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Authors

Connor, Cody J
Selby, John C
Wanat, Karolyn A

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Case report

Severe pediculosis capitus: a case of “crusted lice” with autoeczematization

Cody J Connor MD^{1,2}, John C Selby MD PhD³, Karolyn A Wanat MD^{3,4}

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¹**University of Iowa Carver College of Medicine, University of Iowa Hospitals and Clinics**

²**Broadlawns Medical Center, Department of Family Medicine (Des Moines, IA)**

³**Department of Dermatology at the University of Iowa Hospitals and Clinics (Iowa City, IA, USA)**

⁴**Department of Pathology at the University of Iowa Hospitals and Clinics (Iowa City, IA, USA)**

Correspondence:

Dr. Karolyn Wanat
200 Hawkins Drive
Iowa City, Iowa 52242 USA.
Email: Karolyn-Wanat@uiowa.edu
Telephone: 319-356-1694
Fax: 319-356-0349

Abstract

Pediculosis humanus capitus infestations are common and classically present with intense pruritus of the scalp. Although many treatment options are available, lice are becoming more resistant to conventional therapies and severe clinical presentations are bound to become more prevalent. We present a case of treatment-resistant pediculosis capitus resulting in diffuse autoeczematization of the torso and extremities and severe crusting and scaling of the scalp, which we called “crusted lice.” This eruption differs from the well-described id reaction known as “pediculid” and represents a more dramatic manifestation of rampant infestation. This paper provides an up-to-date review of treatment options available for pediculosis humanus capitus, including newer medications like the ones that eventually led to resolution of our patient’s extreme infestation.

Keywords: Lice, Pediculosis capitus, treatments, ivermectin, spinosad, autoeczematization

Introduction

Pediculosis humanus capitus is a common infestation resulting in extensive pruritus of the scalp. Although a variety of treatments are available, resistance to many first line options is increasing and cases of extreme infestation are bound to become more common. We present a case of *P. capitus* leading to severe autoeczematization and a “crusted lice” appearance.

Case synopsis

A woman in her 50s with mild mental impairment presented with 4 months of intense pruritus and rash on the face and body. She had previously been diagnosed with both lice and scabies and had received treatment with numerous agents, including a

prednisone taper, permethrin 5% cream, triamcinolone 0.025% ointment, clobetasol 0.05% solution, fluocinonide 0.05% cream, and hydroxyzine, without improvement.

Physical exam revealed innumerable nits and live lice on the scalp and neck; extensive erosions, serous crusting, and scaling were evident (Figure 1A). There were also diffusely scattered, erythematous and ill-defined, eczematous patches on the face, trunk, and extremities (Figure 1B). There was no evidence of body lice or eggs and scrapings were negative for fungal and scabetic elements. During treatment for lice and secondary auto-eczematization, the patient did develop fluctuant abscesses on the bilateral lower extremities. These were treated with incision and drainage and sent for culture, which subsequently grew *Staphylococcus aureus*.



Figure 1. Extensive *Pediculosis humanus capitis*. (a) There are numerous nits with extensive live lice leading to serous crusting, extensive scaling, and erosions on the scalp (b) Autoeczematization of the torso secondary to severe infestation

The patient was diagnosed with an extensive infestation of *P. humanus capitis* with secondary, diffuse autoeczematization: so-called “crusted lice.” Because of prior failure to improve with permethrin, treatment with oral ivermectin 250 mcg/kg dose, spinosad 0.9% suspension (preferred treatment option by patient’s insurance), combing, environmental decontamination, and hair cutting was instituted. For her secondary infection she was empirically treated with doxycycline; she completed a 14 day course. In combination, the aforementioned treatments resulted in dramatic improvement and resolution of the patient’s symptoms. Her dermatitis also cleared with triamcinolone 0.1% cream and hydroxyzine. At a two-month follow-up, the patient had complete resolution.

Discussion

Our patient’s significant infestation resulted in an autoeczematization reaction, which has rarely been reported. Severe eczematous dermatitis in association with *P. capitis* was initially reported in 1946 with other reports occurring since that time [1, 2]. However, it differs from the reaction known as “pediculid,” which demonstrates flesh-colored papules coalescing into plaques rather than an eczematous dermatitis [3].

Identification of the cause of the eczematous dermatitis in a pediculid reaction is important and prompt treatment of the infestation is necessary while treating the hypersensitivity reaction with topical steroids. Several classes of medications exist including topical pediculicides, oral therapies, physical agents, and behavioral interventions. First-line therapy involves the use of topical pyrethroids: permethrin or pyrethrin. These have largely replaced older pediculicides like malathion and lindane, which remain second-line agents but are associated with increased toxicity as well as flammability. Unfortunately, resistance is increasing against this class of drugs, with studies reporting failure rates as high as 82% for permethrin and 64% for malathion [4]. Piperonyl butoxide is a supplemental agent that prevents pyrethrin catabolism and can be used to increase effectiveness. Newer topical agents include ivermectin, benzyl alcohol, and spinosad [5-7]. Spinosad has shown to be more effective than permethrin [7], whereas ivermectin and benzyl alcohol have not been directly compared to other agents. Oral therapy with ivermectin (200-400 mcg/kg/dose every 7 days for 2 doses [8]) or trimethoprim-sulfamethoxazole (10 mg/kg/day trimethoprim in 2 doses for 10 days [9]) can also be used for treatment (review of medications, including dosage, mechanisms of action, and approximate cost, is available in Table 1).

Table 1. Summary of medications used for treatment of pediculosis capitus, including mechanism of action, approximate cost, age of use, and advantages and disadvantages

Treatment	Mechanism: Pediculocidal/ Ovicidal	Advantages	Disadvantages	Cost/Standard Treatment (30 mL/g + repeat), \$	Application Instructions	Age Group
Permethrin 1% (Nix)	Neurotoxin that prolongs sodium channel activation in neurons: Pediculocidal	Good clinical support and familiarity, available OTC, short treatment duration	Risk of resistance, requires repeat treatment and combing since not ovicidal	11	Wash hair with regular shampoo and dry. Saturate scalp with lotion. Leave on for 10 minutes. Rinse. Repeat in 1 week.	2 months and up
Pyrethrin + Piperonyl butoxide (Rid)	Neurotoxin that prolongs sodium channel activation in neurons. Piperonyl butoxide acts synergistically by decreasing louse metabolism of pyrethrin: Pediculocidal	Good clinical support and familiarity, available OTC, short treatment duration	Risk of resistance, requires repeat treatment and combing since not ovicidal	11	Wash hair with regular shampoo and dry. Saturate scalp with lotion. Leave on for 10 minutes. Rinse. Repeat in 1 week.	2 years and up
Malathion 0.5% (Ovide)	Organophosphate parasympathomimetic: irreversibly binds and inhibits cholinesterase: Pediculocidal and ovicidal	Less resistance than other insecticides	Cost, risk of resistance, flammable, long treatment duration, contraindicated in children	73	Wash hair with regular shampoo and dry. Apply lotion to scalp. Leave in place for 8-12 hours. Rinse. Single application usually sufficient. May repeat if live lice seen 7-9 days later.	6 years and up
Lindane Shampoo	Neurotoxin that interferes with GABA _A receptor-chloride channel complex: Pediculocidal and ovicidal, though low ovicidal activity (30-50% of eggs not killed)	Can be effective as 2 nd line agent, short treatment duration	Cost, risk of resistance, rare neurologic toxicity→reported instances of seizure and death, enters breast milk, Contraindicated in patients with skin conditions increasing skin permeability (e.g. psoriasis, eczema)	66 (for one 30 mL application and no repeat) 133 (for one 60 mL application and no repeat)	Wash hair with regular shampoo and dry. Gloves should be worn to avoid unnecessary exposure (latex not as effective as other options), apply to hair and scalp without water (30 mL average, 60 mL max for thicker, longer hair), wash out exactly 4 minutes later, wash hands well. Retreatment should be avoided.	2 years and up
Ivermectin 0.5% (Sklice)	Enhances inhibitory neurotransmission by activating glutamate-gated chloride channels, inducing paralysis and death: Pediculocidal and ovicidal	Short treatment duration, generally well-tolerated	Cost, new agent with less empirical support	70 (no repeat required)	Wash hair with regular shampoo and dry. Saturate scalp with lotion. Leave on for 10 minutes. Rinse. No repeat treatment required.	6 months and up
Spinosad 0.9% (Natroba)	Hyperexcitation of nervous system by binding nicotinic acetylcholine receptors and also acting as GABA agonist: Pediculocidal and ovicidal	Single application often sufficient, short treatment duration, demonstrated superior efficacy to	Very high cost, newer agent with less empirical support	270 (if repeated)	Wash hair with regular shampoo and dry. Saturate scalp with lotion. Leave on for 10 minutes. Rinse. Repeat in 1 week if live lice present.	Approved for ages 6 months and up, but safety in children < 4 years old has not been established.

		permethrin				
Benzyl alcohol 5% (Ulesfia)	Paralyzes the louse's respiratory sphericles, allowing mineral oil and other ingredients to infiltrate the breathing apparatus and asphyxiate the parasite: Pediculocidal	Non-neurotoxic, safe in children as young as 6 months, lower risk of resistance, short treatment duration	New agent with less empirical support, systemic exposure has been associated with neonatal gasping syndrome	16	Wash hair with normal shampoo and dry. Saturate scalp with lotion. Leave on for 10 minutes. Rinse. Repeat in 1 week.	6 months and up. Safety in ages >60 has not been established.
Oral Ivermectin (Stromectol)	Binds glutamate-gated chloride channels, causing hyperpolarization of nerve and muscle and leading to paralysis and death: Pediculocidal and ovicidal	Good for infestation non-responsive to topical treatment	Expensive, systemic effects, pregnancy category C, enters breastmilk	52-104 ^a	200-400 µg/kg/dose every 7 days for 2 doses.	No age specification. Safety data not available in those weighing < 15 kg .
Oral TMP-SMX	Inhibits <i>de novo</i> biosynthesis of tetrahydrofolate, thus inhibiting DNA synthesis. This kills symbiotic bacteria in louse gut that produce B vitamins necessary for louse survival: Pediculocidal and Ovicidal	Available as generic, good for infestation non-responsive to topical treatment	Off-label and controversial use for lice, systemic effects, rare Stevens Johnson syndrome, renal impairment, hemolysis, neutropenia	Brand name (Bactrim): 34 ^a Generic: 13 ^a	10 mg/kg per day trimethoprim in two divided doses for ten days	2 months and up

^a Dosed for a 70 kg person according to mentioned schedule

Non-insecticidal options include physical agents like oils, butter, mayonnaise, petroleum jelly, and silicon-based dimethicone lotion, which suffocate the organism and may additionally disrupt water management in the parasites. Hot air has been explored as another alternative demonstrating high effectiveness [10]. Fine-tooth combing and shaving of the head are adjunctive measures, and environmental decontamination of bedding, clothes, and other fomites vehicles, is an essential component of any effective treatment regimen.

We present a case of florid pediculosis capitis infestation with autoeczematization. Although mild mental impairment may have affected compliance with conventional treatment, addition of oral ivermectin and topical spinosad effectively cleared the infestation and her autoeczematization. This case exemplifies dramatic presentation and the importance for physicians to adequately diagnose, treat, and follow-up to ensure successful resolution of head lice and prevent severe infestation.

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