Navigating Patch Testing Pitfalls and Immunosuppressants

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Objectives

• Understand why ultraviolet therapy interferes with patch test readings

• Implement ideal taper schedule for immunosuppressants prior to patch testing

• Be able to effectively counsel patients on pre-test hair removal and UV exposure avoidance
Pre-test Preparation Key to Avoiding Pitfalls

- Patient education
  - Designated staff scheduling patients and providing info
  - Pre-test instructions mailed to patients
- Consider optimal timing of pre-test consultation
  - Day 1 of testing vs. pre-test consult
  - Telephone questionnaire
- Pitfalls
  - Hairy back
  - Recent UV exposure
  - Recent immunosuppression
  - Active dermatitis
Pitfall: UV Exposure & Patch Testing

• Generally recommended to avoid recreational/therapeutic UV exposure for 7-14 days prior to patch testing

• Why?
  • Exposure to UVB reduces the risk of sensitization and temporarily diminish the ability to elicit allergic reactions in sensitized individuals.
    • Increased chance of false negative reaction due to immunomodulatory impact of local UV radiation
  • Decreased ability to assess patch test reactions if there is sunburn

Mechanism of immunomodulation with UV exposure

- Epidermal Langerhans cells (LC) play a key role in processing antigens in contact sensitivity reactions
- LC exposed to UV light have a diminished capacity to induce T-lymphocyte proliferation.
- LC depletion occurs following UV exposure
- Suppressor macrophages increase in the dermis secrete immunosuppressive factors.

UVB exposure diminishes rates of primary sensitization to DNCB

• Prospective randomized study of 4 groups of adults
  • no radiation, 0.75MED x 4 doses, 2MED x 4 doses, 4MED x 1 dose
• Exposed buttock skin sensitized with dinitrochlorobenzene (DNCB) x 48 hours. Protected buttock skin sensitized with diphenylcyclopropenone (DPCP)
• 3 weeks later- compared rates of sensitization at remote site (arm) to variable concentrations DNCB vs. DPCP

Cooper et al. Proc Natl. Acad Sci. 1992; 89: 8497-8501
Study Conclusions

• UVB exposure in humans results in highly significant dose-responsive decreases in immunologic responsiveness.

• Even levels of UVB exposure below clinical detectability (0.75MED) can impair immune responsiveness*

Cooper et al. Proc Natl. Acad Sci. 1992; 89: 8497-8501
“Tan in a Can”

• Most self tanners contain dihydroxyacetone (DHA), a colorless 3-carbon sugar.

• DHA covalently binds to stratum corneum proteins to produce melanoidins (Maillard reaction) that temporarily stain the skin.

• 1 case reported of patch testing two days after self-application of DHA containing tanning cream.

• Relevant positive reactions occurred

Patient Recommendations

• No UV exposure at test site (vacation sun) for 15 days \(^{(1)}\)
• No in-office phototherapy for 7-15 days \(^{(1,2)}\)
  
  • No sunburn for 15 days*

• Do not tan or use phototherapy during patch testing

Pitfall: Patch Testing (PT) on Immunosuppression

- It may be impossible or impractical to stop or reduce the doses of immunomodulating medications in patients who require PT.
- Positive PT reactions HAVE been reported in patients taking immunomodulating agents but the reliability of PT in patients on immunomodulating drugs is not certain.
- False-negative PT may occur and tests should be repeated when patients are off immunomodulating medications.

Prednisone

• Most common encountered scenario
• Few small papers 1950s-1970s suggested that PT on 20 mg of prednisone or less is likely to preserve some PT response.
  • Unblinded, only 2+ / 3+ reactions considered
• 2004: RDBPCT in 24 Ni^{+2} sensitive patients showing prednisone 20 mg daily suppressed PT responses

Higher $[\text{Ni}^{+2}]$ required to elicit test response on prednisone of 20 mg

*Fig. 2. The number of individuals with positive patch test reactions (+, ++ or ++++) for each test concentration on at least 1 of the readings.*

A shift toward weaker reactions on prednisone 20 mg

Fig. 3. The total number of patch test reactions to nickel sulfate 5% w/v in petrolatum. The sum of all readings on days 2, 3 and 7. 19 individuals were tested and 4 were negative. The results from the remaining 15 subjects are shown.

Summary Recommendations

LESS LIKELY to impact PT results

• Prednisone < 10 mg/day
• Methotrexate (<0.25 mg/kg/wk or 17.5 kg/wk in 70 kg adult)
• TNF-α inhibitors

MORE LIKELY to impact PT results

• Prednisone > 10 mg / day
• High dose cyclosporine (>2 mg/kg/d)
• Intramuscular triamcinolone

Dose-dependent responses

• Azathioprine
• Mycophenolate mofetil
• Oral tacrolimus

Adapted from Dr. Jennifer Chen, AAD 2017
Summary Recommendations

- Avoid topical steroids to the patch testing site for 3-7 days
- Avoid systemic immunosuppression for 5 half-lives of the drug in question
- When unavoidable, use the minimum dose required
- Carefully consider weak positives/indeterminate reactions
- Consider retesting when off immunosuppression

_Derma_ 2012; 23: 301–303
Pitfall: Hairy Backs

- Why Remove Hair Prior to Patch-Testing?
  - Hair makes tape removal more uncomfortable
  - Hairy areas less likely to adhere well
  - Shaving may lead to difficulty in test interpretation if folliculitis occurs on site.
Hair may be shaved in the direction of hair growth

Electric Clippers

Safety Razor
Hair Removal Recommendations

• Shave back 2 days before test appointment
  • Ideal: electric clippers > 24-48 hours before
  • Less Ideal: “close” shave > 24-48 hours before
  • Least Ideal: shave at patch test appointment with a “safety” razor

• Document patient instructions in a telephone encounter or mailing
References