

E-pipe use leading to lipoid pneumonia in Europe

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CASE

A 53-year-old, so far healthy woman was admitted to the emergency department due to increasing cough and dyspnoea. Four days before presentation, the general practitioner initiated an outpatient treatment with amoxicillin/clavulanic acid due to the clinical and radiological suspicion of a bilateral, community-acquired pneumonia. Apart from escitalopram and oestrogen containing hormone replacement therapy, she did not use any medication. She had no pets or humidifier and worked as a saleswoman in a gift shop.

Three weeks before admission, she switched from conventional cigarettes to commercial available electronic pipe (nicotine content 4 mg/mL, taste of pipe tobacco and refillable tank). She performed inhalations approximately 4–5 times per day. She denied using cannabinoid-containing liquids and was no dual user. Ten days after starting consuming the electronic pipe, the patient suffered from dry cough and dyspnoea when hurrying upstairs.

On admission, the patient was in a good health state, afebrile and with normal vital signs. Oxygen saturation was 91% on room air. Laboratory testing revealed the following: C reactive protein of 3.6 mg/L (reference <5 mg/L), normal haematogram including differential count, electrolytes, liver enzymes, brain natriuretic peptide (BNP) and serum creatinine. Testing for HIV, ANA/ANCA, parasites and a nasopharyngeal swab for atypical bacteria and respiratory viruses (PCR) including influenza was negative. CT scan showed bilateral consolidations with mild ground glass opacities (figure 1). Bronchoalveolar lavage revealed a lymphocytic alveolitis (total cell count 800/μL, 37% lymphocytes (CD4/8 ratio 5), 32% macrophages, 18% eosinophils and 12% neutrophils). Testing for *Pneumocystis jirovecii* including PCR for *Mycobacterium tuberculosis complex* and bacterial/fungal cultures were negative. Transbronchial biopsies of the lower right field showed focal airspace accumulation of lipid droplets of different sizes with adjacent proliferated alveolar macrophages, discrete lymphocytic infiltrates and few fibroblastic foci (figure 2A and B). Because the case fulfilled the criteria of e-cigarette or vaping associated lung injury (EVALI)—that is, pulmonary infiltrates in the absence of an infection, vaping within 90 days, no evidence for an alternative diagnosis or agents predisposing to the aspiration of lipids like nose droplets—a diagnosis of vaping-induced lipoid pneumonia was made. Under a tapering treatment with prednisolone (0.5 mg/kg body weight) over 3 months and abstinence from vaping, the patient fully recovered with resolution of the



Figure 1 Chest CT scan revealing bilateral consolidations with diffuse ground glass opacities in all lung field.

radiological findings. Diffusion capacity improved from initially 88% to 104% predicted.

There is increasing evidence about the harm of e-cigarettes or e-pipes.¹ E-cigarettes or e-pipes are battery-operated devices that heat a liquid and deliver aerosolised product to the user. No single causative agent of EVALI has been identified; vitamin E acetate has emerged as a substance of interest.² In the US case series, 94% of cases reported vaping tetrahydrocannabinol (THC) in the days before, or THC or its metabolites were detected in the bronchoalveolar-lavage fluid. This led to a focus on THC containing vaping products in the USA.¹ In our case, EVALI occurred in the absence of THC use highlighting the general health

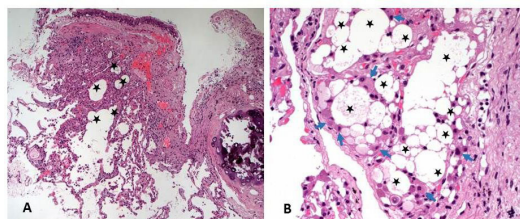


Figure 2 (A) Transbronchial lung biopsy showing intra-alveolar optically empty vacuoles corresponding to lipid droplets (asterisk) adjacent to normal alveolar airspaces (H&E, 100 x). (B) Empty vacuoles (asterisk) surrounded by partly vacuolated macrophages (arrows) (H&E, 400 x).



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issues around e-cigarettes fluids, which contain different toxic compounds (eg, nicotine, volatile organic compounds and particles). An explanation for acute lipoid pneumonia could be the inhalation and deposition of aerosolised oil droplets in the distal airways and alveoli leading to a chemical pneumonitis. This case further illustrates that EVALI can occur even after only a few weeks of vaping. To our knowledge, this is the first case of a native European patient developing EVALI after consuming a commercial available e-pipe after only a short period of vaping.³

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