

Allergic contact dermatitis and photosensitivity to methylisothiazolinone and methylchloroisothiazolinone/methylisothiazolinone: Portrait of an epidemic in Brazil

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Methylisothiazolinone (MI) is a preservative associated with an epidemic of allergic contact dermatitis worldwide, mainly owing to its use in cosmetics, where it is found alone or combined with methylchloroisothiazolinone (MCI/MI, eg. Kathon CG).^{1,2} There are very few studies on sensitization to MI in Brazil, although cases of an unusual pattern of photoeczema associated with MCI/MI allergy have been reported in the country.³ The Brazilian baseline patch test series (FDA Allergenic, Rio de Janeiro, Brazil) does not contain MI and since its creation, MCI/MI 0.5% pet.⁴ has been tested—a concentration well above the 0.02% or 0.01% used in sets from other countries and in a different vehicle.⁵ This study aimed to evaluate the profile of MI sensitization in Brazil, the efficacy of MCI/MI 0.5% pet. in the detection of sensitized patients, and the occurrence of photoeczema to isothiazolinones.

METHODS

This cross-sectional study was conducted in 2016 and 2017 at 2 tertiary centers in Rio de Janeiro, an occupational dermatology clinic and a skin allergy clinic; based on data from medical records. The patch test was performed with the Brazilian baseline series supplied by FDA Allergenic

or Asac Pharma (São Paulo, Brazil). MI 0.2% aq. was introduced in the testing routine in 2016. MCI/MI 0.02% aq. was tested in 2017, only for research purposes. The substances were applied with Finn Chambers (Immunotech) and the readings were carried out according to guidelines of the International Contact Dermatitis Research Group. The photopatch test was performed with portable Prolumina equipment (Prolumina Cotia, São Paulo, Brazil) and the suspected substances were irradiated with 5 J/cm² UVA. The research was approved by the ethics committee (CAAE 12783519.2.0000.5240).

RESULTS

Patch tests with the Brazilian baseline series plus MI were performed on 303 consecutive patients. MI was positive in 26.7% (95% confidence interval [CI]: 21.5%–31.4%) of tests, with clinical relevance in 76 (93.8%). MCI/MI 0.5% pet. was positive in 21.6% (95% CI: 17%–26.3%) of cases, with clinical relevance in 63 (95.4%). Table 1 shows the annual prevalence of positive contact tests for MI 0.2%, MCI/MI 0.5% pet., and 0.02% aq.

We observed that 21% (n = 17) of the patients with a positive MI test displayed negative results to MCI/MI 0.5% pet. (Cohen's kappa [κ]

TABLE 1 Prevalence of positive tests for methylisothiazolinone 0.2% aq., methylchloroisothiazolinone 0.5% pet., and 0.02% aq., respectively in 2016 and 2017

Year	MCI/MI 0.5% pet.			MI 0.2% aq.			MCI/MI 0.02% aq.		
	Total tests N	Positive		Total tests N	Positive		Total tests N	Positive	
		N (%)	95% CI		N (%)	95% CI		N (%)	95% CI
2016	154	32 (20.8)	14.4–28	102	20 (19.6)	12.4–28.6	-	-	-
2017	205	48 (23.4)	17.8–29.8	201	61 (30.3)	23.8–36.9	192	36 (18.7)	13.2–24.2

^aAbbreviations: CI, confidence interval; MCI, methylchloroisothiazolinone; MI, methylisothiazolinone.

0.82; 95% CI: 0.76–0.90) while for MCI/MI 0.02% aq., the proportion was 35.7% ($n = 20$) (κ 0.72; 95% CI: 0.61–0.83). The difference between Cohen's kappa coefficients was statistically significant ($P = .003$).

Eczema predominating in exposed areas was described in 30 (37%) patients who were allergic to isothiazolinones. Photopatch testing with MI and MCI/MI 0.5% pet. was performed in only 18 patients. In 4, it was possible to observe a pattern of photoaggravation: 2 related to MI and 2 to MCI/MI. However, among the 14 cases where no photoaggravation could be detected, 12 had extreme positive (+++) reactions on day (D) 4 both on the irradiated and non-irradiated areas. There was no association between presumptive isothiazolinone photoeczema and the use of photosensitizing drugs ($P < .26$, X^2 test) or any other dermatosis with photosensitivity.

DISCUSSION

The prevalence of sensitivity to MI in Brazil exceeds the highest prevalences observed so far in the literature.^{2,6–8} This can be attributed to high concentrations of this preservative still allowed in cosmetics as well as in cleaning products and paints. Brazil, in agreement with the other members of MERCOSUR (Argentina, Paraguay, Uruguay), still uses the maximum concentrations of 100 ppm for MI, regardless of the nature of the cosmetic.⁹

There was a slightly higher agreement of with MI 0.2% with MCI/MI 0.5% pet. than with MCI/MI 0.02% aq. However, the risk of sensitization when using allergens at high concentrations in the patch test should be considered.⁵

The low performance of the photopatch test for the confirmation of clinically suggestive cases of photodermatitis may be explained by the extreme positive reaction observed in most tests, both in the irradiated and non-irradiated areas on D4. Regarding this, it has already been suggested that MI should be tested at concentrations lower than 0.01% in patients with suspected photodermatitis, to increase the chance of observing photoaggravation at the irradiated site compared to the non-irradiated site.¹⁰

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CONFLICT OF INTERESTS

The authors declare no conflicts of interest.

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