

Acropigmentation - rare presentation of occupational dermatosis due to epoxy resin and hardener

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Introduction

An occupational skin disease (OSD) is defined as pathological skin disorder for which occupational exposure can be shown to be a major causal or contributory factor. Dermatitis accounts for almost half of all reported cases of occupational disease and hands are affected in 80-90% of cases¹. The commonest cause of OSD is irritant contact dermatitis of the skin by contact with substances like strong irritants such as acids, alkaline or organic solvents and next is allergic contact dermatitis due to sensitization to substances handled at work like cement, metals and epoxy resins. The pattern of employment in a country has a significant effect on the incidence of occupational skin disease.

Case history

Seven factory workers were referred to Dermatology Clinic, Teaching Hospital, Karapitiya from a yacht making company in Export Processing Zone, Koggala with a history of asymptomatic discoloration over hands and forearms for several months. It was observed that all seven workers, have been engaged in the production of yachts in the same unit and they had been in contact with two new substances, which are used for adhesive purposes during last 6 months. The substances were identified as Swancor 2713A-Epoxy resin (Bisphenol A) and Swancor 2713BS-hardener (modified amine). Apparently they have not taken any proper protective measures during handling these substances.

On examination all workers had fairly extensive macular pigmentation over the hands and forearms accompanied by acanthosis in some areas. (Figure 1) None showed features of active inflammatory dermatitis.

With the differential diagnosis of subclinical allergic contact dermatitis with post inflammatory hyperpigmentation, chemical induced hyperpigmentation, we have proceeded with patch testing on them for epoxy resin, hardener and for the mixed solution containing equal amounts of both those. For standard patch test concentration (1%) it showed

negative results for all three substances. But with repeat patch testing using the concentrations to which workers are exposed showed strong positive reaction with erythema and blister formation for both resin and hardener (Figure 2). But the development of pigmentation was seen mainly due to hardener. Histology of the skin biopsies performed on them showed acanthosis nigricans like changes without any features of acute dermatitis (Figure 3).



Figure 1.



Figure 2.

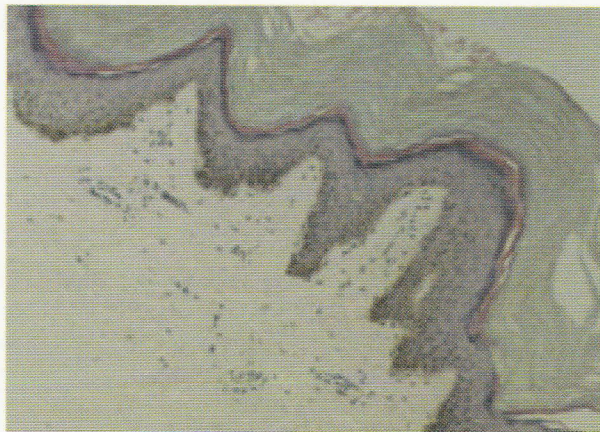


Figure 3.

Although there are few reported cases of discoloration of skin following chemical burns induced by hardener there is no documented case report found on acropigmentation associated with acanthosis nigricans like skin changes due to hardener or epoxy resin.

Discussion

Epoxy resin systems are used widely in industry because of their strong adhesive properties, chemical resistance and toughness. It is primarily used in painting ships and other marine instruments as a surface coating to provide a hard, durable and rustproof surface. These chemicals on their own may cause irritant and/or allergic contact reactions usually affecting the hands and arms involving interdigital spaces and wrist. Hardeners and diluents are more volatile than resin and may cause air borne contact dermatitis and allergic reactions from breathing in fumes. Cured epoxy resin is usually non-irritating and non-sensitising.

The first reports of sensitisation to epoxy resin compound were published in the 1950s. By the beginning of the 1970s epoxy compounds began to cause increasing number of OSD, and it was 10% of all occupational allergic contact dermatitis in 1990s. Roughly 1% of exposed workers annually developed an occupational dermatitis due to epoxy resin compounds². Sensitivity for epoxy resin can be demonstrable by doing standard patch test series, or 1% petroleum preparation of diglycidyl ether of bisphenol A. There are too many hardeners and reactive diluents for routine testing and it should be tested with 0.1-1% aq. or in petrolatum, acetone or ethanol. In case of suspected occupational dermatitis it will usually be necessary to test the patients, with appropriate concentration of the actual resin and hardener with which they have been in contact.

Although non-eczematous occupational dermatoses like acquired hypomelanosis, lichenoid skin reaction and contact urticaria are recognized complications of epoxy resin or hardener the acropigmentation is a unrecognized entity. Introduction of new chemicals may have increased the incidence of unrecognized industrial dermatitis, it can be counteracted by accurate diagnosis and preventive educational measures.

References

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