



Severe Chemical Pneumonia in a Young Patient Due to Electronic Cigarette Use: A Case Report

Ian Caldeira Ruppen^{1*} , Haloany Maola Chitolina¹, Júlia Fernanda Taveira de Souza¹, Lara Beatriz Dallaqua Bitiati¹, Tauane Cano Barreto¹, Alan Henrique de Oliveira Torchi¹, Náyra Thais Afonso Sella¹, Larissa da Rosa Piccoli¹, Adecris Santin², Luka Valcarengi Pannebecker¹, Poliana Zara Carvalho², Rafaela Witte², Fernando De Oliveira Dutra Filho², Adriano Gustavo Lourenson¹, Camila Karoline de Mello¹

¹Centro Universitário Ingá – Uningá, Maringá, PR, Brazil.

²Faculdade Cesumar - Unicesumar Maringá, Paraná, Brazil.

Correspondence to: Ian Caldeira Ruppen, Centro Universitário Ingá - Uningá, Maringá, Paraná, Brazil. E-mail: Ian2ruppen@gmail.com

Received date: February 05, 2026; **Accepted date:** February 13, 2026; **Published date:** February 20, 2026

Citation: Ruppen IC, Chitolina HM, Taveira de Souza JF, et al. Severe Chemical Pneumonia in a Young Patient Due to Electronic Cigarette Use: A Case Report. *J Med Res Surg.* 2026;7(1):13-15. doi:10.52916/jmrs264197

Copyright: ©2026 Ruppen IC, et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

ABSTRACT

The growing popularity of electronic cigarettes among adolescents and young adults raises concerns regarding their respiratory repercussions. This report describes the case of a 14-year-old male patient who developed severe chemical pneumonia associated with frequent use of electronic cigarettes and hookah. The patient presented with productive cough, hemoptysis, weight loss, and fatigue, progressing to the need for Intensive Care Unit (ICU) hospitalization. Chest computed tomography revealed extensive pulmonary consolidation, ground-glass opacities, and pleural effusion. Infectious causes were ruled out, and treatment included empirical antibiotic therapy, ventilatory support, and multidisciplinary follow-up. The clinical and radiological evolution was favorable. This case reinforces the association between the use of electronic smoking devices and the risk of severe lung injury, especially among younger individuals, highlighting the importance of preventive actions, regulatory policies, and long-term monitoring to prevent irreversible respiratory complications.

Keywords:

Chemical Pneumonia; Electronic Cigarettes; Pleural Effusion, Computed Tomography (CT).

Introduction

In recent years, electronic cigarettes have gained popularity as an alternative to conventional smoking. Although often promoted as less harmful, alarming evidence suggests that their use can cause serious lung damage, including chemical pneumonia. This condition is characterized by lung inflammation caused by the inhalation of toxic agents present in aerosols. Among the suspected components are vitamin E acetate, used as a thickener in liquids containing Tetrahydrocannabinol (THC), and other chemical additives. These compounds can trigger acute inflammation, damage the lung epithelial barrier, and impair respiratory function. Clinical cases show patients with symptoms such as cough, dyspnea, and chest pain, often accompanied by radiological findings of ground-glass opacities, which are common in severe inflammatory conditions. The severity of the reported cases and the growing prevalence of this practice justify a deeper analysis of the health risks associated with electronic cigarette use.

Objective

This study aims to report the clinical case of a young patient with chemical pneumonia associated with the use of electronic cigarettes and hookah.

Case Report

A 14-year-old male student presented to the emergency

department with a two-month history of persistent productive cough, weight loss (6 kg), chest pain, fatigue, and a single episode of hemoptysis. He reported daily use of electronic cigarettes and frequent hookah use. He denied any other comorbidities or relevant medical history. The patient was admitted to the Intensive Care Unit (ICU) on 11/04/2024 due to the severity of his condition. On admission, he was conscious, hypotensive, and required oxygen therapy via nasal cannula at 3 L/min, alternating with Non-Invasive Ventilation (NIV). Initial serological tests ruled out infections such as HIV, syphilis, and hepatitis. Chest CT at admission showed extensive consolidation in the right lower lobe, with adjacent ground-glass opacities, suggesting an inflammatory/infectious process. Empirical antibiotic therapy with ceftriaxone 2 g once daily was initiated, considering associated bacterial pneumonia as guided by the infectious disease team. A follow-up CT scan on 11/07/2024 revealed extensive consolidation with air bronchograms in the right lower lobe, mild right pleural effusion, and small ground-glass foci in the left lung, supporting a diagnosis of extensive lobar pneumonia with secondary inflammatory lung injury. After three days in the ICU, a new CT scan showed significant radiological improvement, with resolution of the pleural effusion and identification of a small non-calcified subpleural nodule (6 mm), suggestive of a residual lymph node. Further evaluations by pulmonology and thoracic surgery confirmed a likely diagnosis of chemical pneumonia induced by frequent use of electronic cigarettes and hookah. The patient progressed favorably and was transferred to the general ward after seven days in the ICU. He was conscious, hemodynamically stable,

breathing spontaneously in room air, eating orally with good acceptance, and showing progressive symptom improvement. He received intensive multidisciplinary support, including respiratory physiotherapy. He was discharged on the 11th

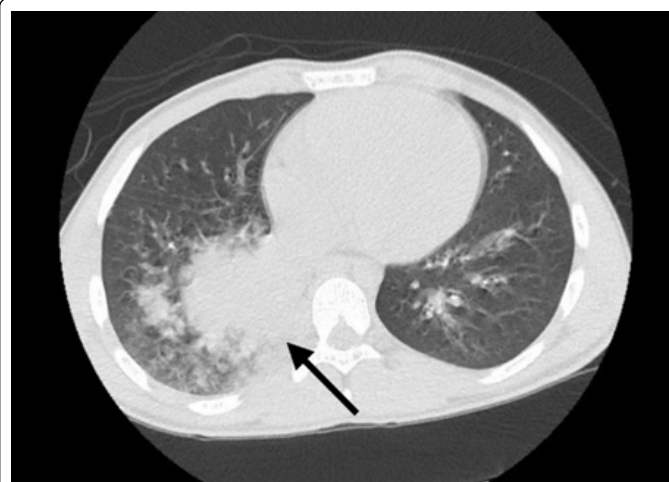


Figure 1: Admission CT-ICU: Consolidative opacity affecting the right lower lobe, with adjacent ground-glass opacities.

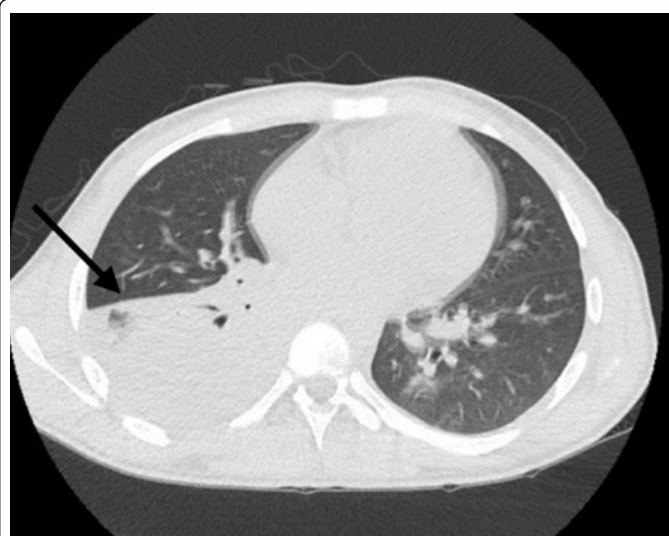


Figure 2: CT scan on day 4 of hospitalization: Small right pleural effusion. Extensive consolidation with air bronchograms in the right lower lobe.

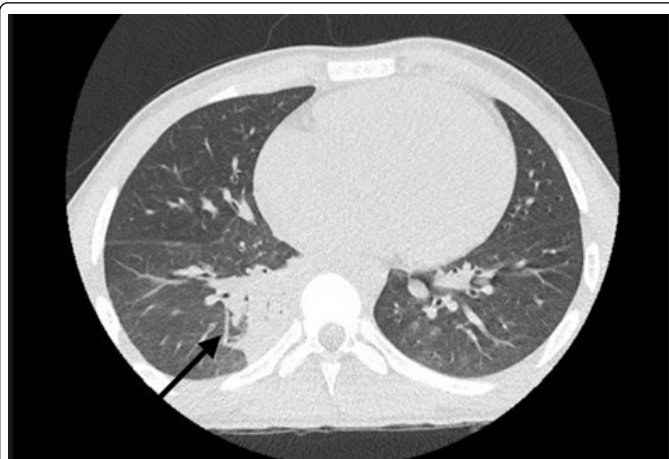


Figure 3: CT scan on day 6 of hospitalization: Non-calcified subpleural nodule in the right lower lung lobe, 6 mm, suggestive of a small lymph node.

day of hospitalization with recommendations for outpatient pulmonology follow-up for at least one year due to the potential risk of pulmonary sequelae. Strict instructions were given to discontinue all use of electronic smoking devices to prevent recurrence and future pulmonary complications.

Discussion

This case highlights a severe presentation of chemical pneumonia associated with electronic cigarette and hookah use in an adolescent, reinforcing concerns about vaping-related lung injury in young populations. Although often perceived as a safer alternative to traditional smoking, electronic cigarettes have been increasingly linked to acute and severe pulmonary complications, even in previously healthy individuals. The patient's clinical course, characterized by progressive respiratory symptoms, hemoptysis, and the need for intensive care, is consistent with reports of E-Cigarette Or Vaping Product Use–Associated Lung Injury (EVALI). Imaging findings such as extensive consolidation, ground-glass opacities, and pleural effusion align with commonly described radiological patterns in vaping-related lung injury and reflect significant inflammatory involvement of the lung parenchyma.

The pathogenesis of vaping-associated chemical pneumonia is multifactorial and involves exposure to toxic substances present in aerosols, including aldehydes, heavy metals, and lipid-based additives such as vitamin E acetate. These agents can induce direct epithelial injury and trigger intense inflammatory responses. In this case, the exclusion of infectious etiologies and the clear history of frequent vaping strongly support a diagnosis of chemically induced lung injury.

Management is primarily supportive, with oxygen therapy, ventilatory support when necessary, and empirical antibiotics until infectious causes are excluded. The favorable clinical and radiological evolution observed after cessation of electronic cigarette use emphasizes the importance of early recognition and prompt intervention. However, given the uncertainty regarding long-term pulmonary sequelae, prolonged follow-up is recommended, particularly in pediatric and adolescent patients.

Overall, this case reinforces the potential severity of vaping-related lung injury and highlights the need for increased awareness among healthcare professionals, as well as preventive strategies and regulatory measures to reduce electronic cigarette use among adolescents.

Conclusion

The reported case highlights the harmful effects of electronic cigarette use on respiratory health, particularly among young individuals, and the potential development of chemical pneumonia. Exposure to compounds such as vitamin E acetate, formaldehyde, and acrolein is directly linked to the onset of severe lung injury. Despite advances in the understanding of the pathophysiology and management of this condition, challenges remain in the regulation of vaporizer products and in raising public awareness about the associated risks.

Conflict of Interest

The authors declared no conflict of interest

Funding

None.

References

1. Breland A, Soule E, Lopez A, et al. The emerging phenomenon of EVALI. *J Pulm Med*. 2022;12(3):20-30.
2. Blount BC, Karwowski MP, Shields PG, et al. Vitamin E acetate in bronchoalveolar-lavage fluid associated with EVALI. *N Engl J Med*. 2019;382(8):697-705.
3. Chun LF, Moazed F, Calfee CS, et al. Pulmonary toxicity of e-cigarettes. *Am J Physiol Lung Cell Mol Physiol*. 2017;313(2):L193-L206.
4. Crotty Alexander LE, Drummond CA, Hepokoski M, et al. Vaping and lung inflammation. *Am J Physiol Lung Cell Mol Physiol*. 2021;320(5):L662-L673.
5. Ghinai I, Pray IW, Navon L, et al. Characteristics of persons hospitalized with EVALI. *N Engl J Med*. 2020;382(10):903-916.
6. Glantz SA, Bareham DW. E-cigarettes: Use, effects, and associated risks. *Am J Public Health*. 2018;108(6):850-855.
7. Gotts JE, Jordt SE, McConnell R, et al. What are the respiratory effects of e-cigarettes? *BMJ*. 2019;366:l5275.
8. Hess CA, Olmedo P, Navas-Acien A, et al. Public health concerns and regulatory issues regarding e-cigarettes. *Annu Rev Public Health*. 2020;41:181-203.
9. Kaur G, Pinkston R, McLemore B, et al. Current perspectives on the impact of e-cigarettes on lung health. *Toxicol Appl Pharmacol*. 2018;359:101-107.
10. Kligerman S, Raptis C, Larsen B, et al. Imaging of vaping-associated lung injury. *Radiology*. 2020;297(1):198-199.
11. McNeill A, Brose LS, Calder R, et al. Evidence review of e-cigarettes and heated tobacco products 2021. Public Health England; 2021.
12. Moritz ED, Zapata LB, Lekachvili A, et al. Update: Characteristics of patients in EVALI outbreak. *MMWR Morb Mortal Wkly Rep*. 2020;69(1):90-94.
13. Shahab L, Goniewicz ML, Blount BC, et al. Nicotine, carcinogen, and toxin exposure with e-cigarettes. *Ann Intern Med*. 2017;166(6):390-400.