

Allergic contact dermatitis and electronic cigarettes: Is nickel to blame?

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An electronic cigarette is a handheld device designed for inhalant delivery of nicotine through an aerosol, usually consisting of propylene glycol, nicotine, and flavourings.¹ Electronic cigarettes have become popular as a potential alternative to help with smoking cessation.² Recent reports have described cases of allergic contact dermatitis (ACD) caused by nickel resulting from the use of an electronic cigarette.^{3,4}

CASE REPORT

A 38-year-old female reported a 6-month history of itchy erythematous dermatitis on both hands. She was not known to be allergic to nickel. There was no personal or familial history of atopy. Clinical examination showed erythematous, scaly dermatitis, with lichenification on both hands (Figure 1). The patient was patch tested

with the Portuguese baseline series of contact allergens (Chemotechnique Diagnostics, Vellinge, Sweden) in addition to her personal products. Following 2 days of occlusion, the tests were read on day (D) 4 and D7, according to ESCD guidelines.⁵ A positive reaction (++) was seen to nickel 5% pet. On further questioning, the patient reported using an electronic cigarette around the time of onset of the hand dermatitis. Testing of the electronic cigarette device with a dimethylglyoxime (DMG) nickel spot test did not show a positive reaction. However, the patient reported spilling the vaping liquid Cigavapor on her hands (Supporting Information Figure S1). This contains a herbal extract, glycerin, and propylene glycol. Further patch tests were performed with the vaping liquid Cigavapor "as is," propylene glycol 5% pet., glycerin "as is," and a fragrance and a plant series (Chemotechnique Diagnostics). A positive reaction (+++) was seen only to vaping liquid Cigavapor "as is" (Figure 2). We contacted the e-liquid manufacturer, who provided the technical file for the e-liquid



FIGURE 1 Erythematous, scaly lesions with lichenification affecting the patient's right hand



FIGURE 2 Positive patch test reaction to vaping liquid Cigavapor "as is" (+++)

(Supporting Information Table S1). Unfortunately, the manufacturer refused to ship the ingredients to be tested separately. Despite this, we had already tested some of the ingredients of the e-liquid, namely propylene glycol 5% pet., glycerin “as is,” vanillin 10% pet., and citronellol 1% pet. (fragrance series), which did not give positive results. Additionally, we tested menthol 2% pet. from the bakery series (Chemotechnique Diagnostics). The patient reacted strongly (+++) to menthol on D4. Notwithstanding the nickel sensitization of the patient and the possibility of a false-negative DMG test reaction, the distributional pattern supported the diagnosis of ACD caused by the e-liquid. Among the ingredients of the e-liquid Cigavapor available for testing, we identified menthol as the probable culprit agent.

DISCUSSION

The use of electronic cigarettes has increased rapidly in recent years. Contact dermatitis caused by nickel resulting from the use of electronic cigarettes could become increasingly common. Therefore, it is important for clinicians to recognize these devices as potential sources of nickel. Moreover, it should be noted that the liquids used in refillable electronic cigarette devices (e-liquid) contain several ingredients.⁶ Approximately 8000 flavours are known to exist in e-liquids,⁷ many of which may be potential contact sensitizers,⁸ as we have shown with this case of ACD caused by menthol flavouring. Clinicians should be aware of e-liquids as potential allergens.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of this article.

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Zero

www.dekangbio.com

Frut mix
0mg/ml
de nicotina



www.cigavapor.com



Líquido
para
Cigarro Eletrónico



10ml

Component name	% of weight	CAS number	EC number
Propylene glycol	60.0	57-55-6	200-338-0
Glycerin	20.0	56-81-5	200-289-5
Alcohol	5.0	64-17-5	200-578-6
L-Malic Acid	3.0	97-67-6	202-465-2
Vanillin	2.5	121-33-5	204-465-2
3-Methyl-1,2-cyclopentanedione	2.5	765-70-8	212-154-8
Acetylpyrazine	1.5	22047-25-2	244-753-5
2,3,5,6-Tetramethylpyrazin	1.5	1124-11-4	214-391-2
Menthol	1.0	89-78-1	201-939-0
Ethyl maltol	1.0	4940-11-8	225-582-5
Ethyl acetate	0.5	141-78-6	205-500-4
2- Methylbutyric acid	0.5	116-53-0	204-145-2
Citronellol	0.3	106-22-9	203-375-0
2,3,5-Trimethyl Pyrazine	0.3	14667-55-1	238-712-0
Damascenone	0.2	23696-85-7	245-833-2
2-Acetylpyridine	0.2	1122-62-9	214-355-6

Table 1. Composition, information on ingredients. In bold – ingredients available for testing.