

# Is the treatment of scabies hazardous?

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**SUMMARY.** *Treatment for scabies is usually initiated by general practitioners; most consider lindane (gamma benzene hexachloride) the treatment of choice. Lindane is also widely used as an agricultural and industrial pesticide, and as a result the toxic profile of this insecticide is well understood. Evidence is accumulating that lindane can be toxic to the central nervous system and may be associated with aplastic anaemia. Preparations containing lindane continue to be sold over the counter and may represent a hazard to poorly informed patients. This literature review suggests that general practitioners should prescribe scabicides with increased caution for certain at-risk groups, and give adequate warnings regarding potential toxicity.*

## Introduction

GENERAL practitioners are usually the first to see patients with suspected scabies and may use 1% lindane (gamma benzene hexachloride) as a first line treatment.<sup>1-5</sup> As evidence of a worldwide resurgence of scabies accumulates,<sup>1,4</sup> details of the possible serious side effects of lindane are also being published. It is now most important that these dangers be drawn to the attention of all general practitioners and dermatologists so that adverse reactions can be quickly reported.

## Controversy about clinical toxicity

Lindane is widely used as an agricultural and industrial pesticide, and central nervous system and bone marrow toxicity have been associated with prolonged or heavy use.<sup>6,7</sup> The collective observations and research work of dermatologists, occupational physicians and environmentalists have given lindane the most complete toxicological profile of all the scabicides.

Reports of toxicity from commercial use of lindane sparked debate in the medical literature in the USA during the 1970s, and a number of reviews recommended precautions to be taken when applying topical 1% lindane.<sup>5,8-14</sup> Indeed, the World Health Organization imposed restrictions on the commercial use of the insecticide amid suspicion of association with aplastic anaemia<sup>9-12,15-17</sup> and reports of teratogenicity and mutagenicity in rat experiments.<sup>18-20</sup>

The debate continues in the medical literature. For example, Rasmussen<sup>2,5</sup> counts lindane among the safest drugs he uses, and feels the contraindications need only extend to premature infants and those with seizures. Orkin and Maibach, on the other hand, detail the potential toxicity of lindane and predict future restrictions in its use.<sup>1</sup> They point out that risk-benefit analyses may change if careful monitoring is carried out to assess covert central nervous system and haematological effects.

## Absorption

Lindane is best known for its toxicity to the central nervous system. It is rapidly absorbed from the skin and concentrates in the white matter of the brain. Orkin and Maibach have conducted detailed studies demonstrating the rate of percutaneous

absorption.<sup>1</sup> They estimate a single application to a child with a skin area of 5000 cm<sup>2</sup> results in a minimum total body dose of 8 mg. This may be increased considerably with application to the more permeable areas such as the cubital fossa, axilla and groin. The ratio of surface area to body weight in an infant may be twice that of an adult. Therefore one application in a young child or infant can lead to a body dose which correlates with possible adverse effects.

## Poisoning and covert central nervous system toxicity

It is clear that the reported toxic effects from accidental poisoning by lindane<sup>3,18,21,22</sup> bear a striking similarity to anecdotal reports of adverse reactions in patients being treated for scabies.

Even a single application in an infant may cause hypotonia, apathy and irritability which may go unnoticed.<sup>1</sup> Initial symptoms in adults include lassitude, headache, vertigo and myalgia. A study of pesticide workers in Hungary demonstrated a strong correlation between lindane levels above 0.02 ppm in the blood and electroencephalogram abnormalities.<sup>14</sup> Wolfe believed cutaneous penetration to be the most important route in cases of lindane poisoning from pesticide formulators and sprayers.<sup>23</sup>

A careful analysis of central nervous system toxicity carried out by Kramer in 1980<sup>3</sup> divided 13 reported cases of seizures associated with application of 1% lindane into six probable, five possible and two unlikely adverse drug reactions. Of the six probable adverse drug reactions, four clearly resulted from inappropriate use of the drug. Given that the itch from scabies persists for some time after the infestation is treated, patients may be tempted to repeat applications leading to adverse effects, unless they are appropriately warned. Lindane preparations can be acquired without prescription, increasing the potential for inadvertent self-poisoning.

## Blood dyscrasias

Less clear is the relationship between lindane and blood dyscrasias. About 30 cases of aplastic anaemia have been detected in patients with commercial exposure to lindane.<sup>9-11,15-17</sup> Small numbers of cases of anaemia, Schönlein-Henoch purpura and leukaemia have also been reported.<sup>15</sup> More recently a case of aplastic anaemia in a 12-year-old boy following exposure to lindane has been reported in North Wales (Rugman F. Personal communication, 1988). Samuels and Milby demonstrated significantly higher reticulocyte counts, increased total white cell counts and higher polymorphonuclear leucocyte counts in a population with occupational exposure to lindane.<sup>11</sup>

However, Traczyk and Rudowski concluded that organochlorine insecticides may influence blood cell functions even in a dose detectable in the blood of the average human population.<sup>24</sup> Traczyk and Rudowski<sup>24</sup> also refer to the work of Komorova, who found significantly higher concentrations of lindane at autopsy in the bone marrow of patients with aplastic anaemia than with other diseases.

## Worldwide lindane use and background exposure

The opinion that lindane is safe in its medicinal application must be set against the fact that lindane is ubiquitous and accumulates in the adipose tissue of the general population.

The World Health Organization sets the maximum acceptable dietary intake of lindane at 0.01 mg per kg per day. Lindane is present in all soils and many foodstuffs and can be detected at varying background levels in the adipose tissue of most of

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the population of Europe.<sup>18</sup> This is the result of massive production of lindane for its many commercial uses; in Europe 3.5, 1.7 and 0.1 million kg per year are produced in France, Germany and Spain, respectively.<sup>18,19</sup>

Last year the House of Commons Agricultural Committee published a draft report calling for more stringent and open evaluation of the hazards posed by pesticides.<sup>25,26</sup> The report suggests a centralized system to coordinate all reports of pesticide poisonings and calls for more research into the long term effects of pesticide exposure.

### Implications for prescribers

Despite potential toxicity, 1% lindane lotion is effective and easy to use, and many clinicians consider it the scabicide of choice.<sup>1-3,5,8,27,28</sup> There are no well controlled studies comparing lindane with other available agents; each of the alternatives has its own drawbacks and none is fully researched.

Malathion is effective<sup>29</sup> but has an incomplete toxic profile. Sulphur is messy and odorous, but has been used with success since Roman times. Benzyl benzoate is relatively harmless, but frequently causes dermatitis. Crotamiton seems safe and easy to use, but its efficacy is debated.<sup>30</sup>

Many dermatologists consider a combination of sulphur and crotamiton a safer treatment than lindane for infants, young children, pregnant or lactating mothers, and those with excoriated skin. How far such caution should extend is a subject for discussion. The answers lie in careful prospective research and more complete data for potentially less toxic alternatives.

Until more research reveals safer alternatives it seems prudent to observe the following precautions when prescribing lindane:

1. Avoid use of lindane in children under 10 years old, especially infants, pregnant or lactating mothers, those with a history of neurological disorders, and those with badly excoriated skin.<sup>1,8</sup>
2. Discourage hot soapy baths before treatment as this increases skin permeability and subsequent body dose. Advise thorough removal by bath or shower six hours after application.<sup>1,5,8</sup>
3. Avoid repeat application and avoid prescribing large amounts of solution.<sup>1,5,8,16</sup>
4. Warn patients about the toxic nature of lindane when incorrectly used, and remind them that the itch persists after the infection has gone.<sup>1,5,16</sup>
5. Report suspected adverse reactions, particularly central nervous system symptoms or haematological disorders.<sup>1,5</sup>

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## MRCGP EXAMINATION – MAY/JULY 1989

The dates for next year's examination are as follows:

Written papers: Tuesday 9 May 1989 at centres in London, Manchester, Edinburgh, Newcastle, Cardiff, Belfast, Dublin, Liverpool, Leeds, Birmingham and Bristol. Oral examinations: in London from 29 June to 8 July inclusive and in Edinburgh from 26 to 28 June inclusive. The closing date for applications is Friday 24 February 1989.

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