Objective: To describe previously unreported oropharyngeal manifestations and management of caterpillar ingestion.

Design: Retrospective case series.

Setting: Tertiary children’s hospital.

Patients: A total of 733 cases of exposure to caterpillars from January 1, 1994, to November 1, 1997, were reviewed. Twenty-six patients had oropharyngeal exposure with 8 patients ingesting the caterpillar. Ages ranged from 7 months to 7 years with 14 boys and 12 girls.

Interventions: All patients had a thorough examination of the oropharynx for caterpillar spines. For children who ingested a caterpillar, direct laryngoscopy, bronchoscopy, and esophagoscopy with removal of caterpillar spines were performed.

Results: At the point of caterpillar contact, buried caterpillar spines with focal erythema were observed. The lips, tongue, and buccal mucosa were the most frequently involved areas. The esophagus was involved in 8 of the patients. No postoperative complications were noted.

Conclusion: With individualized care and prompt removal of venomous caterpillar spines, complications are not likely to result from caterpillar ingestion.


ONE OF the largest orders in the class of Insecta is Lepidoptera. This order is classified into more than 165,000 different species.¹ The term lepidoptera means “having scaly wings” (from the Greek lepis, meaning scale, and pteron, meaning wing). The larvae are commonly called caterpillars. The general term to describe toxic effects from exposure to caterpillars, moths, or butterflies is lepidopterism. In contrast to bees and scorpions, contact with most Lepidoptera species does not frequently produce severe or fatal symptoms.¹ In 1996, over 3700 incidents were reported to poison control centers in the United States, with over 1000 cases occurring in children younger than 6 years.² To our knowledge, there is no previously published study examining the oropharyngeal manifestations of lepidopterism. The following study will examine the presenting symptoms, physical examination findings, treatment method, and outcomes of children suffering from oropharyngeal lepidopterism.

RESULTS

A total of 733 patients exposed to caterpillars from January 1, 1994, to November 1, 1997, were reported to the Pittsburgh Poison Control Center. The most common presentation was from dermal exposure (675 patients), followed by oral exposure (55 patients), and ocular exposure (3 patients). Twenty-eight patients who were younger than 18 years and were subsequently evaluated for oropharyngeal lepidopterism at Children’s Hospital of Pittsburgh were included in the study. Of these 28 patients, 26 patients’ charts were available for review and make up this study group. Eight patients ingested the caterpillars and underwent operative management (group 1); 14 patients had only oropharyngeal contact but did not ingest the caterpillar (group 2); and 4 children had contact with a cocoon (group 3). Based on the description, the caterpillar was identified as the hickory tussock moth (Figure 1) in 6 of the 8 group 1 patients and 9 of the 14 group 2 patients. The species of caterpillar was not identified in any group 3 patients. The patients ranged from 7 months to 7 years of age (mean age, 19.9 months; median age, 18 months) with 14 boys and 12 girls. All patients were found to have at least 1 presenting sign or symptom immediately after coming into contact with the caterpillars or cocoons. Many of the 26 patients had more than 1 sign or symptom, with the most common be-
ing dysphagia (23 [88%]), and erythema at the site of contact (22 [85%]), followed by pain (18 [69%]), edema (17 [65%]), drooling (15 [58%]), pruritus (15 [58%]), and shortness of breath (1 [4%]).

Common sites of involvement in these 26 patients included the tongue (23 [88%]), lips (12 [46%]), buccal mucosa (12 [46%]), and palate (11 [42%]). Eight children who ingested the caterpillars underwent direct laryngoscopy, bronchoscopy, and esophagoscopy with microscopic removal of the spines. In these 8 children, the most common sites of involvement were the hypopharynx (6 [75%]), esophagus (5 [63%]), and larynx and trachea (1 [13%]). The spines were often embedded in the tissue and difficult to visualize and remove without magnification. Esophageal spines were especially difficult to remove. Nine group 2 patients had removal of the spines with conscious sedation in the emergency department. In 5 group 2 patients, no spines were initially visualized. Further inspection of these patients revealed deeply embedded spines in the tongue (Figure 2), palate, and buccal mucosa.

Steroid (dexamethasone or prednisone) was administered to 4 (50%) of the 8 group 1 patients, 6 (43%) of the 14 group 2 patients, and 2 (50%) of the 4 group 3 patients. Antibiotics (ampicillin and sulbactam [Unasyn], clindamycin [Cleocin]) were used in 3 (38%) of the 8 group 1 patients, 2 (14%) of the 14 group 2 patients, and none (0%) of the 4 group 3 patients. Antihistamines (Benadryl) were used in 4 (50%) of the 8 group 1 patients, 4 (29%) of the 14 group 2 patients, and all 4 (100%) of the group 3 patients. At telephone follow-up 2 days following treatment or discharge from the hospital, none of the patients was found to have complications.

**COMMENT**

The order Lepidoptera consists of a large variety of butterflies and moths. The larvae of these insects are commonly called caterpillars (from the Latin *catta pilosa*, or hairy cat). All Lepidoptera undergo complete metamorphosis with a 4-stage life cycle: egg, larva (caterpillar), pupa, and adult. After hatching, the larva undergoes a series of developmental molts (usually 5 or 6) and transformations (also known as instars). During the last instar, the pupa stage, the larva forms a cocoon and completes the transformation into an adult. At pupation, most of the larval organs degenerate, and new organs for adult forms are reconstituted in the cocoon. In most species, the venomous hairs appear in the second and later instars of larvae (Figure 1). In some species, the larval hairs are transferred and incorporated into the cocoons (Figure 3). The cocoons may have a higher concentration of spines than the caterpillars and become a greater source of irritation. Emerging from the cocoons, adults of many species lose their irritating hairs and become harmless. In most species, caterpillars abound in spring or early summer and the adults emerge in late summer and early fall. However, the puss caterpillar, common in Texas and the Gulf Coast states, demonstrates a reverse pattern with adults appearing in spring and caterpillars in late summer to early fall. An estimated 50 to 150 species have been implicated as a cause of lepidopterism, which is less than 0.1% of all species of butterflies and moths. There have been no deaths directly attributed to lepidopterism in the United States. Because of the size and shape of caterpillars, many nonvenomous caterpillars have been found as incidental foreign bodies in the ear, nose, and gastrointestinal

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**PATIENTS AND METHODS**

An initial retrospective review of all patients exposed to caterpillars and reported to the Pittsburgh Poison Control Center from January 1, 1994, to November 1, 1997, was conducted. The Pittsburgh Poison Control Center serves most of western Pennsylvania, West Virginia, New York, and eastern Ohio. In addition, the emergency department records of Children's Hospital of Pittsburgh in Pennsylvania were reviewed from January 1, 1996, to October 1, 1997, for patients evaluated for lepidopterism. All children younger than 18 years who were evaluated at this hospital for oropharyngeal exposure were included in the study. The charts were reviewed for a description of the caterpillar, presenting symptoms, physical examination findings, and treatment outcomes.

**Figure 1.** Hickory tussock moth caterpillar with numerous small, solid spines.

**Figure 2.** Caterpillar spine embedded on tongue causing edema and erythema.
People coming into direct contact with the spines of venomous caterpillar species may develop localized or systemic reactions. The spines may be hollow or solid. Hollow spines or spicules often contain various venoms. Localized inflammatory reactions of the eyes, respiratory tract, and skin have been reported. On rare occasions, tachycardia, arrhythmia, dyspnea, peripheral neuropathy, limb paralysis, and convulsions have been reported. In a study of 112 cutaneous caterpillar envenomations, localized pain, erythema, and edema were the most common symptoms. Several patients reported muscle spasms, numbness, and radiating pain in the involved extremity. To our knowledge, this is the first study to examine effects of oropharyngeal contact with venomous caterpillars. All the patients in our series developed an immediate localized reaction such as pain, erythema, and edema at the site of contact. Many patients subsequently developed dysphagia and drooling.

Envenomation can result from direct or indirect contact with the caterpillar or aerosolized spines. The mechanisms of local and systemic reactions caused by the spines (also called setae, nettles, spicules, flechette, and arrows) are unknown. There is evidence to suggest that mechanical irritation, hypersensitivity reaction to antigens in the spines, and presence of venom within the spines all contribute to the reaction. In pine processionary caterpillars, the protein thaumetopoein has been isolated. This protein can cause direct mast cell degranulation. In addition, histamine, tryptase, chymotrypsin, phospholipase, and serotonin have been isolated in other species.

Therapy for lepidopterism is symptomatic and supportive. No antivenom exists. Topical applications of corticosteroids and pramoxine hydrochloride may provide some relief for perioral cutaneous contacts. Systemic intramuscular triamcinolone acetonide has been successfully used in the treatment of pain and dermatitis. To remove spines embedded in skin, adhesive tapes can be used. Patients with drooling and dysphagia may require general anesthesia to determine the distribution of the spines and to facilitate their removal.

Individualized care with prompt removal of venomous caterpillar spines results in no complications.