

how frequently this dose can be safely given and how long they should continue treatment before consulting a health professional again. It is also extremely important that parents and other carers, including grandparents and other family members who might help to supervise a sick child, know the importance of checking the strength of the paracetamol mixtures and the correct dose. People need to be aware that too much paracetamol may be toxic. Stressing how important it is to store the medicine safely where children cannot reach it would reinforce the message about the possibility of harmful overdose.

Changing family and social patterns may mean parents are turning to their general practitioner or pharmacist for practical advice and reassurance that previously came from family or friends. As well as reminding parents about the appropriate use of paracetamol and the dangers of overdose, doctors may

need to provide practical advice about other care measures. It is important that doctors check that parents understand what is really meant by directions such as 'keep up the fluids', 'sponge if they are getting too hot' and 'plenty of rest'. Parents want the best for their children, but they may need guidance about what that comprises.

### Recognising serious illness in babies

Useful information for parents on how to recognise serious illness in babies has been prepared by Professor Peter Hewson. It can be found in the internet version of Australian Prescriber Vol 23 No 3.

## Treating head lice

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### SYNOPSIS

Head lice (*Pediculus capitis*) is a common condition in children. It is usually detected in schools, when children are seen scratching their heads. The diagnosis can be confirmed by finding live adult lice or viable eggs. Lice are usually adequately treated with an over-the-counter topical permethrin preparation. Treatment failure results from inadequate therapy, re-infection, resistance to the insecticide or an underlying immunosuppression. Prescription drugs such as ivermectin may be needed in more difficult cases.

Index words: *Pediculus capitis*, permethrin, maldison, ivermectin.

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### Background

Blood sucking lice of the order Anoplura are successful obligate ectoparasites of humans.<sup>1</sup> *Pediculus humanus capitis*, the head louse, is a distinct clinical form. It clings to hair with its claws and feeds by sucking blood from the scalp. Its life cycle is about 17–20 days with eggs hatching 7–10 days after they are laid, and adults are fully developed about 10 days later.<sup>2</sup> Head lice spread by head to head contact.

### Diagnosis

A child found to be scratching their head at school is often checked by the teacher, school nurse or public health personnel. If they are well trained or experienced they will look for live adult lice on the crown of the scalp, immature nymphs or

viable eggs. Empty shells or nits adhere to the hair, 1 cm from the scalp surface, with a glue-like substance. They are unlike seborrhoeic scales, hair casts and hair spray, which are easily brushed off.

### Treatment

Three types of insecticide are marketed worldwide. In my local pharmacies all insecticide products for head lice are either permethrins 10 mg/mL as shampoos, lotions or creme rinses or maldison products with 0.5% alcohol bases, 1% foam bases, shampoos or soaking solutions.

Alcoholic lotions have greater ovicidal activity<sup>3</sup>, the creme rinses are less ovicidal than liquids and lotions<sup>4</sup> and shampoo formulations have low ovicidal activity and may not kill eggs.<sup>5</sup>

In theory, one application should kill all lice and eggs. However, *in vitro* studies<sup>3,4</sup> suggest that some eggs can survive and require a second application after seven days. Surviving eggs can cause reinfestation if not removed.

Everyone who has been in contact with the patient should be examined and treated if affected. It is also advisable to wash all clothes, head gear, towels, bed linen, combs and brushes as head lice can survive away from the human host for about three days and eggs can survive for up to 10 days.

Permethrin (3 phenoxybenzyl cis trans3(2,2-dichlorovinyl)-2,2 dimethyl cyclopropane carboxylate) is a synthetic pyrethroid. It acts on parasitic nerve cell membranes and has low mammalian toxicity, but incomplete ovicidal properties.<sup>6</sup> Patients apply permethrin to the hair for 10 minutes then wash

it off. As permethrin is not ovicidal, treatment may need to be repeated after a week.

Maldison is a moderately toxic organophosphate insecticide and a fast-acting ovicide which acts by non-reversibly blocking acetylcholine.<sup>6</sup> Patients apply maldison to their hair then wash it off after 12 hours.

### Evidence of therapeutic efficacy

The most often quoted systematic review of the topical treatments for head lice<sup>7</sup> concludes that there is only sufficient evidence to support the efficacy of permethrin. However, a recent review by the Cochrane Collaboration could not make a recommendation about which treatment is best.<sup>8</sup>

### Other therapy

A visit to the local pharmacy revealed naturally occurring substances including echinacea and melaleuca oil being marketed to treat head lice as well as an electronic lice comb. Reports supporting mechanical methods are anecdotal.<sup>9</sup>

Other anecdotal reports include the use of petrolatum used for its occlusion properties.<sup>10</sup>

Ivermectin is an antiparasitic agent used extensively in veterinary practice and more recently has been used in human medicine. The mode of action is via chloride ion channels in cell membranes, leading to an influx of negatively charged ions that block cellular action potentials and cause muscle paralysis. Much higher concentrations are required to affect neurological function in mammals than in parasites. Open studies on oral ivermectin, using a single 200 microgram/kg oral dose with or without a second dose at 10 days<sup>11,12</sup> suggest that further trials are warranted.

### Resistance

In the UK resistance to permethrin is widespread. In Australia resistance to maldison has been reported.<sup>13</sup>

### Safety and adverse effects

If used correctly the treatments have no major adverse effects. Patients may develop stinging or tingling of the skin, erythema of the scalp or red eyes. Maldison does not have the potential to cause a specific polyneuropathy as, unlike other organophosphates, it does not bind to the relevant target protein.<sup>14</sup>

### Contacts

Parents are generally shocked when they discover that their children have head lice. It often becomes very difficult to trace contacts as parents do not wish to admit to their friends and family that their children have lice, because of the associated embarrassment and social stigma. On a practical level, whenever a school discovers even a few eggs, the whole class is treated and the recommendation from schools is often that the entire family also be treated.

### Conclusion

Systematic review shows that only topical permethrin is efficacious for head lice. Clinical experience and information on the ovicidal properties of maldison suggests that further randomised controlled clinical trials are necessary to assess the efficacy of this alternative and cheaper insecticide. Immunosuppression may require the consideration of other medications and again appropriate clinical trials are needed.

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### Self-test questions

*The following statements are either true or false (answers on page 67)*

7. Resistance to permethrin has made it ineffective against head lice in Australia.
8. Alcoholic lotion may have greater ovicidal activity than the shampoos used to treat head lice.

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