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TREATING LICE AND SCABIES INFESTATIONS

(OUR BACK-TO-SCHOOL ISSUE!)

Treating Lice and Scabies Infestations

Pharmacology Literature Reviews

Formulary Update

It has been estimated that more than 2 million school-age children develop a lice or scabies infestation each year (1). More than half of those children will pass along the condition to another family member. People living in nursing homes, as well as hospitalized patients and homeless persons are also considered to be at risk for infestation (2). A number of topical pediculicides and scabicides are available to eradicate these parasites. For the health care professional, the choices can be overwhelming: prescription or over-the-counter products, cream or shampoo method, with single or multiple applications. This brief article will review the active ingredients of the products currently on the market, including their advantages and disadvantages and provide basic guidelines for use. For information on the diagnosis and clinical presentation of these patients, readers are encouraged to refer to one of the recent review articles on this topic (3-6).

Active Ingredients

Lindane

Known to most clinicians by its common trade name Kwell®, lindane has been the agent of choice for treating lice and scabies until recent years. Lindane is the pure gamma isomer of hexachlorocyclohexane and has been in use for more than 50 years.5 It is available, by prescription, as either a lotion or a cream for scabies, or as a shampoo for head lice.7 Lindane has a prolonged killing time of up to 190 minutes, but no residual activity after removal from the skin. Its success rate is considered to range from 45-76%, primarily dependent on variations in the application process. For most patients, two applications are necessary (5). Lindane is available in generic formulations, and costs approximately $4.00 to $5.00 per treatment. The use of lindane may be limited by the potential for adverse effects, including aplastic anemia and neurotoxicity. Lindane acts by stimulation of the neuronal inhibitory activity of GABA within the parasite. While it is a very effective treatment, there has been growing concern over the potential neurotoxic effects of lindane in the patient (3,8-11). While absorption of clinically significant quantities during routine use appears rare, patients with open skin lesions may absorb greater quantities. In addition, toxicity is possible from accidental or intentional oral ingestion (3). Following systemic absorption, symptoms range from dizziness and hallucinations to involuntary motor movement and seizures. Due to the extensive penetration of lindane into the CNS, serum concentrations do not accurately predict toxic manifestations (8).

It has been recommended that lindane-containing products not be used in patients with known seizure disorders (3). Recently, it also has been suggested that patients with HIV infection not be treated with lindane due to their increased susceptibility to seizures (11).

Pyrethrins

Unlike lindane, pyrethrin-based products are available without a prescription. These agents are useful for treating lice only, not scabies. Pyrethrins are derivatives of pyrethrum plants (chrysanthemums) and function as natural pesticides. They act as a toxin to the parasite's nervous system, damaging nerve cell membranes by disrupting the sodium channel current and delaying repolarization. As a result, the parasites are paralyzed. Most products on the market combine pyrethrins with piperonyl butoxide for a synergistic effect. Success with these products is estimated to be 30-75%. The killing time of pyrethrins is only 10-20 minutes and they have no residual activity. In most cases, a second application seven to ten days after the initial treatment is recommended (12).

A variety of shampoo-like products are available, including liquids, gels, and foams. Common trade names are RID®, R&C®, Licetrol®, Pronto®, and A-200 Pyrinate®. Many pharmacies also carry a store brand that is considerably less expensive. In the Charlottesville area, pyrethrin-containing products range in price from $5.00 to $8.00 for a single treatment. Several products are available in family kits designed to treat up to four people. These kits generally cost between $12.00 and $17.00. Most products contain a fine-toothed comb for removal of nits and several include a spray for cleaning household objects. Families should be instructed to follow the package instructions carefully and to contact a health care provider for assistance.

Permethrin

Permethrin is a synthetic analog of the pyrethrins (1). Permethrin is active against both lice and scabies. Clinical trials have demonstrated an efficacy of 97-99%. While the killing time of permethrin is similar to the pyrethrins, it has been shown to have residual activity for up to 10 days after application (12). As a result, only one application is needed for most patients.

Adverse effects with permethrin appear to be limited to transient erythema and pruritus. These effects are difficult to distinguish from the characteristics of the infestation itself. It has been estimated that less than 2% of a treatment is systemically absorbed. It is considered the first-line treatment by many clinicians because of its efficacy and safety profile (1).

Several clinical trials have shown permethrin to be superior to lindane in the eradication of both scabies and lice. In addition to being more effective, it appears to be better tolerated (13-17). Permethrin also has been shown to be more effective than pyrethrin products (18). Clore and colleagues performed a randomized, double-blind trial comparing lindane, permethrin, and several pyrethrin-containing products in 223 school children with head lice (19). The authors found that permethrin, used with a nit removal comb, successfully eradicated lice in a significantly greater number of children. Only one of the 33 children treated remained infested at the end of the two-week study period.

Interestingly, the authors also found that the pyrethrin products were more effective than lindane.
Permethrin is available in two forms. The 5% cream (Elimite®) is used for treating scabies. Elimite® is available by prescription only and costs between $5.00 to $10.00 for a 2-ounce tube. A typical adult will use approximately one ounce per application. Children under 12 years of age should use 1/2 ounce. Nix®, a 1% liquid cream rinse for treating head lice, is available without a prescription. The Nix® kit comes with a nit-removal comb. The average cost of a single treatment package of Nix® in the Charlottesville area is $9.00 to $11.00. A family kit typically costs between $15.00 and $20.00.

Crotamiton

Crotamiton (Eurax®) is an alternative for the treatment of scabies. It is available by prescription only, in a 10% strength in both cream and lotion forms (12). Its mechanism of action is not known. The success rate for eradication is only 40-50%. When compared to permethrin, crotamiton is significantly less effective. In a double-blind comparative trial involving 96 children aged 2 months to 5 years, crotamiton had an eradication rate of 60% four weeks after a single treatment, while 89% of the patients treated with permethrin were successfully treated (20). Some authors have suggested serial applications daily for a period of five days to increase crotamiton's efficacy (3,5). Crotamiton is one of the most expensive treatments, costing approximately $16.00 for a 2-ounce tube or $18.00 for a 2-ounce bottle.

Malathion

Malathion is an organophosphate used for treating head lice. Among the pediculicides, it has a unique mechanism of action, causing cholinesterase inhibition in the parasite. It has an effective killing time of only four to five minutes, but it has residual activity for up to one month after application. This occurs through a slow bonding of the malathion to the sulfur atoms in the hair shaft. As a result, its efficacy approaches 95% (12).
The 0.5% lotion dosage form (Ovide®) contains flammable isopropyl alcohol as a solvent. With safer alternatives on the market, the role of this therapy appears limited. If it must be used, patients should be cautioned about the use of hair dryers following treatment. Although there have been few reports of toxicity, approximately 8% of a dose is absorbed systemically. Ovide® is available only with a prescription (5).

Treating Infants and Pregnant Women

The use of scabicides and pediculicides in infants and pregnant women is frequently a concern of health care providers. While most of these products do

not provide information on the package label for young children, this is often the very population most likely to need them. It has been suggested that the prevalence of scabies is greatest in children less than two years of age (3). There has been little published in the medical literature regarding the treatment of these patients, and most papers are in the form of case reports and case series. Many clinicians have elected not to use lindane in infants or pregnant women (4,21). The increased skin surface area of infants may place them at risk for greater systemic absorption. The potential for teratogenicity with lindane is unknown. At this time, there have been no reports of fetal malformations in infants of mothers treated with lindane (5). If it is to be used, the manufacturer recommends no more than two applications during a single pregnancy (6). Permethrin appears to be a safe and effective alternative for these patients (3,4,21). It has been used successfully in children as young as one month of age (21). Crotamiton also has been marketed as an alternative for young children, but is not recommended due to its limited effectiveness.

Lindane is secreted in small amounts into breastmilk. There have been no reports of neurotoxicity in infants of mothers who have been treated. However, if a nursing mother must be treated with this agent, an alternative method of feeding may be used for a period of four days to avoid any potential drug transfer (6). There is currently no information on the transfer of pyrethrins or permethrin into breastmilk.

Patient Instructions

Specific instructions for use are provided with all the products discussed above. In addition, patient information sheets have been published which describe the parasites and the need for eradication (4,7). The following general instructions may be useful for counselling families.

Treatment of Head Lice

1. Apply product to dry hair until completely covered. Allow to remain in place for 5-10 minutes (see package instructions).
2. Add water and work shampoo into a lather. Rinse thoroughly.
3. Use a nit-removal comb to comb hair. Often, more nits may be removed if the hair is back-combed (starting at the ends and combing towards the scalp).
4. Perform a second application only if recommended by your physician or if described in the package instructions.
5. Inspect all family members and treat as needed.

Treatment of Scabies

1. Apply a thin layer of cream or lotion to dry skin. If the patient has recently bathed, allow the skin to dry and completely cool before application. Rub in thoroughly.

2. Trim nails and apply lotion/cream under nails with an old toothbrush. Discard toothbrush after use.
3. Apply lotion/cream over the entire body in children and from the neck down in adults. Include hands and soles of feet.
4. Leave in place for 8-12 hours (usually overnight). For young children, cover hands and feet with heavy socks to prevent possible licking of medication.
5. Remove medication by bathing or showering.
6. Reapply medication only if indicated by your physician.
7. If applying lotion/cream to another person, wear rubber gloves.
8. Inspect all family members and treat as needed.

In addition to the application of these products, families should be counselled to launder all clothing and bed linens the infested person has used in hot water. Personal items that cannot be washed or dry-cleaned should be sealed in a plastic garbage bag for a period of one to two weeks to ensure the elimination of all insects. Families should be told to expect the itching to remain for up to one month after treatment. Antihistamines, such as diphenhydramine, and topical corticosteroids may help to relieve some of the pruritus associated with lice or scabies (3,7).

Conclusions

At UVa, crotamiton, lindane, and 5% permethrin cream are on formulary. In a typical community pharmacy, the choices are even greater. The selection of product should incorporate efficacy, safety, cost, and availability, as well as patient and family preference. While having at least one episode of lice or scabies often seems to be a rite of passage of childhood, the good news is that there are many safe and effective products from which to choose and that, in most cases, a single treatment will eradicate the problem.

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Pharmacology Literature Review

Assessing MedWatch

This report from the FDA is an attempt to summarize the changes seen in adverse drug reaction reporting since the initiation of the MedWatch project (for more information about MedWatch, refer to Pediatric Pharmacotherapy, Volume 1, Number 3, March 1995). Improvements in the descriptions for determining adverse reaction severity appear to have increased the percentage of reports which are truly of a significant nature. The section for describing required interventions, however, continues to be misused. Revision of the form in an effort to clarify this section is being considered. The MedWatch group is also

interested in reducing the lag time for submission. The average time delay between adverse event and report submission was three months. Piazza TD, Kennedy DL. Reporting of adverse events to MedWatch. **Am J Health-Syst Pharm 1995;52:1436-9.**

Asthma Therapy in Adolescents

The results of a discussion group of adolescents with asthma is presented. A group of 28 adolescents receiving treatment for asthma were asked to participate in a focus group and complete a questionnaire about their treatment. Most of the teens considered themselves compliant with prescribed regimens, but wanted more information about the potential adverse effects and cost of different therapeutic options. The major issue cited by group members as a problem was the conflict with adults (parents, teachers, physicians) regarding control of their therapy. Most teens evaluated wanted total responsibility for their treatment. Slack MK, Brooks AJ. Medication management issues for adolescents with asthma. **Am J Health-Syst Pharm 1995;52:1417-21.**

Cefixime Review

This review of cefixime (Suprax®) provides a detailed description of the drug's antibacterial spectrum, pharmacokinetics properties, adverse effects, and recommended dosages for treating lower respiratory tract infections. Although the adult population is the primary focus of the review, information on treating children is included. Markham A, Brogden RN. Cefixime: A review of its therapeutic efficacy in lower respiratory tract infections. **Drugs 1995;49(6):1007-22.**

Dilution of Medications for Neonates

The authors present the system developed at Texas Children's Hospitalfor diluting IV medications for use in their neonatal intensive care units. This procedure, similar to the one used at UVa, sets standard concentrations for each medication in an effort to eliminate excessive fluid administration and reduce drug wastage. Nieuwoudt CD. Dilution of intravenous medications for neonates. **Am J Health-Syst Pharm 1995;52:1320-2.**

Pemoline-associated liver failure

This is the third report of fatal hepatotoxicity associated with the use of pemoline for attention deficit-hyperactivity disorder. A 14-year old boy was being treated

with methylphenidate and pemoline for over one year before beginning to exhibit signs of toxicity. Liver function tests as well as clotting studies were abnormal. Biopsy showed 90% multilobar necrosis, inflammatory changes and cholestasis. Berkovitch M, Pope E, Phillips J et al. Pemoline-associated fulminant liver failure: Testing the evidence for causation. **Clin Pharmacol Ther 1995;57:696-8.**

Zidovudine in Pregnancy

This concise article provides the basic guidelines for the use of zidovudine in pregnant women to reduce the prenatal transmission of HIV infection. Criteria for use, dosing guidelines, and monitoring parameters to assess toxicity are provided. De Santis M, Noia G, Caruso A et al. Guidelines for the use of zidovudine in pregnant women with HIV infection. **Drugs 1995;50(1):43-7.**

Formulary Update

The following actions were taken by the Pharmacy and Therapeutics Committee at their meeting on 7/28/95:

1. Losartan (Cozaar®) was added to the fomulary. This is the first angiotensin II antagonist available for the treatment of hypertension. It blocks binding to the AT1 receptor, inhibiting vasoconstriction and aldosterone secretion. This agent has not been studied in children.
2. Fluticasone nasal spray (Flonase®) was also approved. It is an intranasal steroid for the treatment of allergic rhinitis. The manufacturer recommends a dose for adolescents > 12 years of age of 100 mcg (1 spray in each nostril) once or twice daily. Additional research has shown this dose to be safe and effective in children as young as four years of age (see J Pediatr 1994;125:628-34).
3. Norgestrel (Ovrette®) was added as a progestin-only option in oral contraceptives.
4. Loratadine (Claritin®) was added as an alternative non-sedating antihistamine. It offers the advantage of once daily dosing, as well as a decreased incidence of cardiac adverse effects and drug interactions than terfenadine. It is also less expensive. A dose of 5-10 mg once daily has been used in children (see Clin Therapeut 1993;15:855-65).
5. The following medications were removed from the formulary:

   fenoprofen, meclofenamate, and quinine sulfate.

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