

Phototoxic Reaction after Exposure to Bitumen

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Introduction

Phototoxic skin reactions are common after exposure to psoralens in plants or herbal juices, or due to medication followed by UV-exposure. Dermal tar exposure followed by UVA-exposure may lead to a phototoxic skin reaction clinically similar to an ordinary sun burn [1].

Keywords: Phototoxic reaction; Bitumen; Sandblasting; Occupational

Case History

During renovation of a large public building, three construction workers had the task to sandblast a ceiling. Before starting their work, a pre-blasting test was conducted, and an analysis of the ceiling-material was made. It turned out to consist of bitumen and cork, which allegedly served as soundproofing. When starting the sandblasting the workers were dressed in a full bodysuit and wore neoprene gloves. The work was very dusty and the material removed from the ceiling, was sticking to the workers. The symptoms started the first day of sandblasting, where the weather was hot, dry and sunny. During the day, the workers spent several breaks outdoors in the sunshine. After a day of sandblasting, all 3 workers developed a rash localized to forearms, neck and scalp, with a clear demarcation of where the workers had worn clothing underneath the bodysuit. The symptoms gradually turned from erythema to scaling of the affected skin. Only the hands, arms, and neck were affected.

Just one of the three workers was subsequently examined at the 'Department of Occupational and Environmental Medicine', and at the 'Department of Dermatology' at Bispebjerg Hospital. The other two workers were unable to attend any further examination, due to foreign work-commitments. At this point there were no longer any visible skin lesions, and no treatment was required. The worker-a 47 year old male with no previous medical history of allergies, systemic diseases, earlier phototoxic reactions, and no use of medicine-was patch tested with the baseline series, expanded rubber series, and own equipment (bodysuit and gloves). All results were negative.

Based on a previously described phototoxic reaction [2], as well as the similarities between bitumen and tar [3], it was estimated that the combination of bitumen-dust, insufficient protective equipment, and exposure to the sun, could explain the skin reaction with localized rash

on uncovered areas of the skin and subsequent scaling, which was consistent with a phototoxic reaction.

Resumption of sandblasting of bitumen at the work site - this time with an increased focus on avoiding the exposure to bitumen-dust and sunlight - resulted in the work being completed without further symptoms in the workers involved.

Discussion

Phototoxic reaction after exposure to the bitumen is, in contrast to charcoal tar, not widely described in the literature in spite of the fact, that bitumen is frequently used, particularly in asphalt production worldwide. Basically there are two types of photoreactions, toxic and allergic. Photo-allergic reactions require a previous sensitization to have taken place, and only sensitized individuals will react. When 3 out of 3 individuals react to exposure to bitumen, it is therefore most likely to expect a photo-toxic reaction.

Bitumens are engineering materials produced by the distillation of crude oil during petroleum refining, and it exists in numerous of forms and types. Bitumen has previously been described as the culprit in a phototoxic reaction [4] and also in this report the combination of shot-blasting and sunshine were factors leading to the skin reaction. Sandblasting, or shot-blasting, creates fine dust, likely to attach to any uncovered skin, and if exposed to UV radiation, it will result in a phototoxic reaction. This kind of dust formation is not seen in connection with the most common use of bitumen: paving roads, which may explain why phototoxic reactions are rarely reported in relation to the bitumen.

References

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