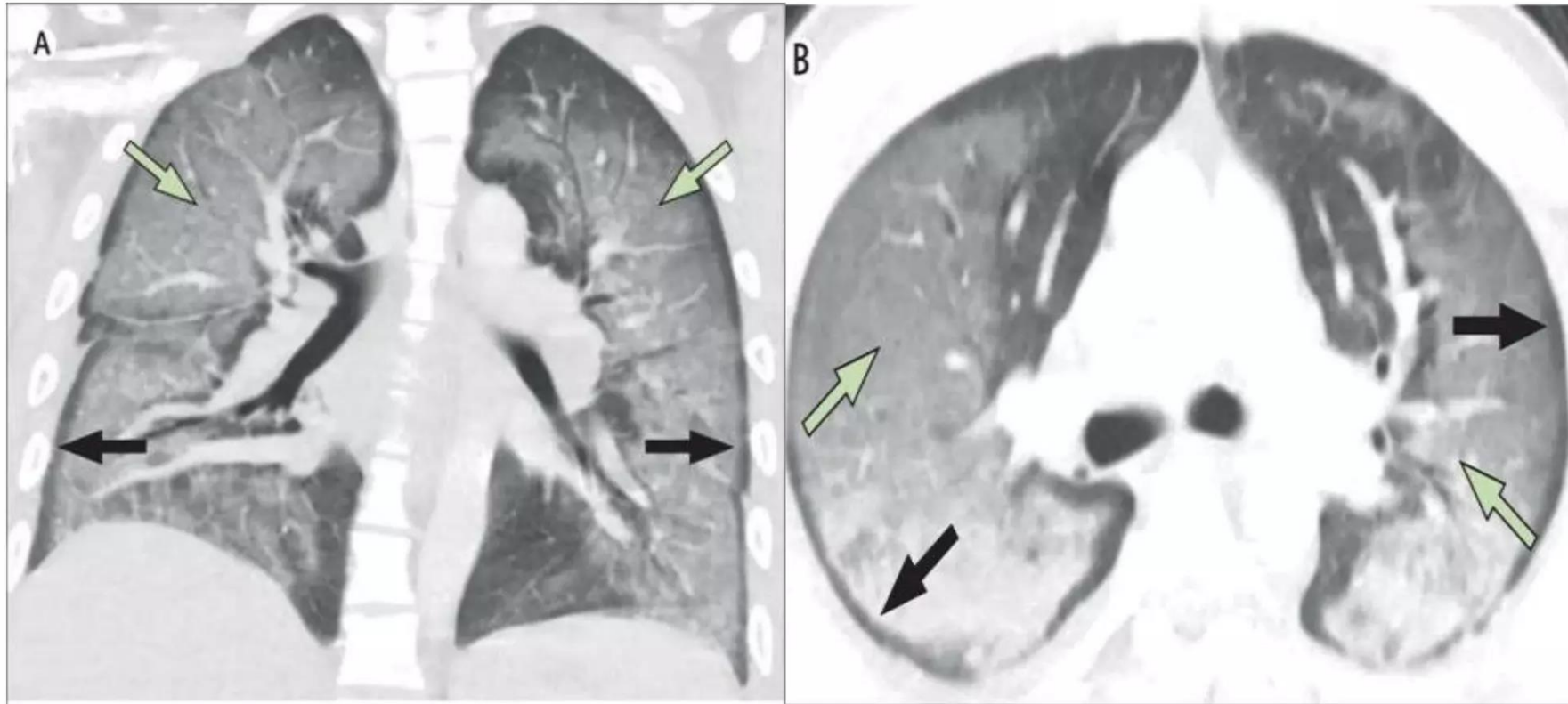
- Use of an e-cigarette ("vaping") or "dabbing" in the previous 90 days
- Lung opacities on chest radiograph or computed tomography
- Exclusion of lung infection based on: Negative influenza PCR or rapid test (unless out of season); Negative respiratory viral panel; Negative testing for clinically-indicated respiratory infections (eg, urine antigen test for Legionella and Streptococcus pneumoniae, blood cultures, sputum cultures if producing sputum, and bronchoalveolar lavage if performed); Negative testing for HIV-related opportunistic respiratory infections (if appropriate)
- Absence of a plausible alternative diagnosis (eg, cardiac, neoplastic, rheumatologic)

DIAGNOSIS

Probable case:

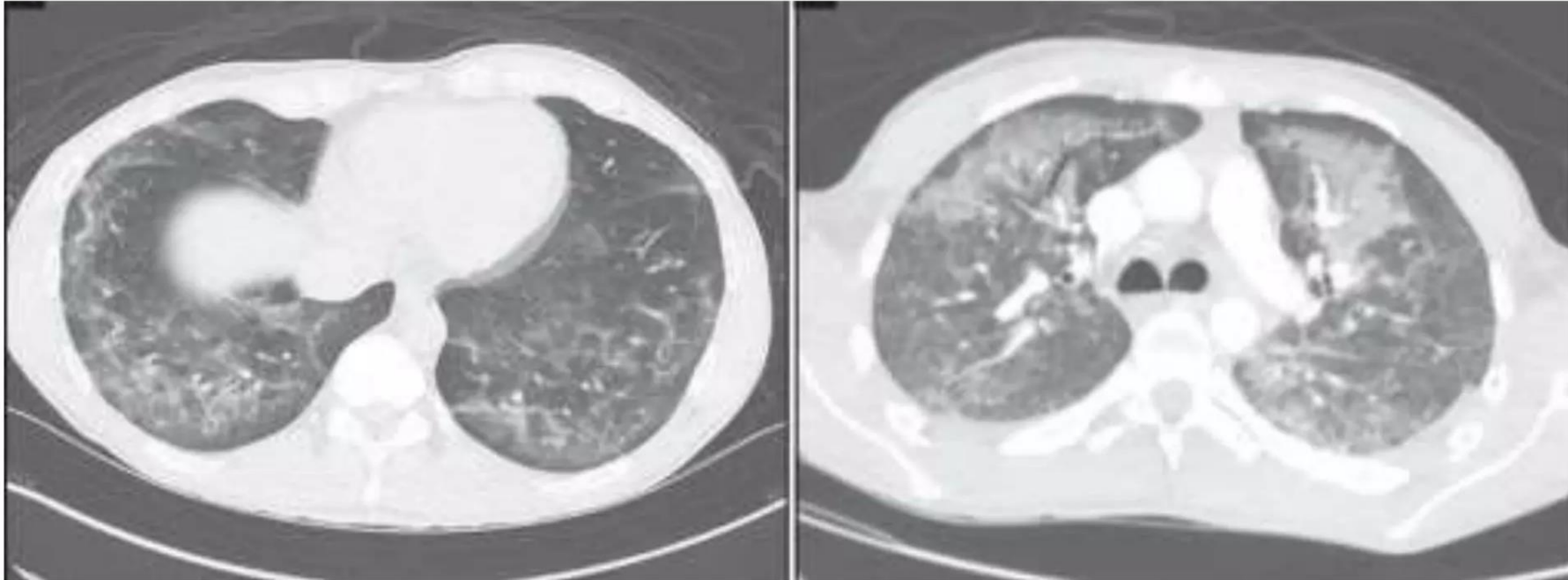
- Use of an e-cigarette ("vaping") or "dabbing" in the previous 90 days
- Lung opacities on chest radiograph (diffuse hazy or consolidative opacities) or computed tomography (ground glass or consolidative opacities)
- Infection identified via culture or PCR, but clinical team believes this infection is not the sole cause of the underlying lung injury **OR** Minimum criteria to rule out pulmonary infection not met (testing not performed) and clinical team believes infection is not the sole cause of the underlying lung injury
- Absence of a plausible alternative diagnosis (eg, cardiac, neoplastic, rheumatologic)

DIAGNOSIS-CHEST IMAGES



This patient has e-cigarette, or vaping, product use associated lung injury, with diffuse bilateral ground glass opacities (green arrows) in a peribronchovascular distribution, with subpleural sparing (black arrows).

DIAGNOSIS- CHEST IMAGES



A - diffuse bilateral ground-glass opacities with peripheral prominence, mimicking eosinophilic pneumonia.

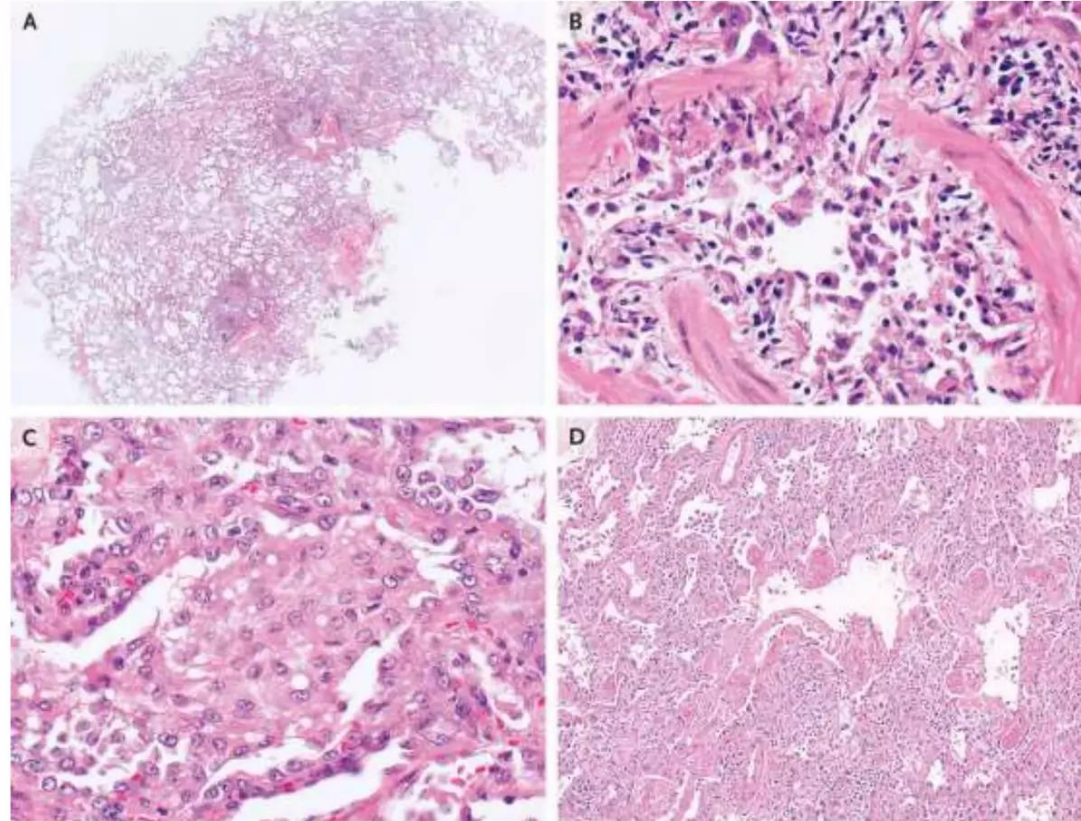
B - diffuse bilateral ground-glass opacities with areas of consolidation

Lung Biopsy Findings in Severe Pulmonary Illness Associated With E-Cigarette Use (Vaping): A Report of Eight Cases, *American Journal of Clinical Pathology*, , aqz182, <https://doi.org/10.1093/ajcp/aqz182>

DIAGNOSIS

- Lab. findings- to exclude processes in differential diagnosis
- Bronchoscopy – used in patient with progressive or severe symptoms; also to exclude diff dg
- BAL- dominant neutrophils, eosinophils in some cases. Lipid laden macrophages are common but non specific finding
- Pathology: acute fibrinous pneumonitis, diffuse alveolar damage, foamy (lipid-laden) macrophages (seen in all cases), and organizing pneumonia (usually bronchiolocentric and accompanied by bronchiolitis)

DIAGNOSIS- PATHOLOGY



N Engl J Med 2019; 381:1780-1781

Most cases showed airway-centered acute lung injury (Panel A), often with severe bronchiolitis accompanied by marked mucosal edema, sloughing of bronchiolar epithelium, and peribronchiolar organization (Panel B). All cases showed accumulation of foamy or vacuolated macrophages in peribronchiolar airspaces with pneumocyte vacuolization (Panel C). Four cases showed severe injury, with diffuse alveolar damage and hyaline membranes (Panel D).

DIFFERENTIAL DIAGNOSIS

- CAP
- COVID 19
- Acute eosinophilic pneumonia
- Organizing pneumonia
- Lipoid pneumonia- areas of negative attenuation are not reported in EVALI, while in patients with lipoid pneumonia are present 1/2-2/3 cases
- DAH, RB ILD, Giant cell pneumonitis

TREATMENT

Hospitalization is advisable for any patient with suspected EVALI who has respiratory distress, decreased oxygen saturation (eg, 95% on room air), significant comorbidities that compromises lung reserve, and/or suboptimal access to follow-up within 24 to 48h

- **Empiric antibiotics**
- **Systematic glucocorticoids**- individualized assessment:

Methylprednisolone 0.5-1 mg/kg per day, tapering over 5-10 days guided by clinical course

- **Supportive care**

PROGNOSIS

- When comparing **fatal and nonfatal cases** of EVALI, the proportion of fatal cases was higher among **patients over age 35** years and (when the medical history was available) among those with a **history of asthma** (23 versus 8 percent), **cardiac disease** (47 versus 10 percent), or a **mental health condition** (65 versus 41 percent). Among patients who died, 52 percent were **obese**.

CONCLUSION

- EVALI is new kind of respiratory illness, growing prevalence in young patients
- Most of cases are present with interstitial thickening and GGO in chest images
- Mechanism of genesis is not known yet, but all cases are connected with e cigarettes or vaping products
- Comorbidities are risk factors for poor prognosis
- Treatment depends on clinical presentation



THANK YOU