CASE 9.3
Parasitic Infections | Level 2

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1. What subjective and objective evidence supports the diagnoses of pinworm infestation and head lice in this patient?

Pinworm and head lice infestation are distinctly different parasitic infections that both occur commonly in children of all socioeconomic classes. Pinworm, or *Enterobius vermicularis*, is the most common worm infection in the United States. The prevalence is as high as 50% in school-aged children along with their families or caregivers and in institutionalized children. Infection occurs only in humans and is caused by ingestion of pinworm eggs that subsequently hatch and mature in the small intestine. The mature female worm migrates to the colon and lays eggs around the anus usually at nighttime. Infection is easily spread to others via contamination of hands, clothing, bedding, and toilet seats with eggs.

Head lice infection, or *Pediculus humanus capitus*, is another common infection in school-aged children and their families or caregivers with up to 12 million infestations each year in the United States. It spreads through head-to-head contact with an infested person, wearing clothing worn by an infested person, using infested brushes or towels, or lying on bedding or pillows used by an infested person. Infection is propagated through adult lice that crawl from person to person. The adult females lay eggs (nits) that attach to hair shafts near the scalp and hatch within 1 week. Nymph forms then mature into adult lice about 7 days after hatching. The adult lice require frequent blood feedings from the scalp several times each day and will die within 1 to 2 days without a host. Risk factors for both pinworm infestation and head lice include young age because of the lack of attention to proper hygiene and spread of infection through close contact.

SUBJECTIVE FINDINGS OF PINWORM INFESTATION: The patient presented with a chief complaint of perianal itching and burning that began recently. The itching and burning were significant enough that they interfered with her sleep last night. She attends elementary school and daycare, and she recently spent prolonged time in close proximity with young family members, which are both risk factors for pinworm infestation.

OBJECTIVE FINDINGS OF PINWORM INFESTATION: On physical exam, she has perianal and perivaginal erythema and skin excoriations near her anus. The erythema extends to her groin, which indicates a possible secondary bacterial infection. The "tape test" is positive, indicating that pinworm eggs were present. This test is performed

by touching the perianal area with transparent tape in order to collect eggs that can be viewed under a microscope.

SUBJECTIVE FINDINGS OF HEAD LICE: The patient had no subjective findings related to head lice. As noted previously, her age, school and daycare attendance, and recent camping trip where she shared sleeping quarters with young family members are risk factors for contracting head lice.

OBJECTIVE FINDINGS OF HEAD LICE: The office nurse observed that the patient has been scratching behind her ears, and nits have been noticed at the base of her hair shafts behind the left ear and in the occipital area. These are common areas to find head lice. The presence of nits alone that are within ¼ inch of the hair shaft base is also suggestive of head lice infestation, but the diagnosis can only be confirmed if live lice are observed. This patient has been exhibiting symptoms (itching), but many children are asymptomatic.

2. Assess the use of hydrocortisone for this patient's symptoms related to pinworm infestation.

Hydrocortisone is a commonly used topical corticosteroid available without a prescription (0.5% and 1%) to treat inflammation and itching associated with various conditions including atopic dermatitis, contact dermatitis, insect bites, and psoriasis. Its action, in theory, is mediated by immune suppression of cytokines that promote vasodilation, inflammation, and pruritus. It should not be applied to broken or infected skin because systemic absorption is enhanced when the skin barrier is disrupted, and it can mask symptoms of local infections, potentially causing them to worsen if they are not treated with appropriate anti-infective therapy. This patient has perianal excoriations caused by scratching, and she has evidence of cellulitis that has spread to the groin area. Use of topical hydrocortisone should be discouraged because its vasoconstrictive and anti-inflammatory properties can make monitoring for improvement of the secondary bacterial infection more difficult. Treatment of the underlying condition with anthelminthic therapy will relieve the perianal pruritus.

3. Develop a pharmacologic treatment plan for this patient's pinworm infestation and head lice.

The goals of treatment for pinworm infestation are to relieve symptoms, eradicate the infestation, and prevent reinfection and transmission to others. Anthelminthic therapy is recommended and is available with or without a prescription. Pyrantel pamoate is a nonprescription oral anti-infective that causes neuromuscular depolarization and paralysis of adult worms, which subsequently detach from the intestinal wall and pass in the stool before their eggs can be laid on the perianal skin. One initial dose is given but is often followed by a repeat dose in 2 weeks because the medication only kills worms and not eggs or developing larvae. The second dose will kill worms that hatched from eggs still present after the first treatment dose; a second dose should be given if it is recommended by a primary care provider upon repeat examination, particularly if perianal itching or pain continue. Albendazole is an anthelminthic agent that interferes with the worm's ability to store glycogen and produce other energy sources, leading to its eventual death. It can be used in patients who fail pyrantel therapy or whose healthcare providers prefer its use; however, it requires a prescription, is more expensive, requires administration with high-fat meals, and may have more adverse reactions than pyrantel pamoate. It also usually requires two doses given 2 weeks apart to reduce recurrence. Mebendazole is similar to albendazole but is no longer available in the United States.

This patient should receive 187 mg (11 mg/kg) of pyrantel base per dose in an amount that is easily measurable; the dose should be rounded up to 250 mg given as 5 mL of the 50 mg/mL suspension. Pyrantel pamoate can be taken with or without food at any time of the day. Adverse reactions are uncommon but, if present, are usually mild and short-lived; they can include nausea, vomiting, diarrhea, abdominal cramps, and tenesmus. If she is still experiencing symptoms of perianal itching or pain 2 weeks after