

# E-cigarette or Vaping Associated Lung Injury in the Time of COVID-19

Rachel Quick, MSN, RN, CNS<sup>1</sup>, Donald Murphey, MD<sup>1,2</sup>, Marisol Fernandez, MD<sup>1,2</sup>, Julia Sapozhnikov, PharmD<sup>1</sup>, and Sarmistha B. Hauger, MD<sup>1,2</sup>

(1) Dell Children's Medical Center of Central Texas, Austin, TX ; (2)The University of Texas at Austin Dell Medical School, Austin, TX

## Introduction

Pediatric providers have been caring for two new and similar respiratory illnesses:

- E-cigarette or vaping use associated lung injury (EVALI) beginning in 2019
- Coronavirus Disease 19 (COVID-19) in 2020

Similarities in COVID and EVALI:<sup>1-5</sup>

- Prodrome: gastrointestinal or respiratory prodrome
- Clinical presentation: Respiratory distress, febrile illness; often rapidly progressive.
- Imaging: ground glass opacities on CT
- Laboratory testing: elevated inflammatory markers, leukocytosis, lymphopenia

Although a positive severe acute respiratory syndrome coronavirus 2 (SARS CoV-2) polymerase chain reaction (PCR) test is helpful, this result does not definitively identify SARS CoV-2 as the primary cause of symptoms in patients with a history of vaping, as both processes may coexist. Coinfection with other infectious agents is commonly found in children with COVID-19 infection, and the majority of children with PCR positive SARS CoV-2 are asymptomatic or mildly symptomatic.<sup>6,7</sup>

### Study Objective:

To differentiate COVID-19 and EVALI presentation with the goal of aiding in diagnosis for these two similar presentations.

## Methods

### Study Design & Setting:

In hopes of better defining EVALI versus COVID-19 clinical syndromes, we reviewed charts of pediatric patients admitted to a freestanding children's hospital in Texas diagnosed with EVALI over a year period from June 1, 2019 and June 1, 2020. Cases were identified through a local patient registry. We compared findings in these cases with literature regarding pediatric patients with acute COVID-19 and EVALI. Variables included presenting symptoms, timing of symptoms, vital signs, imaging, and laboratory results.

### Inclusion Criteria:

Patients 0-21 years of age admitted to a free standing children's hospital with a diagnosis of EVALI diagnosis from June 1 2019-June 1, 2020

## Results

Twelve patients with EVALI diagnosis were included. Clinical presentation, imaging, and laboratory findings were similar to those described with acute COVID-19 (Figures 1 and 2). Repeated interviewing regarding vaping revealed a history of vaping in all EVALI cases; frequency reported varied from multiple times daily to remote use. Some cases with EVALI also had a significant psychiatric history, positive urine drug screen, or significant weight loss prior to hospitalization. Cases with EVALI and steroid treatment improved within days of treatment. In a review of literature, BAL sampling often reveals lipid pneumonia in EVALI cases, which would not be expected in COVID-19. Of note, the single case in our group tested did not have lipid pneumonia on bronchoalveolar lavage (BAL) cytology.

Figure 1. EVALI Case Presentation and Description

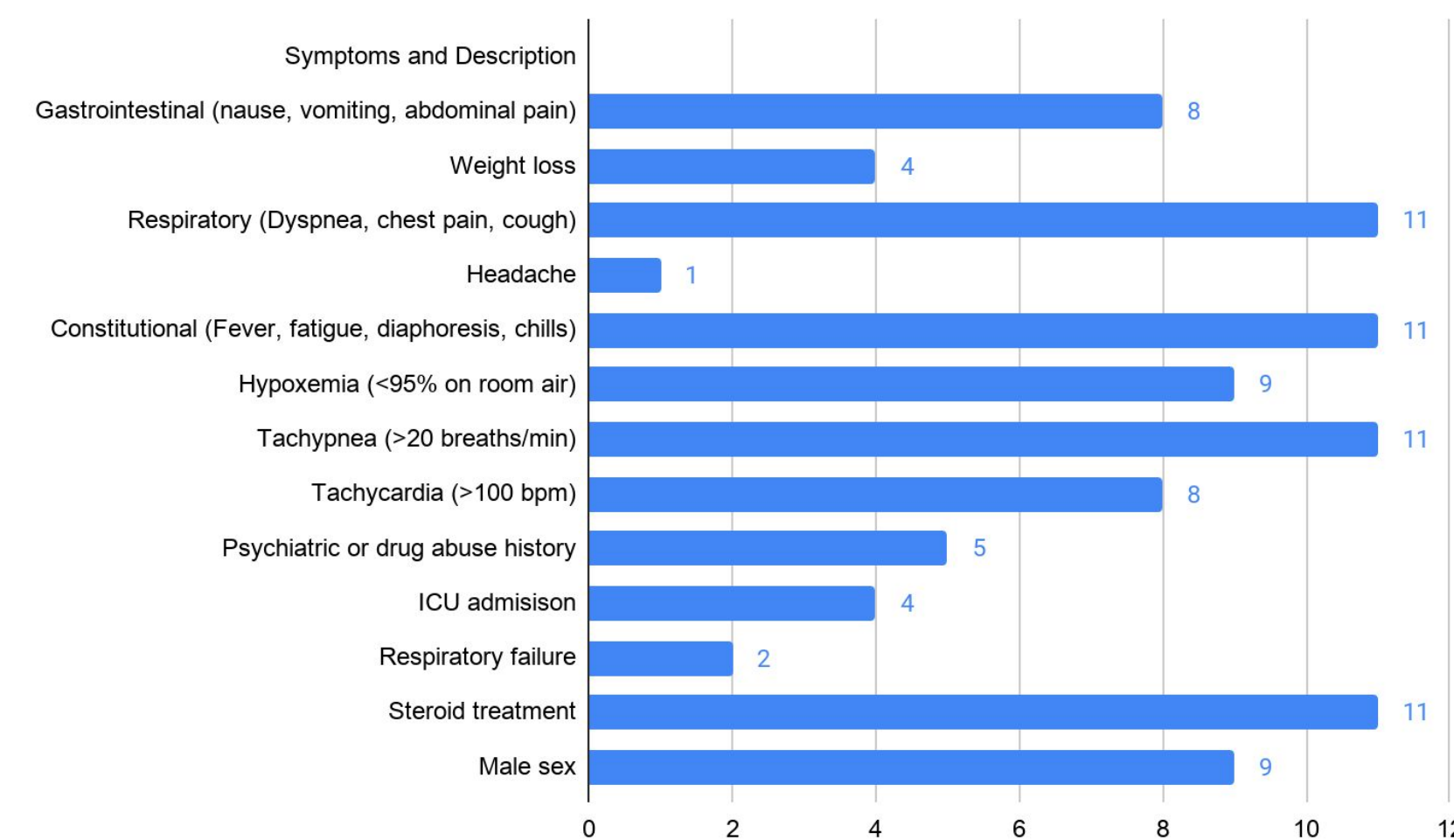
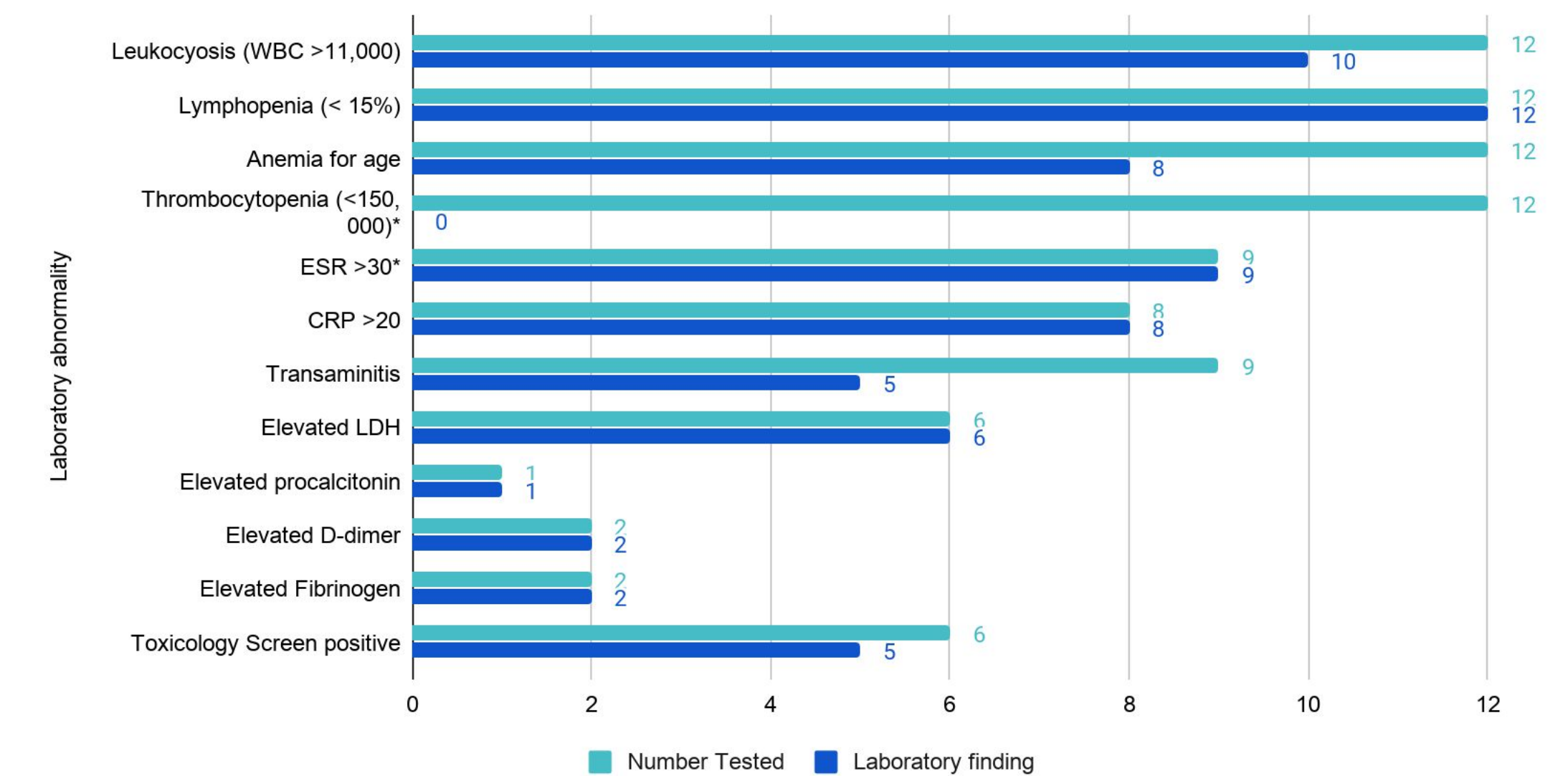


Figure 2. Laboratory Findings among 12 Cases with EVALI



## Conclusions

Differentiating EVALI and COVID-19 Disease requires detailed history and evaluation.

These conditions present very similarly and can potentially be coexisting in a patient

Presence of prolonged preceding weight loss, or BAL cytology could help differentiate these clinical states.<sup>2,3</sup>

Cases with EVALI might show evidence of lipid pneumonia on BAL cytology.<sup>1-3</sup>

## References

1. Lilly CM, Khan S, Waksmundzki-Silva K, Irwin RS. Vaping-associated respiratory distress syndrome: Case classification and clinical guidance. *Critical Care Explor*. 2020; Feb 22: e0081
2. Siegel DA, Jatlaoui TC, Koumans EH, et al. ; Lung Injury Response Clinical Working Group; Lung Injury Response Epidemiology/Surveillance Group. Update: Interim guidance for health care providers evaluating and caring for patients with suspected e-cigarette, or vaping, product use associated lung injury. *MMWR Morb Mortal Wkly Rep*. 2019; 68:919-927
3. Davidson K, Brancato A, Heetderks P, et al. Outbreak of electronic-cigarettes-associated acute lipid pneumonia- North Carolina, July-August 2019. *MMWR* September 13, 2019. 68(36); 784-84
4. Mannheim J, Grets S, Layden JE, Fricchione J. Characteristics of hospitalized pediatric COVID-19 cases- Chicago, Illinois, March-April 2020. *PIDS*. Downloaded from <https://academic.oup.com/jpids/advance-article-abstract/doi/10.1093/jpids/piaa070/5849922> by guest on 02 June 2020
5. Zachariah P, Johnson, CL, Halabi, KC, et al. Epidemiology, clinical features, and disease severity in patients with coronavirus disease 2019 (COVID-19) in a Children's Hospital in New York, New York. *JAMA Pediatrics*. 2020. doi: 10.1001/jamapediatrics.2020.2430
6. Kim D, Quinn J, & Pinsky B. Rates of co-infection between SARS-CoV-2 and other respiratory pathogens. *JAMA*. 2020 323(20): 2085-2086
7. Wu Q, Xing Y, Shi L, et al. Coinfection and other clinical characteristics of COVID-19 in children. *Pediatrics*. 2020:e20200961, doi: 10.1542/peds.2020-0961