are compatible with previously reported drug-induced lichenoid eruptions (1, 2, 4).

Thus ethambutol can be added to the list of drugs capable of provoking lichen planus-like eruptions.

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Pyriderm® Shampoo in the Treatment of *Pediculosis capitis*

Kamma Lange, Aksel Otkjær Nielsen, Ove Jensen and Charlotte Graudal

Department of Dermatology, Municipal Hospital, Copenhagen, Denmark

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Abstract. 112 patients with head lice were treated with a shampoo containing pyrethrins. All were treated twice with an interval of one week. At examination immediately before the second treatment, 6 patients had small, newly hatched lice, and one patient had both small and mature lice—probably due to reinfestation. This patient was lice-free after the third treatment, the other patients after the second treatment. It is concluded that pyrethrins are highly effective against head lice and have the advantages of a low toxicity to mammals and a short contact time.

Key words: Pediculosis capitis; Pyrethrins

During the past 30 years clophenothane has been the most common treatment for head lice infestation in Denmark. Because of an increasing number of treatment failures, possibly due to the development of resistance to clophenothane, we had to consider a change of treatment. Lindane (gamma benzene hexachloride) was considered but rejected. It is chemically related to clophenothane and cross resistance between the two compounds may exist. We therefore resumed an older treatment schedule with an extract of quassia, which gave excellent results (4). However, the slow pediculocide effect of quassia made this treatment time-consuming and less suitable for home treatment.

Pyrethrum has been widely used as an insecticide for more than 50 years and before that even as an antihelminthic for humans (6). For mammals, pyrethrum seems to be one of the safest insecticides with a peroral LD_{50} of 820–1 500 mg/kg body weight (6). No studies on the percutaneous absorption are available, but considering the low concentrations necessary for topical treatment, this problem seems to be negligible. In nature, pyrethrum is easily decomposed to inactive substances (2, 3).

In 1978 Pyriderm® shampoo containing pyrethrin, which is an extract of pyrethrum, was introduced in Denmark. In the following we report the results of this preparation on patients with head lice.

CHEMISTRY

By extraction of *Chrysanthemum cinerariaefolium* a solution of pyrethroids is obtained along with waxes and pigments. This solution is allergenic due to pyrethrosin, a sesquiterpene lactone, which causes contact dermatitis and often shows cross reactions with a similar substance in ragweed (1, 5, 7). By further procedures pyrethrosin can be removed, leaving purified, non-allergenic "pyrethrin". This contains 6 esters with insecticidal properties (cinerin I, jasmolin I, pyrethrin I, cinerin II, jasmolin II and pyrethrin II).

Since 1950 synthetic pyrethrins have been available. They act as contact poisons and cause rapid paralysis and death of the insects after a few minutes (6). Pyriderm® shampoo contains 0.15% pyrethrin I and II, perfume, and 1.65% piperonylbutoxide, which increases the effect of the pyrethrins, presumably by a restraining effect on the decomposition of the pyrethrins in the insects (6).

MATERIAL AND METHODS

During the period 1.10.78–31.12.79 a total of 160 patients with live live and/or eggs were treated with Pyriderm®. 48

Table I.

Number of patients before treatment		Number of patients with live lice	
		Before 2nd treatment	One week after 2nd treatment
Patients with live lice	60	6	1
Patients with eggs but without live lice	52	1	0

were excluded from the study as they did not return for control examination or they had already started treatment at home. The remaining 112 patients are listed in Table I. In addition, a number of close contacts without lice or eggs were treated.

The treatment was carried out in the clinic. The shampoo was thoroughly massaged into the dry or slightly moistened hair and left for 10 minutes. Thereafter tepid water was added to give a thick, foamy lather. After rinsing with water the hair was combed. One week later a careful inspection for live lice was made, and immediately thereafter all patients received a second treatment. A final examination was made one week after the second treatment.

RESULTS

Table I shows the distribution of the patients according to the findings at the initial examination and the two control examinations. Six patients had live lice immediately before the second treatment. These lice were all very small and seemed to be newly hatched. These patients were lice-free after the second treatment. One patient had live lice, most of them small, but a few of mature size, suggesting that the patient had been reinfested. One week after the second treatment the patient had small lice, and after a third treatment there were no lice. No side effects were noted and the treatment was acceptable to both patients and staff.

DISCUSSION

The successful treatment of lice infestations requires not only an effective insecticide but also a thorough examination and treatment of close contacts and a proper disinfection of utensils and clothes.

This investigation confirmed that Pyriderm® shampoo is highly effective against head lice and it is now used as a routine treatment at our clinic. The main advantages are its low toxicity and the rapid insecticide action which allows a short contact time and makes it suitable for home treatment. Our results indicate a certain but not complete ovicidal effect and we must stress the necessity of at least two treatments, with a one-week interval. However, the manufacturer suggests three treatments at 5-day intervals. As with other insecticides, resistance or increased tolerance may occur after some time and should be considered in unexpected cases of treatment failure.

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