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# Phenylephrine is a frequent cause of periorbital allergic contact dermatitis

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Phenylephrine is a selective  $\alpha 1$ -adrenergic receptor agonist used in eye drops, in order to dilate the pupil to facilitate visualization of the retina, and also to treat nasal congestion and increased sinus pressure resulting from rhinitis. However, in Denmark it is only marketed as mydriatic eye drops. Phenylephrine hydrochloride (HCl) is a well-known contact allergen. The Allergen Bank is a service established in 1992 for dermatologists in practice in Denmark, where, on a subscription basis, they can gain access to extra contact allergens, for example phenylephrine HCl, as supplements to the baseline series for case-by-case testing of individual patients (1). Phenylephrine HCl has been available from the Allergen Bank since 2000. We performed a retrospective analysis of patients patch tested with phenylephrine HCl from 2000 to 2014 both in private dermatological practices and in a department of dermatology. The vast majority of patients tested at the dermatology department were referred by the ophthalmologist because of acute periorbital dermatitis and suspected allergic contact dermatitis caused by eye drops. We assume that the same referral mechanism was in effect in dermatological practice; however, detailed information is not available.

## Methods and Results

Patch test results from consecutive eczema patients from 2000 to 2014 tested with phenylephrine HCl at the department of dermatology and in the dermatological

practices were reviewed. At the department of dermatology, Odense University Hospital, phenylephrine HCl (10% aq.; Trolab<sup>®</sup>, SmartPractice, Phoenix, AZ, USA) was tested in Finn Chambers<sup>®</sup> on Scanpor<sup>®</sup> tape (SmartPractice). For dermatologists subscribing to the service, a small amount of phenylephrine HCl 10% aq. was sent to the office in Eppendorf tubes<sup>®</sup> together with IQ Ultra<sup>™</sup> chambers (Chemotechnique Diagnostics, Vellinge, Sweden) and a filter paper to be used for application. Patch tests were performed and read on D3, D4 and D7 at the department according to ICDRG guidelines. In the dermatological practices, tests were performed according to their clinical routines.

A total of 764 patients suspected of having contact allergy to eye drops were tested with phenylephrine HCl. The Allergen Bank had 55 subscribers in 2014, and 37 have ordered phenylephrine HCl at least once during the last 14 years. More positive reactions to phenylephrine HCl were diagnosed in private practice than in the dermatology department (130 versus 104), and in both settings

**Table 1.** Patch test reactions to phenylephrine hydrochloride (HCl) in private dermatological practices (n = 37) and in a university department of dermatology from 2000 to 2014

|                                                           | Dermatology practices<br>D3/D4 | Department of dermatology<br>D3/D4 |
|-----------------------------------------------------------|--------------------------------|------------------------------------|
| 2+                                                        | 0                              | 4                                  |
| +                                                         | 28                             | 18                                 |
| ++                                                        | 60                             | 56                                 |
| +++                                                       | 41                             | 20                                 |
| Number of tested patients                                 | 419                            | 345                                |
| Number of positive reactions on D3/D4 (%)                 | 129 (31)                       | 98 (28)                            |
| Number of additional positive reactions only on D5/D7 (%) | 1                              | 6 (2)                              |

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the same yield of ~30% positive reactions was obtained (Table 1). Most patch test reactions were strong (++ or +++) on D3/D4, and only four doubtful reactions on D3 turned positive on D5/D7 (Table 1). The MOAHLFA index for patients tested in private practice was similar to that for patients tested at the department of dermatology (data not shown). In the dermatological department, 46% of tested patients were male, and in private practice, 42% of tested patients were male. Nearly all patients in both groups were older than 40 years.

## Discussion

This is a retrospective study, with the inherent limitations of such studies. Contact allergy to phenylephrine HCl is a frequent cause of periorbital contact dermatitis resulting from the use of mydriatic eye drops in Denmark (2, 3). It is used for aimed testing, and the contact allergy is easy to suspect on the basis of patient history and clinical characteristics, supported by the high yield of positive reactions obtained both at the hospital department and in dermatological practices. Phenylephrine HCl is not licensed as a nasal spray in Denmark. Repeated ophthalmological examination together

with repeated use of phenylephrine HCl as a mydriatic drug is a plausible explanation for sensitization. Nearly all patients are more than 40 years old, and it is our impression that the vast majority had undergone regular ophthalmological examination prior to the development of acute periorbital dermatitis.

It is usually recommended to perform two patch test readings, one at D3/D4 and one at D5/D7. However, as nearly all positive reactions were seen at D3/D4 and very few turned positive at the second reading, it can be argued that, in the case of phenylephrine HCl, one reading on D3 or D4 is sufficient. Furthermore, very few doubtful reactions were seen.

Different patch test routines in private practice might have affected the test results. However, phenylephrine HCl patch tests caused strong reactions in the vast majority of cases, making the patch test reading less susceptible to small variations in test technique. Patch testing with other contact allergens causing weak positive reactions (+) may be more sensitive to technical variations in the procedure. The present results show one of the advantages of an Allergen Bank: The dermatologists in practice can obtain rarely needed contact allergens on an individual basis when the history raises the suspicion of allergy.

## References

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