Patch testing in occupational allergic contact dermatitis

ABSTRACT
Patch testing is a cornerstone in the investigation of patients with suspected occupational allergic contact dermatitis. The purpose of the paper is to raise awareness of challenges related to patch testing for this condition. Availability issues and the improvement of test procedure are considered.

Keywords: occupational, allergic contact dermatitis, patch testing, procedure improvements, availability

INTRODUCTION
Contact dermatitis is the commonest clinical manifestation of occupational skin disease. Patch testing, which was introduced by Josef Jadassohn over a century ago to diagnose allergic contact dermatitis ACD, is a cornerstone in the investigation of patients with suspected occupational ACD. The purpose of the paper is to raise awareness of problems related to patch testing for this condition.

PATCH TEST PROCEDURE
Patch testing should be carried out with the proper standard technique and the test allergens should be pure and properly diluted in a base. Patients should be instructed about the patch test procedure.

A number of allergens, grouped together for patch testing, are referred to as a patch test battery or patch test series. The "standard battery" which contains common environmental allergens is the most commonly applied. Special batteries, e.g. photographic battery, hairdresser battery, dental battery, rubber chemical battery, clothing or textile battery, cosmetic battery, cutting fluid battery, preservative battery are applied where indicated. The standard battery is extremely useful and should be applied on all patients undergoing patch testing. Often unsuspected causes of allergic contact dermatitis can be identified.

Closed patch tests with the Finn Chamber or Al patch test strip are the most practical patch test method (Figures 1 and 2). The True test system is an alternative. The duration of application of allergens is 48 hours, after which patch test chambers are removed for not less than 15 minutes and then read (Figures 3 and 4). A second reading is done at 72 hours or 96 hours after the application. An allergic reaction should persist after 48 hours (Figures 3 and 4).

INTERPRETATION OF POSITIVE REACTION
The patch test procedure is simple but reading and interpretation of the reaction requires experience. A positive reaction must be interpreted correctly as it may be of present or past relevance. Occasionally a patient may have past exposure to the allergen without dermatitis. A false positive or negative reaction also has to be considered.

COMPLICATIONS OF PATCH TESTING
These include pigmentation, depigmentation, scarring, necrosis, exacerbation, dissemination, sensitisation, infection, koebnerization, and keloid. When the patch testing is completed, and the allergen identified as the cause of ACD, the dermatologist must provide the patient with sufficient information to avoid recurrence of the reaction. The name and possible sources of the allergen should be given to the patient.

IMPROVING PATCH TESTING PROCEDURE
Patch testing is a simple procedure but the selection of the patch test allergen for patch testing and interpretation of patch test reactions requires adequate experience. Since the introduction of patch testing, ideas for refining the technique and the interpretation of its clinical relevance have been ongoing resulting in great improvements in patch-test technology, patch-test strategy, and interpretation of patch-testing. This in turn has improved the way we manage occupational contact dermatitis.

To further refine Jadassohn’s patch testing, the following questions might be addressed:
• Stability of patch test allergens – what is the bioavailability of the test allergens over time?
"Often unsuspected causes of allergic contact dermatitis can be identified."

Figure 1. Patch testing procedure – application of patch test battery on the patient’s back

Figure 2. European standard battery

Figure 3. A strongly positive patch test reaction with erythema and vesiculation

Figure 4. A weakly positive and negative reaction
• Identifying the causative allergen – we often assume that causative chemical produces the positive patch test but could it have been a metabolite?

• What of the need for serial dilutions testing as not everyone reacts to the same concentration of a substance and clinical immunology should not be considered an “all or none” science?

• How do we define irritancy as allergens are marginal irritants, resulting in false positive patch-test reactions?

• What is the ideal patch test occlusion duration – is the standard 48 hours occlusion necessary as patients would appreciate a shorter wearing time?

• How do we interpret clinical relevance of positive patch-test reactions which may signify an immunologic response, but may have little or no clinical significance?

To further improve the diagnosis of ACD, the future will see research into identifying less invasive procedures, in vitro diagnostic methods, skin physiology measurement instruments, and ribonucleic acid diagnostic methods. However, these procedures include animal studies and are still in the experimental stage so are not readily available for clinical use.

LESSONS LEARNED

• Patch testing should be carried out with the proper standard technique and the test allergens should be pure and properly diluted in an appropriate base.

• The standard battery should be applied on all patients undergoing patch testing. Additional patch test series can then be added depending on the suspected aetiology of the allergic reaction.

• An allergic reaction should persist after 48 hours.

• A positive reaction must be interpreted correctly as it may be of present or past relevance.

• False positive or negative reactions can occur.

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REFERENCES


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