

**Title:** Vaping-related pneumomediastinum in the younger patient population

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**Introduction:** Herein, we describe a case of a young patient presenting with pneumomediastinum (PM) associated with vaping use. PM is due to air leaking within the mediastinal tissues that can travel to associated structures, often classified as spontaneous or traumatic. PM is an uncommon complication of asthma and often presents with acute chest pain or shortness of breath.<sup>1</sup> While relatively rare, it is more common in infancy or adolescence and can present with subcutaneous emphysema.<sup>2</sup> Of the most common risk factors is asthma exacerbations, and a relatively new risk factor is infection with Covid-19.<sup>3,4</sup> As the air leak progresses, it can cause complications such as pneumopericardium, pneumomediastinum, or even pneumorrhachis; sometimes leading to tension physiology.<sup>5</sup> With the rise of vaping and e-cigarette use amongst the younger population in the United States, there are data suggesting this is an independent risk factor for PM.<sup>6,7</sup>

**Case description:** 18-year-old man with past medical history of asthma and ADHD presented with abrupt onset shortness of breath (SOB) preceded by three days of upper respiratory symptoms. The acute SOB awoke him from sleep and was associated with pleuritic chest wall and back pain. He began hourly albuterol nebulizers at home without improvement in his symptoms, at which point he presented to the emergency department. He had no recent allergen exposures, ill-contacts, recent travel, or new pets. Initial exam was consistent with an asthma exacerbation with the addition of supraclavicular crepitus. Chest x-ray and CT chest confirmed the presence of a PM extending up to his neck base. He was monitored for 48 hours while undergoing treatment for asthma exacerbation with steroids and regular nebulizer treatments. A repeat x-ray on day of discharge showed near-resolution of the PM and he was discharged with PCP and pulmonology follow-up.

#### **Discussion:**

This case demonstrates that what was once a relatively rare diagnosis of PM is slowly becoming more prevalent in the light of new risk factors. One 2022 survey demonstrated that in the United States, e-cigarettes are used by up to 14% of high school students and more than 3% of middle school students.<sup>8</sup> One explanation of why vaping may increase the risk of PM is that one has to inhale more forcefully than with a traditional cigarette, thus causing greater changes in intrathoracic pressures.<sup>7</sup> For uncomplicated cases, treatment is often supportive. As vaping and e-cigarette use is becoming more common in younger patients, providers need to have a high index of suspicion for PM when a patient presents to the hospital with cardiopulmonary symptoms.

#### **Sources:**

1. Yellin A, Gapany-Gapanavicius M, Lieberman Y. Spontaneous pneumomediastinum: is it a rare cause of chest pain? *Thorax*. 1983;38(5):383-385.
2. Stack AM, Caputo GL. Pneumomediastinum in childhood asthma. *Pediatr Emerg Care*. 1996;12(2):98-101.
3. Wong KS, Wu HM, Lai SH, Chiu CY. Spontaneous pneumomediastinum: analysis of 87 pediatric patients. *Pediatr Emerg Care*. 2013;29(9):988-991.
4. Chowdhary A, Nirwan L, Abi-Ghanem AS, et al. Spontaneous Pneumomediastinum in Patients Diagnosed with COVID-19: A Case Series with Review of Literature. *Acad Radiol*. 2021;28(11):1586-1598.
5. Belotti EA, Rizzi M, Rodoni-Cassis P, Ragazzi M, Zanolari-Caledrerari M, Bianchetti MG. Air within the spinal canal in spontaneous pneumomediastinum. *Chest*. 2010;137(5):1197-1200.
6. Adhikari R, Manduva D, Malayala SV, et al. A Rare Case of Vaping-Induced Spontaneous Pneumomediastinum. *Cureus*. 2021;13(8):e171166.
7. Burgwardt S, Huskic A, Schwartz G, Mason DP, Tapias L, Podgaetz E. Spontaneous pneumomediastinum secondary to electronic cigarette use. *Proc (Bayl Univ Med Cent)*. 2020;33(2):229-230.
8. Park-Lee E, Ren C, Cooper M, Cornelius M, Jamal A, Cullen KA. Tobacco Product Use Among Middle and High School Students - United States, 2022. *MMWR Morb Mortal Wkly Rep*. 2022;71(45):1429-1435.