

# A case of acute lung injury due to an e-cigarette

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## Introduction

Although considered to be by some as a safer alternative to smoking, electronic cigarettes (e-cigarettes) are associated with significant, even life-threatening, complications; for example, e-cigarette or vaping product use-associated lung injury (EVALI) especially in older patients with pre-existing respiratory and cardiovascular comorbidities.<sup>1–3</sup> We present an interesting case of a patient who was admitted with confusion, fever, cough and breathlessness with raised inflammatory markers and bilateral radiologic abnormalities on chest imaging.

## Case presentation

A woman aged in her 40s presented with 1-week history of fever, cough, shortness of breath and confusion. She was normally fit and well with past medical history of asthma, anxiety and Lown–Ganong–Levine syndrome. Her usual medications included salbutamol metered dose inhaler and sertraline. There was no history of recent travel, flu-like illness, use of recreational drugs or trauma. In the previous few months, she had started to vape an e-cigarette and she drank alcohol in moderation. On examination, she was alert but confused with no focal neurology and no signs of meningism. Chest auscultation revealed bilateral crackles. The rest of the examination was normal. Chest X-ray showed widespread, bilateral pulmonary infiltrates, consisting of a mixture of ill-defined and nodular opacities (Fig 1). Routine blood tests showed raised inflammatory markers with C-reactive protein (CRP) of 161 mg/L, white cell count of  $11.3 \times 10^9/L$  and neutrophil count of  $9.3 \times 10^9/L$ . There was patchy bilateral consolidation involving all the lobes in the computed tomography (CT) of the chest (Fig 2) along with enlarged bilateral hilar and mediastinal nodes. CT of the head, magnetic resonance imaging of the head and CT of the abdomen and pelvis were nil acute. Blood and urine culture had no growth. Viral respiratory panel; chlamydia; mycoplasma serology; anti-HIV antibodies; pneumococcal and *Legionella* urinary antigen; and vasculitic and connective tissue disease screens were all negative. Electrocardiography and 2D echocardiography were within normal limits. The patient was started on broad spectrum antibiotics and high-dose oral prednisolone with rapid clinical improvement. Repeat chest imaging was done after 2 weeks of onset of symptoms and this showed that the lungs were clear, with preserved volume and satisfactory mediastinal and hilar shadows.

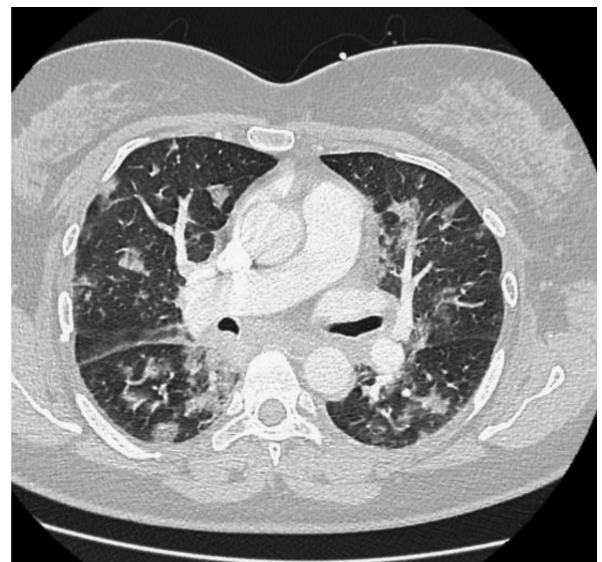
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**Fig 1.** Posteroanterior X-ray of the chest.

## Results

Although EVALI is a diagnosis of exclusion, rapid resolution of symptoms and radiological findings with high-dose corticosteroids and ruling out alternative diagnoses confirmed the diagnosis of EVALI.



**Fig 2.** Axial computed tomography of the chest.

## Conclusion

Due to variable presentation of EVALI, there is no consensus regarding its diagnostic criteria.<sup>4,5</sup> Case definition stipulates that, to diagnose EVALI, there should be a history of use of an e-cigarette in the previous 90 days along with lung opacities on chest imaging, exclusion of lung infection based on negative influenza PCR, viral respiratory panel and urine antigen tests for *Legionella* and *Streptococcus pneumoniae*, blood cultures, sputum culture, bronchoalveolar lavage and testing for HIV-related opportunistic infections and absence of a likely alternative diagnosis (eg cardiac, neoplastic or rheumatologic).<sup>6</sup> Even though underlying pathogenesis of EVALI remains elusive, multiple potential toxins have been highlighted including vitamin E acetate, tetrahydrocannabinol, nicotine and others.<sup>7,8</sup> Risk factors for more severe disease include obesity, increasing age, history of asthma and cardiac disease.<sup>3</sup> Due to widespread usage of e-cigarettes, clinicians should be vigilant regarding this serious respiratory illness that can be life threatening.<sup>9,10</sup> ■

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