



Allergic contact dermatitis caused by elastic bands of an N95 mask

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CASE REPORT

A 29-year-old woman, Fitzpatrick phototype II, with a personal history of atopy, presented with face and neck dermatitis lasting 6 months. During the past year, she worked as a nurse in a coronavirus disease 2019 (COVID-19)-dedicated ward of a tertiary hospital. The dermatitis had developed since she started wearing N95 masks. She referred to using two N95 masks, with similar symptoms: 3M Aura 9320+ N95 mask (3M, Saint Paul, MN, USA) and Halyard Fluidshield Surgical N95 Respirator Mask (Halyard Health, Alpharetta, GA, USA). She also mentioned a history of contact-hypersensitivity reactions to metals and leather shoes for several years.

Physical examination exhibited linear erythematous and edematous plaques distributed along the contact area of the elastic bands of the N95 mask on the cheek and neck (Figure 1A).

Patch tests were carried with the Portuguese Group for the Study of Contact Dermatitis (GPEDC) baseline series (Chemotechnique Diagnostics, Vellinge, Sweden), a rubber additives series (Chemotechnique Diagnostics), and the elastic bands of the two N95 masks “as is” (Figure 1 B–C). The patch tests were applied to the upper back and occluded for 48 hours. Readings were performed on day (D)2 and D4, according to the recommendations of the ICDRG. On day D2 and D4, positive reactions were observed to the elastic band of the 3M Aura 9320+ (++) (Figure 1D), mercapto mix (++) , 2-mercaptobenzothiazole

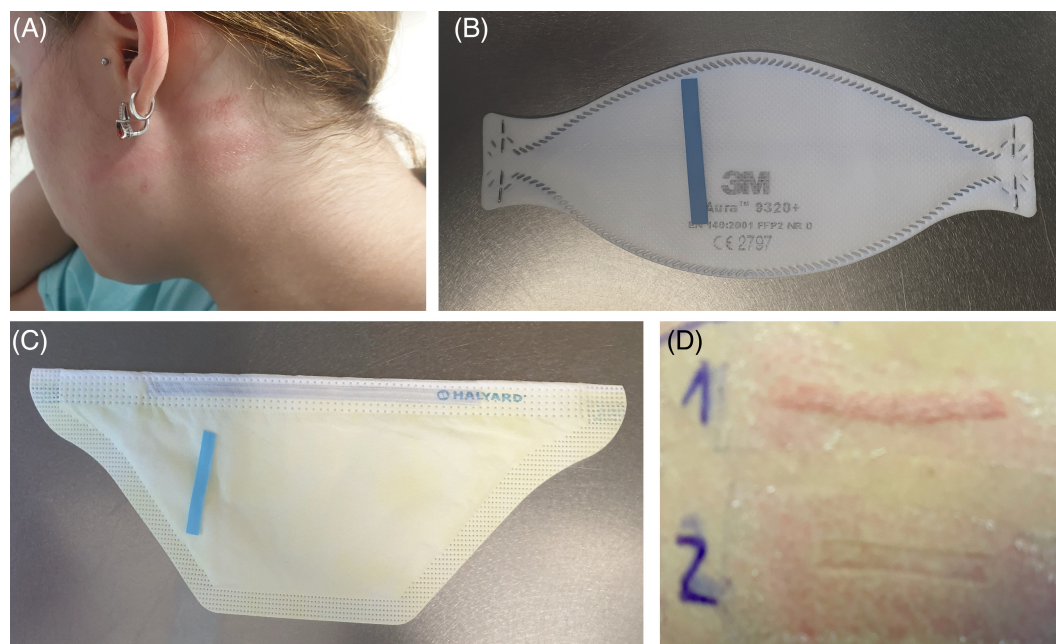


FIGURE 1 (A) Linear erythematous and edematous plaques distributed along the contact area of the elastic bands of the N95 mask on the cheek and neck. (B) 3M Aura 9320+ FFP2 mask and rubber elastic band mask (3M, Saint Paul, MN, USA). (C) Halyard Fluidshield Surgical N95 Respirator Mask and rubber elastic band (Halyard Health, Alpharetta, GA, USA). (D) Positive patch tests to the elastic band 3M Aura 9320+ “as is” (3M, Saint Paul, MN, USA)

(MBT) (++), 2-(4-morpholinylmercapto)benzothiazol (MOR) (++), N-cyclohexyl-2-benzothiazolesulfenamide (++), textile dye mix Mx-30 (++), potassium dichromate (+), cobalt dichloride (+), and nickel sulfate hexahydrate (+). Prick tests with natural rubber latex proteins and latex-specific immunoglobulin E (IgE) were both negative.

After the sensitivity to the textile dye mix Mx-30 was found with patch testing, the patient was questioned in detail and reported contact hypersensitivity to green clothes, including her nursing uniform. Additional patch tests were then performed with a textile dye series (Chemotechnique Diagnostics). Positive reactions to disperse yellow 3 (++) and disperse blue 106 (+) were identified on D2 and D4.

A diagnosis of allergic contact dermatitis (ACD) to the elastic bands of the 3M Aura 9320+ N95 mask was made.

The patient was prescribed methylprednisolone aceponate 0.1% cream b.i.d. for 5 days and masks were changed to a type with cotton cloth bands, with resolution of complaints. She was also advised to avoid wearing green clothes.

DISCUSSION

Personal protective equipment is essential to the safety of health care workers. In particular, N95 masks are recommended for the protection of health care workers who are providing direct patient care or working within the zone for individuals with suspected or confirmed COVID-19 infection. Prolonged wear of facial protective equipment can lead to occupational dermatoses.¹ However, few cases of N95 mask-associated ACD have been reported, despite their generalized wear during the COVID-19 pandemic.²

The main allergens involved in ACD to the elastic bands from N95 masks are the rubber additives thiurams and dithiocarbamates.³ We were unable to clarify the role of benzothiazole compounds and textile dyes in the presented case of ACD from elastic bands of an N95 mask. It has not been possible to obtain further information about the constituents of the N95 masks from the manufacturers, and no laboratory analysis of the elastic bands was performed. Nevertheless, benzothiazole compounds are well-known vulcanization accelerators of polyisoprene, the main material in the elastic bands of the 3M Aura 9320+ N95 mask. Therefore, these allergens may have a relevant role in this case of ACD. Of interest, only one of the two masks with blue elastic bands elicited a positive reaction. ACD

in response to textile dyes in masks is scarcely reported in the literature. Recently a case of contact vitiligo was described in a patient with delayed hypersensitivity to disperse blue in surgical blue masks.⁴

In conclusion, ACD from N95 mask components in health care workers can be severe, given the prolonged and continuous contact with the source of allergens. Therefore, identification of the allergens is crucial to adapt personal protective equipment, avoiding potential decrease in work performance and quality in life.

CONFLICT OF INTERESTS

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The patient has consented to the submission of the case report to the journal.

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