False-Positives in Patch Testing: Mechanisms, Contributing Factors, and Strategies for Diagnostic Accuracy

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Background
Patch testing is a fundamental tool in diagnosing allergic contact dermatitis, a type IV hypersensitivity reaction. However, false-positive results, reactions which appear positive in the absence of true sensitization, confound clinical interpretation, stemming from irritant reactions, marginal irritant concentrations, impurities, coexisting skin disease, and heightened skin reactivity.
Objectives
This narrative review aims to synthesize the mechanisms and contributing factors underlying false-positive patch test reactions and to summarize strategies that improve diagnostic accuracy.
Methods
A narrative review of literature was conducted with sources extracted from Embase, PubMed, Scopus, and Web of Science.
Results
False-positive patch testing reactions are not infrequent and may be grouped into identifiable categories: weak-positive reactions with poor reproducibility, irritant rather than allergic reactions, excited skin syndrome and spillover, cross-reactions, co-existing skin conditions and individual skin sensitivity, and technical/vehicle/environmental factors. Reproducibility, lesion morphology, serial dilution, irritant and vehicle controls, and confirmatory use testing can help discern irritant from allergic responses.
Conclusions
Accurate patch testing depends on standardized methodology, trained readers applying standardized criteria, correlation with clinical relevance rather than reaction strength alone, and ongoing refinement of non-irritant test concentrations.