Iontophoretic Patch Test in Allergic Contact Dermatitis: 30 Years' Experience

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Iontophoresis
Patch testing
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The increased interest of dermatologists in topical iontophoretic drug and inhalant allergen delivery [1-3] indicates a renaissance of this remarkable noninvasive technique. Somewhat beyond the boundaries of clinical research remain the hitherto not exploited experiments of Haxthausen [4] using the electrophoretic patch test. In 1970, Wahlberg [5] speculated about the iontophoretic allergen administration for the investigation of obscure cases of contact dermatitis. The articles on iontophoresis published in former issues of this journal [1,3] encouraged us to submit our experiences concerning the iontophoretic test.

Since 1966, our Dermatological Department has been systematically investigating the iontophoretic patch test as a possible alternative diagnostic method in contact dermatitis [6,7]. Patients with iatro-genic and occupational contact dermatitis and dermatitis of various etiology and localization, as well as patients with leg ulcers were enrolled in the study.

The parameters of iontophoresis were defined with regard to the physicochemical properties of the different allergens and the degree of positivity of the expected reactions: aqueous solutions were applied to the upper back and were allowed to penetrate into the skin via the anode or cathode, using electric current intensities between 0.3 and 0.5 mA for 15 s to 5 min. An active metal electrode (lead or aluminum alloy) was applied to seven layers of filter paper, size 1 cm² and adequately soaked with the solution to be tested. Results were evaluated daily during a period of 5-7 days. Toxic reactions were not observed.

A total of 490 positive patch test results in response to aminoglycoside antibiotics (266), topical drugs (41), metal salts (178) and other substances (5), and physicochemical parameters were evaluated [8]. Compared to scratch-patch tests, 20% more patients known to be allergic to neomycin sulfate were detected using the iontophoretic patch test. Readings of 65 and 90% positive reactions were recorded already 24 and 48 h after the test, respectively [9].

The iontophoretic patch test is a combined epidermal-dermal test, where an allergen is locally administered and a defined physical stimulus is given. The reaction time is shorter and the detection rate is higher compared to regular patch testing, as has been shown in patients with neomycin sensitivity [9]. Moreover, this method can be used to validate other test results.

However, it does not replace standard patch testing: a certain restraint is indicated due to active

sensitization in iatrogenically induced dermatitis observed after novocaine (procaine) and iodine iontophoresis. Allergic contact reactions induced by transdermal iontophoretic delivery of systematically active drugs may also occur. Based on the results of our study we consider the iontophoretic patch test as a useful diagnostic method to detect contact allergies. Although inconclusive reactions may be encountered, this method can be recommended to reevaluate negative, weak or questionable reactions in cases where an allergy is suspected. New findings obtained by the iontophoretic technique can be expected in the diagnosis of systemic drug eruptions, a field in which the means of diagnosis are often lacking. It is surprising that controlled topical iontophoretic allergen delivery was not previously used to a greater extent in dermatology for diagnostic and scientific purposes in delayed type hypersensitivity.

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