Introduction
Psoralens belong to the furcoumarin family, and cause phytophotodermatitis when coupled with ultraviolet light exposure. Specific compounds include 5-methoxypsoralen, xanthotoxin and limettin, which lead to this phototoxic eruption. Their structure is a linear, tricyclic molecule, and thought to be involved in the plant’s ability to fight fungal infections and in regulation of plant growth. There have been multiple case reports on this phenomenon. A classic description in the United States involves a beach vacation on children playing around a swimming pool along with beverage preparation involving lime juice.

An International Phenomenon
Psoralens are found in many types of wild and agricultural plants in a wide geographical distribution. The major plant families which contain furcoumarins include Umbelliferae, Rutaceae, Leguminosae and Moraceae. While the most common culprit in the United States seems to be the lime, the phenomenon has been described after topical and oral exposure to psoralsens in other plants.

Case Series Description

This is a consecutive-patient case series of five girls aged 7-11 transferred from an outside facility for specialty burn center evaluation. Symptoms developed 24 hours after playing with limes on lemons near a backyard swimming pool.

The girls had skin findings of large flaccid bullae on an erythematous base over sun-exposed areas, not following any dermatomal distribution. Initially, parents were questioned regarding possible pool chemical exposure and abuse. Two girls required admission to the intensive care burn unit. One was admitted to the floor and two were discharged from the emergency department. Initial treatment for patients 1-3 included pain control with intravenous opioids, use of bacitracin ointment and non-adherent Xeroform® and adapatic® dressings. Clobetasol ointment was started on hospital day 2 on patients 1-3 and applied during dressing changes. Procedural sedation was required for dressing changes and debridement for patients 1, 2 and 3. Patients 4 and 5 were discharged home with bacitracin ointment and Xeroform® dressings. Following discharge, return visits were required for dressing changes in all 5 patients. Over the next 3 weeks, erythematosus areas gradually became hyperpigmented. Plant specimens were identified by local botanists as Key Lime (Citrus aurantifolia) and Lisbon Lemon (Citrus limon).

Patient Identification  | Age (years)  | Total Body Surface Area Involved (%) | Distribution of Skin Findings | Clinical Setting | Hospital Length of Stay (days)
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1 | 7 | 10 | Face, Bilateral Upper Extremities | Burn Unit | 4
2 | 8 | 18 | Face, Bilateral Upper and Lower Extremities | Burn Unit | 3
3 | 9 | 8 | Face, Hands, Bilateral Lower Extremities | Pediatric Floor | 3
4 | 9 | 5 | Lips, Left Thigh | Emergency Department | <1
5 | 11 | 10 | Bilateral Anterior Thighs, Bilateral Anterior Forearms, Lower Abdomen | Emergency Department | <1

Discussion

Few phytophotodermatitis outbreaks demonstrate such severity in multiple pediatric patients, requiring transfer to a burn center for management. Optimal management of severe psoralen toxicity is not well established. In these cases, supportive care and topical steroids were used with good result. Oral steroids and silver impregnated dressings may also be considered.

Psoralen phytophotodermatitis diagnosis requires a high index of suspicion and may be initially misdiagnosed as herpes zoster, lymeangitis, chemical burns, poison oak or even jellyfish envenomation. Although potential abuse or pool chemical burns was considered in these cases, it became clear that the lesions were actually due to citrus exposure.

Therapeutic Applications of Psoralsen

Surprisingly, the effects that these girls had from psoralen toxicity forms the basis of one of the most commonly used treatments in the field of dermatology, ‘PUVA’ or psoralen with ultraviolet long wavelength radiation. This effect was used as far back as 1400 BC in India and Egypt, for the treatment of vitiligo.

Modern medicine has incorporated PUVA to treat not only vitiligo, but also psoriasis, mycosis funigoids and atopic dermatitis.

References


