



A CASE REPORT ON VAPING ASSOCIATED SPONTANEOUS PNEUMOTHORAX

Internal Medicine

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ABSTRACT

The association between vaping and spontaneous pneumothorax (SP) represents a relatively novel concept in pulmonary medicine. Emerging evidence suggests that vaping alone may precipitate spontaneous pneumothorax. Several case reports have documented this phenomenon, indicating an evolving understanding of its etiological role. Pneumothorax is defined as the accumulation of air within the pleural cavity, leading to dyspnea and thoracic pain. While tobacco smoking and cannabis use are long established risk factors for SP, vaping has recently surfaced as an additional risk factor of concern [1]. We present a case involving a 35-year-old physically fit Caucasian male who presented to the emergency department with acute dyspnea and right-sided pleuritic chest pain, accompanied by referred pain in the back. A chest X-ray revealed a right-sided pneumothorax with an apical pleural gap measuring 2.5 cm. The patient had no significant past medical history and did not exhibit any marfanoid features. Given his stable clinical condition, a chest drain was deemed unnecessary. This case highlights vaping as a potential emerging cause of pulmonary injury [2]. The association between vaping and spontaneous pneumothorax warrants further investigation, particularly given the high recurrence rate of SP in such cases. Early intervention, including thoracostomy and surgical options, is crucial in severe presentations to mitigate recurrence.

KEYWORDS

Spontaneous pneumothorax, Vaping, Pulmonary Injury

INTRODUCTION

The use of electronic nicotine delivery devices (ENDDs), commonly referred to as "vaping," has gained significant popularity, particularly among individuals aged 18 to 34. Several case reports have emerged indicating that vaping may be a potential risk factor for spontaneous pneumothorax (SP) [3]. In this article, we present a case of a 35-year-old Caucasian male who presented with chest pain and dyspnoea following extensive vaping the previous day.

**Figure 1:** Right-sided Apical Pneumothorax**Figure 2:** Resolved Pneumothorax

CASE STUDY

A 35-year-old Caucasian male presented to the emergency department with complaints of dyspnoea, chest pain and associated back pain. He reported a history of vaping and had a body mass index (BMI) of 23. The patient had no significant past medical history, nor was there any personal or familial history of Marfan syndrome. He denied any history of smoking and consumed approximately six units of alcohol weekly.

Upon examination, his initial vital signs were as follows: respiratory rate 16 breaths per minute, blood pressure 147/85 mmHg, pulse 64 beats per minute, oxygen saturation (SpO₂) 99%, and temperature 36.5°C. Auscultation revealed mildly decreased breath sounds on the right side, although chest expansion was symmetrical.

A chest X-ray was performed, revealing a right-sided apical pneumothorax measuring 2.5 cm. An electrocardiogram (ECG) demonstrated normal sinus rhythm, and routine blood investigations returned within normal limits. Given the patient's stable clinical condition, surgical intervention was deemed unnecessary; however, he was observed for 24 hours.

Following observation, the patient was safety netted and discharged with recommendations to cease vaping, avoid aerobic exercises, and rest for one week. He was advised against flying for the next three months, and a follow-up X-ray was scheduled for two weeks later. The repeat X-ray indicated complete resolution of the pneumothorax, and the patient reported feeling well with full symptom resolution.

CONCLUSIONS

This case report highlights the rare yet significant association between vaping and spontaneous pneumothorax, underscoring the need for public education regarding the risks associated with vaping. Early interventions, such as thoracostomy and the placement of a chest drain, can mitigate the risk of recurrence, making appropriate follow-up essential for patient outcomes.

DISCUSSION

Given the absence of significant past medical history, a lack of smoking history, and no personal or familial history of Marfan syndrome, we concluded that the spontaneous pneumothorax was associated with the patient's vaping habits. Although the precise pathophysiology underlying this association remains unclear, recent case reports have documented similar links.

In this case, surgical intervention was not required; however, in severe instances, procedures such as thoracostomy may be indicated. The risk

of recurrence is notably high with vaping-associated spontaneous pneumothorax (VASP), making timely surgical intervention critical to prevent further episodes [4,5].

Follow-up X-rays are vital for verifying complete resolution of the condition, while computed tomography (CT) scans may be required to exclude the presence of blebs in the lung parenchyma, as these could increase the patient's risk of subsequent pulmonary injury [6]. Inhalation of flavoured chemicals may introduce various toxic agents, such as 2, 3-butanedione and 2, 3-pentadiene, which can adversely affect the transcriptional profile of primary human bronchial epithelial cells. This exposure can result in phenotypic alterations, including compromise the building of the cell's antenna (primary cilia) or extracellular fluid mediation mechanism (motile cilium) [7]. When vaping, individuals may employ various respiratory techniques to optimize the delivery of vaporized substances, which could influence the risk of developing vaping-associated spontaneous pneumothorax (VASP). Techniques that incorporate the Valsalva maneuver, such as deep inhalation followed by forceful exhalation, can lead to increased positive pressure in the distal airways. This elevated pressure may heighten the risk of complications such as pneumothorax, particularly in those with preexisting pulmonary conditions [10].

Repetitive deep inhalation through devices with high resistance, such as water pipes or pod-based e-cigarettes, may mimic the Müller maneuver, resulting in a significant negative intrathoracic pressure. This physiological change can potentially lead to the development of spontaneous pneumothorax. This maneuver involves a voluntary inspiratory effort against a closed mouth and obstructed nasal passages, which may exacerbate the risk of lung injury in susceptible individuals. Further investigation is warranted to elucidate the pathophysiological processes involved and to assess the implications for respiratory health in the context of vaping and other inhalation methods [8,9].

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