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The oak processionary moth:

a new health hazard?

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INTRODUCTION

Although a native of southern Europe, the thermophilic oak processionary moth (OPM, *Thaumetopoea processionea*) is expanding its prevalence to encompass Central and Northern Europe. Roughly, over the past decade, the moth's range has spread northwards and the species has now became established in the warmer regions of Northern France, the Netherlands, the UK, and Germany.[1–3] In the UK, the moth occurs in Surrey and in parts of west London.[4] It is thought that the northward progression is due to a decline in late spring frosts, resulting in a more synchronous egg hatch.[4] Occurrence of caterpillar dermatitis has increased considerably, not only in gardeners, but also in people engaging in outdoor activities. The larvae of these caterpillars are equipped with fine, barbed hairs (setae, 0.2 mm), which can readily penetrate the human skin.[5,6] One of the major issues with the hairs is that they readily detach and can then be blown via wind currents for considerable distances. The older larvae (fifth and sixth instars) are of particular concern as they can carry up to half a million of the urticating setae per caterpillar. The spines can be active for up to 10 years, posing a long-term threat to human health (Box 1).

The caterpillars start emerging in late April, and can be seen marching on oaks in long head-to-tail lines in order to feed on the foliage of oak trees; hence the name 'processionary'. They are the larval stages of the OPM and June is the time of the year when they build their distinctive silken, web-like nests on the trunks of oak trees, typically about the size of a tennis ball (Figure 1). Not only do the caterpillars contain numerous urticating hairs with microscopic barbs but so do the nests. Control of the OPM is warranted for health reasons if affected trees are located in the vicinity of preschools, schools, or recreational facilities. The high-risk period stretches from mid-May to the end of August.

Box 1. Key information

- Urticating hairs can be active for up to 10 years
- A high number of cases go unreported
- First symptom is a severe itching
- Clinical signs vary from cutaneous lesions to conjunctivitis, pharyngitis, malaise, and anaphylactic reactions.

Figure 1. A nest of the oak processionary moth at an oak tree. ©Rahlenbeck.

HEALTH EFFECTS

The systemic health effects caused by adult moths can result in a variety of medical conditions referred to as lepidopterism (*Lepidoptera* is the order of insects that includes butterflies and moths), while the skin conditions caused by the setae of the larvae are referred to as erucism or caterpillar dermatitis.[2,6]

After exposure the skin is always affected, particularly the neck, face, arms, and legs. Contact with the hairs and a protein contained in it (thaumetopoein) results in a mechanical, pseudo-allergic skin sensitisation, including the release of histamine and other kinins, as well as the

Box 2. Signs and symptoms of a caterpillar dermatitis[2,6]

- Within minutes: severe pruritus
- Within 1–2 hours:
  - toxic-irritative
  - urticarial dermatitis
- After 6–8 hours; delayed reactions:
  - papular dermatitis (persisting)
  - papules/nodules resembling insect bite reactions (up to 4 weeks)

Box 3. Post-exposure prophylaxis

- Remove hairs (wearing gloves) using adhesive duct tape or wash hairs off
- Avoid introducing setae into home or living areas (clean shoes, remove setae using adhesive tape, vacuum)
- Remove all clothes (wearing gloves) and wash at 60°C
- Take a shower and wash hair
- If eyes are affected: rinse with water to remove setae, contact an ophthalmologist

development of a toxic-irritative dermatitis. Processionary caterpillars cause primarily a type I hypersensitivity reaction with the main complaint being intense itching. An erythema with wheals and flares is usually elicited within 1 hour after exposure and disappears within 24 hours. Some patients experience papules and nodules resembling reactions to an insect bite (Figure 2). Setae that is inhaled can result in an irritation of the upper respiratory system, with symptoms including cough and dyspnoea. When the eyes are affected, conjunctivitis and pronounced blepharal swelling can occur. Intraocular penetration of caterpillar hair resulting in ophthalmia nodosa has also been reported.[7,8] Generalised systemic symptoms may include fever, nausea, and malaise. An anaphylaxis syndrome with shock has been reported on rare occasions. The duration of symptoms usually extends for 1–2 weeks, but may persist for up to a month (Box 2).

The incidence of the condition can only be estimated, as the entity is not a reportable disease, with the result that patient numbers have not been registered in a systematic fashion. As no specific ICD-10-GM numbers are existing, an evaluation of health insurance data has not been possible. Severe itching is almost always reported, with conjunctivitis (15–20%) and irritation of the upper respiratory tract appearing in some patients (about 10%). One in four patients is usually a child or adolescent.

DIFFERENTIAL DIAGNOSIS

Presenting initially as a skin reaction, patients usually approach paediatricians and GPs. The differential diagnosis for skin reaction is broad and includes urticaria, allergic reactions, and insect bites. Early lesions of a bullous pemphigoid should be considered because of the bullous appearance, as should Sweet's syndrome and all forms of figurate erythema. When itchy papules are already in existence for some time (caterpillar dermatitis), any irritative dermatitis of other origin, and a polymorphous light eruption should also be considered. The same applies to all other diseases producing an exanthema as part of their presentation. Although patients' history of caterpillar setae exposure is a clue to the diagnosis, a skin biopsy with histopathologic analysis may also be helpful for a correct diagnosis. In the presence of conjunctivitis, pharyngitis, and asthmatic complaints, other allergic or toxic reasons must be ruled out.

TREATMENT

Management is symptomatic and supportive following recommended strategies of gently washing the urticating hairs off the skin or removing them using cellophane or adhesive tape. Clothes should be removed immediately and washed at a minimum of 60°C. With ocular manifestations, eyes should be washed and an ophthalmologist contacted. Conjunctivitis should be treated locally and may include application of an antiseptic (Box 3). Patients with intracorneal setae should be informed about the risk of intraocular penetration and followed up for a minimum of 6 months. Topical antihistamines and medium or high-strength corticosteroids can be applied to skin reactions. Use of nebulised and/or systemic bronchodilators may be administered for asthmatic bronchospasms. In severe cases, parenteral application of corticosteroids may be necessary.

OUTLOOK

Due to a lack of standardised methods for counting setae, it has been impossible to establish a dose–response relationship between symptoms and setae exposure. As a consequence, it is not possible to determine the levels of exposure that result in or trigger the various symptoms and/or the subsequent health condition that ensues. In addition, methods for dermatologic investigations are not available as yet, neither are diagnostic criteria, nor the syndromic classification of the entity. To this end, more research is required to understand the details of the pathogenesis of OPM-related health effects and the approach to adequately address the condition.

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