



A Case Report of Vaping–Associated Pulmonary Injury: From Trendy Habit to Hemorrhagic Lung Injury

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Abstract

E-cigarette or vaping product use–associated lung injury (EVALI) is a potentially severe respiratory condition linked to harmful substances in vaping products. This case report describes a 17-year-old girl presenting with paroxysmal cough, hemoptysis, and shortness of breath, ultimately diagnosed with EVALI after initial reluctance to disclose vaping habits. Diagnostic workup included bronchoscopy and CT imaging, revealing minor bleeding and ground-glass opacities. Treatment with prednisolone led to full resolution. This report highlights the diagnostic challenges of EVALI as a diagnosis of exclusion, the importance of non-judgmental history-taking in adolescents, and the need for ongoing public awareness about vaping risks.

Keywords: *EVALI; vaping; adolescents; hemoptysis; lung injury; case report.*

Introduction

E-cigarette or vaping product use–associated lung injury (EVALI) is a severe respiratory illness caused by exposure to harmful constituents present in electronic cigarettes [1]. It was described in 2019 when more than 2800 hospitalized cases of EVALI were reported to the Centers for Disease Control and Prevention (CDC), including 68 associated deaths [2,3]. Patients younger than 35 years old account for nearly 80 percent of all EVALI cases [2]. Due to the variable clinical presentations of the disease, formal diagnostic criteria for EVALI have not yet been established. The variability in clinical presentations makes EVALI a diagnosis of exclusion and requires thorough anamnesis, especially among adolescents who may be reluctant to disclose their vaping habits [1]. This case report aims to present the case of a 17-year-old girl hospitalized due to EVALI and to emphasize the importance of obtaining a comprehensive medical history for establishing an accurate diagnosis.

Case Description

A 17-year-old girl was hospitalized because of paroxysmal cough, hemoptysis and shortness of breath. She had no fever and denied having any contact with infectious diseases or any unhealthy habits. During the physical examination, her oxygen saturation was 98% and auscultation of the lungs revealed symmetrical

breath sounds bilaterally. Laboratory tests did not show any inflammation or bleeding disorders. The chest X-ray exhibited solely increased hilar vascularity. The patient was consulted by an otorhinolaryngologist — no bleeding was observed. It was decided to perform a bronchoscopy, which revealed minor active bleeding from anterior basal segmental bronchus (B8) of the right lung (Fig. 1). A subsequent computed tomography (CT) scan displayed the tree-in-bud sign and ground-glass opacity zones in the right lung's inferior lobe (Fig. 2). Further anamnesis was obtained, and the girl admitted to occasionally vaping e-cigarettes. Molecular tests for various viruses and bacteria causing respiratory tract infections, including SARS-CoV-2 and acid-resistant bacteria, were negative. No bacterial growth was detected in the culture from the bronchoalveolar lavage fluid. Also, acid-fast bacteria were not identified by microscopy using Ziehl-Neelsen staining. Eventually, a conclusive diagnosis of vaping-associated pulmonary injury was made. The patient was prescribed prednisolone and discharged home 4 days after hospitalization. During the follow-up visit 2 months later, the patient had no complaints, and the CT performed at that time showed positive dynamics, with previously observed changes in the right lung no longer visible.

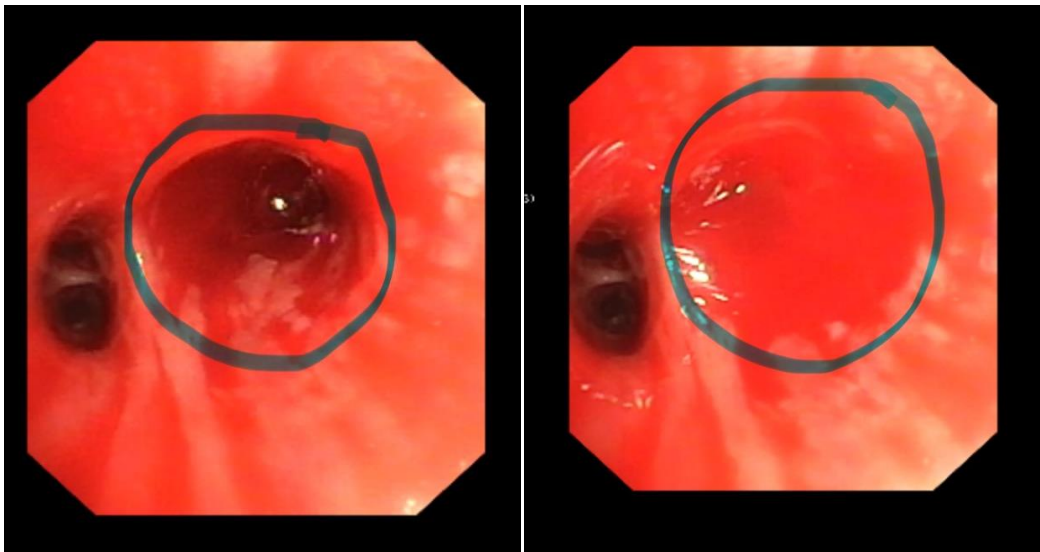


Fig. 1: Bronchoscopy demonstrating minor active bleeding from the anterior basal segmental bronchus (B8) of the right lung

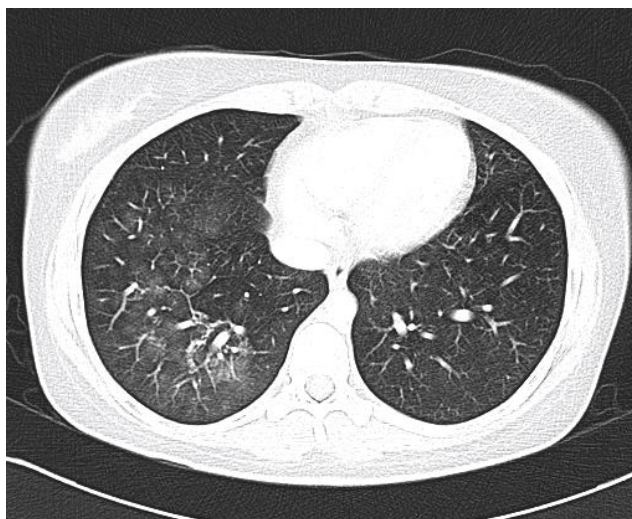


Fig. 2: Chest CT showing tree-in-bud opacities and ground-glass attenuation

Discussion

Although public awareness of the potential harms associated with e-cigarette use has increased, vaping remains a significant concern due to its continued widespread use, particularly among adolescents. Recent reviews, such as Alqahtani et al. (2025), highlight that despite the overall decline in cases following the 2019–2020 outbreak, EVALI continues to be reported [4].

Over the years, e-cigarettes have been refined to become more appealing and user-friendly. The current wide range of models, flavor options and the ability to use these devices discreetly, make them particularly attractive to young people, many of whom remain unaware that the cartridges often contain nicotine or other harmful substances [5]. Nicotine is a highly addictive stimulant that can negatively influence cardiovascular function and promote the development of dependence. In addition to nicotine, e-liquids typically contain a base of propylene glycol or vegetable glycerin, along with various flavorings and other additives [6,7].

In a comprehensive review, Amjad et al. (2025) analyzed current evidence on the potential harms of e-liquid components and their association with pulmonary complications, including EVALI. They noted that while propylene glycol and vegetable glycerin are generally considered safe for ingestion, their long-term effects on the respiratory system remain unclear. Propylene glycol may damage the delicate airway epithelium and impede cellular repair, whereas vegetable glycerin has been shown to alter normal nasal function, leading to thicker mucus that may increase the risk of inflammation and impaired airway clearance. Furthermore, the authors highlighted that many flavoring agents - though deemed safe for oral consumption - can induce cytotoxicity, promote the generation of reactive oxygen species and disrupt clearance mechanisms when inhaled. Vitamin E acetate, commonly used as a thickening agent in cannabis-containing e-liquids, has been

identified as a major contributor to the EVALI outbreak. When heated, it decomposes into toxic compounds such as ketene, alkene and benzene, which can damage lung tissue. Additionally, it disrupts the function of pulmonary surfactant, increasing surface tension, promoting inflammation, and contributing to lung injury [8]. Children and adolescents with EVALI can present with a wide spectrum of symptoms that often overlap with infections, environmental exposures or autoimmune disorders. Respiratory symptoms — such as cough, shortness of breath and chest pain — are most common, but gastrointestinal (nausea, vomiting, abdominal pain, diarrhea) and constitutional (fever, fatigue, chills, weight loss) symptoms are also frequent [9,10].

Our patient presented with shortness of breath, cough and hemoptysis, the latter being an uncommon but documented manifestation within the heterogeneous spectrum of EVALI presentations. Increasing evidence suggests that diffuse alveolar hemorrhage (DAH) can occur as a consequence of vaping, highlighting the potential for severe pulmonary injury associated with e-cigarette use [11,12]. Physical findings may include tachypnea and hypoxia, while laboratory results are nonspecific, sometimes showing elevated inflammatory markers and leukocytosis. Symptoms typically develop within 90 days of e-cigarette or vaping product use [9].

Careful, non-judgmental patient interviewing is essential, as some adolescents, particularly those using tetrahydrocannabinol (THC) or cannabidiol (CBD) products, may be reluctant to disclose their vaping history. In this case, the patient was interviewed multiple times, including without parental presence, and eventually admitted to occasional vaping. It is recommended that patient interviews include detailed information about the type of vaping device used, the substances consumed, the frequency of use and the source of the e-cigarette or vaping products [10].

Computed tomography can assist in the evaluation of patients with suspected EVALI, as characteristic imaging patterns have been described in the literature. Typical CT findings include ground-glass opacities, consolidation, subpleural sparing, septal thickening and patchy infiltrates [13,14]. Although these features can support the diagnosis, EVALI remains a diagnosis of exclusion. CT may also be useful for follow-up, as studies have shown that most radiologic abnormalities gradually resolve over time [14,15]. This pattern was also observed in our patient.

Conclusion

EVALI remains a diagnosis of exclusion that requires a thorough clinical assessment and repeated, non-judgmental patient interviews to obtain an accurate vaping history. This case highlights the importance of detailed anamnesis, as adolescents may initially withhold information about e-cigarette use. Continued education and awareness are essential, as vaping persists among young people despite known health risks.

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