Ophthalmia nodosa and the oculoglandular syndrome of Parinaud*

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SUMMARY We present a case of ophthalmia nodosa and Parinaud's oculoglandular syndrome in a patient scratched by a cat six and a half months previously and who gave a positive result to an antigen test for cat scratch disease. In conjunctival swabs were also found urticarial hairs, tracheal fragments, processionary caterpillar oenocytes, and a grain of pollen. The pathogenic part played by each of these foreign bodies is discussed, as well as the possibility of the oculoglandular syndrome being due to the reactivation of a latent virus, the organism of cat scratch disease. So far as we know, this work provides the first description of the association of ophthalmia nodosa with the oculoglandular syndrome of Parinaud.

The hairs of certain insects or plants can penetrate the conjunctiva and the cornea to produce an inflammation named ophthalmia nodosa. The severe ocular reaction is the combined effect of two separate components, one mechanical and the other toxic.¹ The term 'ophthalmia nodosa' derives from the nodular conjunctival reaction.² Depending on the regions, the cause of the ophthalmia nodosa is mainly the needles of plants, such as the common burdock,^{1,3,4} or urticarial hairs of some caterpillars.^{5,7} According to Watson and Sevel⁸ only six varieties of caterpillars are known to cause ophthalmia nodosa. *Macrothylacia rubi* and *Arctia caja* are found only in the British Isles, while *Thaumetopoea pityocampa* Schiff (pine processionary), *Thaumetopoea jordana*, *Isia isabella*, and *Dendrolimus pini* may be found in other countries. Two other species may be added to these, namely *Thaumetopoea pinivora*, another pine processionary, and *Thaumetopoea processionea* L., an oak processionary.⁹ Furthermore, the oak processionary is supposed to have a greater urticarial impact than the pine caterpillar.¹⁰

The oculoglandular syndrome¹¹ is defined as a unilateral granulo-conjunctivitis associated with one or several pretragal and/or submaxillary adenopathies. Although in several cases the patients either

had been scratched or had simply come into contact with cats, many other causes of the disease have been reported (Table 1).

The explanation for the unusual association in the same patient of an ophthalmia nodosa and of an oculoglandular syndrome is suggested from histopathological examination of the lesions.

Table 1 Causes of the oculoglandular syndrome

Diseases	Responsible agents
<i>Frequent</i>	
Cat scratch disease	Unknown
Tularaemia	<i>Francisella tularensis</i>
Sporotrichosis	<i>Sporothrix schenckii</i>
<i>Occasional</i>	
Tuberculosis	<i>Mycobacterium</i>
Syphilis	<i>Treponema pallidum</i>
Coccidioidomycosis	<i>Coccidioides immitis</i>
<i>Rare</i>	
Pasteurellosis	<i>Pasteurella septica</i> <i>Yersinia pseudotuberculosis</i> , <i>y. enterocolitica</i>
Equinia	<i>Actinobacillus mallei</i>
Chancroid	<i>Haemophilus ducreyi</i>
Venereal lymphogeanuloma	<i>Chlamydia trachomatis</i> L, L2, L3
Listeriosis	<i>Listeria monocytogenes</i>
Actinomycosis	<i>Actinomyces israelii</i>
Blastomycosis	<i>Blastomyces dermatidis</i>
Mumps	<i>Paramyxovirus</i>
Infectious mononucleosis	Epstein-Barr herpes virus
Spotted fever	<i>Rickettsia conorii</i>

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Modified according to Chin and Hyndiuk.²⁴

Fig. 1 Characteristic aspect of the nodular lesions in ophthalmia nodosa.

Fig. 2 Macroscopic, nodular conjunctival lesion. (H-E, scale=200 μ m).

Fig. 3 Typical nodule in ophthalmia nodosa, centred by a caterpillar hair. Same slide as in Fig. 2. (H-E, scale=50 μ m).

Case report

CASE HISTORY AND STATUS OF THE EYE

A 56-year-old man, without a history of ocular disease, came to our outpatient department on 28 February 1983 suffering from unilateral conjunctivitis of the right eye since 21 February 1983. On examination, we observed conjunctival injection and marked inferior temporal chemosis but an unscathed cornea. The condition deteriorated in spite of an initial treatment with neomycin and bacitracin, followed by neomycin, polymyxin B, and dexamethasone. Taking a second case history revealed

that six and a half months earlier the patient had been scratched on the forehead and right eyelid by a cat. Around mid February 1983, a few days before the beginning of the conjunctivitis of the right eye, the patient had pulled down a caterpillar nest from a pine in his garden without taking any precautions.

On 18 March 1983, the right pretragal gland, palpable since the beginning of the disease, had become very enlarged and painful, measuring 5 by 7 cm; the conjunctival lesion of the right eye remained unchanged. Various investigations (general, ear, nose, and throat, blood tests) all gave normal results.

The patient's condition did not improve in spite of

Fig. 4 Tracheal fragments of the processionary caterpillar found in the conjunctival lesion. (H-E, scale=55 μ m).

Fig. 5 Tracheal fragments and eight oenocytes of the processionary caterpillar. Same slide as in Fig. 4. (H-E, scale=20 μ m).

Fig. 6 Grain of pollen found in the conjunctival lesion. (H-E, scale=30 μ m).

local and general antibiotic therapy (Spiramycin 2 g daily). Consequently on 29 March 1983 we performed an incision and drainage of the swollen gland. Examination (aerobic and anaerobic cultures) proved negative, and histological examination led us to the conclusion of reticulo-abscess lymphadenitis compatible with cat scratch disease. On 1 June 1983 we excised the conjunctival lesion, which had not regressed in spite of local treatment (Fig. 1). Histopathological examination showed the presence of granulomas containing foreign bodies, caterpillar hairs, tracheal fragments, caterpillar oenocytes, and a grain of pollen. On 13 June 1983 a thorough examination of the eye showed no other ocular

lesion. On 20 June 1983 an antigen test for cat scratch disease proved to be positive after 48 hours.

At follow-up on 25 June 1983 the patient was regarded as cured.

PATHOLOGY OF THE CONJUNCTIVAL LESION

Macroscopically. Characteristic nodular lesion measuring 5 mm in length, 2 mm in width, and 1.5 mm in height were observed. They were whitish yellow in colour, firm in consistency, and not adherent below (Fig. 2).

Microscopically. On light microscopy the conjunctival stroma was highly infiltrated by lymphocytes in which were found various badly delimited nodules

Fig. 7 Granuloma photographed within the pretragal adenopathy. (H-E, scale = 127 μ m).

made up of epithelioid cells and sometimes of giant multinucleated cells of the foreign body type. Serial slides showed various structures—caterpillar hairs (Fig. 3), tracheal fragments, oenocytes (Figs. 4 and 5), and a grain of pollen (Fig. 6). Although the circumstances of the onset of this condition, the macroscopic appearance of the lesion, and its histological appearances were pathognomonic according to Malan,¹² we wanted to ascertain whether the foreign bodies found on the slides did in fact come from processionary caterpillars.

PATHOLOGY OF THE PRETRAGAL ADENOPATHY

Histological examination showed a ganglionic stroma with micro-abscesses surrounded by histiocytes (Fig. 7). The histological image was compatible with cat scratch disease.

Morphology of the processionary caterpillar

The caterpillars studied, *Thaumetopoea pityocampa* Schiff, were captured at the larval stage on a black pine (*Pinus nigra*) in mid November 1983. Scanning electron and light microscopic examination allowed us to compare and recognise the various foreign bodies found in the conjunctival swab.

THE INSECT EYE AND URTICARIAL HAIRS

Urticarial hairs are implanted on the facets of the insect 'mirror',* including two small posterior and two large anterior facets (Figs. 8 and 9). The hairs

found elsewhere on the caterpillar body were not urticarial and did not become detached spontaneously. Experimental studies on the rabbit eye with hairs other than the urticarial ones of the insect eye did not provoke ophthalmia nodosa.¹³

TRACHEAL FRAGMENTS

The tracheal apparatus, highly developed in the caterpillar, is subdivided into a multitude of small tracheas, the smallest of which is intercellular.¹⁴

Discussion

In Switzerland ophthalmia nodosa is mainly caused by urticarial hairs of the pine processionary caterpillar. Their urticarial hairs, constituent elements of the 'mirror', measure from 0.08 to 0.16 mm depending on the age of the caterpillars.¹⁵ Contrary to what is generally thought, the hairs surrounding the 'mirror' do not play any part in the releasing of the hairs. When a 'mirror' opens, the hairs are carried away by the wind and break up at the slightest contact, thus releasing an unknown urticarial substance.¹⁶ When the urticarial hairs penetrate the human eye by an as yet unknown means,^{17, 18} they cause various complications, such as hypopyon ulceration, iritis, iridocyclitis, cataract, and even retinal detachment.¹⁹⁻²¹ The eyelid and conjunctival lymphatic drainage is carried out by means of the pretragal glands for the external part and by the submaxillary glands for the internal part.²² In this case the lesion situated in the conjunctival sac near the external angle is therefore related to the pretragal adenopathy, described as Parinaud's oculoglandular syndrome. However, so far as we know, ophthalmia nodosa has never been

*'Mirror' or group of papillae (Beille, 1896), cited by Pesce H, Delgado A. Poisoning from adult moths and caterpillars. In: Bücherl W, Buckley EE, eds. *Venomous animals and the venoms*. New York: Academic Press, 1971; 3: 142.

Fig. 8 Open mirror of the pine processionary caterpillar *Thaumetopoea pityocampa* Schiff (larval stage L4). Scanning electron microscopy. (Electron Microscopy Center of the Medical Faculty, Lausanne University. Scale=1 mm).

Fig. 9 Urticarial hairs. Enlargement of a bunch of hairs on the left upper facet of the mirror shown in Fig. 8. (Scale=100 μ m).

described in association with an oculoglandular syndrome,^{3 8 23 24} nor has the oculoglandular syndrome, with cat scratch disease as its most frequent cause, ever been described as appearing later than the sixth week after the scratching.²⁵⁻²⁷ Thus we realise that pretragal adenopathy is related not only to caterpillar hairs but also to some other pathogenic element, such as tracheal fragments, oenocytes, pollen, the cat scratch disease agent, or another.

TRACHEAL FRAGMENTS AND OENOCYTES

It was possible to identify tracheal fragments and oenocytes found in conjunctival tissue through a

review of the entomological literature,^{14 28-31} and from a comparison between the conjunctival and caterpillar slides. Oenocytes are cells of ectodermal origin, usually found in chain formation on the caterpillar walls³¹ in the vicinity of the trachea.¹⁴ The oenocytes produce lipoprotein, probably carried by oenocytoids. These lipoproteins are necessary for the formation of the caterpillar's cuticle.³² Are the oenocytes and their lipoproteins the responsible antigens or co-antigens in causing the adenopathy? If this were so, the association would probably be known, because when destroying a caterpillar nest one is exposed to hairs as well as to fragments.

POLLEN

Even though the patient had several types of allergy—for example, to penicillin and streptomycin—we think it most improbable that a black-pine pollen grain could be the cause of the oculoglandular syndrome. Clinical and laboratory tests possibly failed to reveal some other pathogenic agent, contracted by the patient at the same time or transmitted by the caterpillar fragments.

OTHER PATHOGENIC ELEMENTS

It is seldom that a second pathogenic agent is associated with the hairs of the processionary caterpillar. The only reported case was one described by Rhoner and Huber,³³ who, after having enucleated an eye for aspergillosis, found a caterpillar hair in the vitreous body. In the case we present here mycological tests proved to be negative.

CAT SCRATCH DISEASE

The cause of cat scratch disease is unknown, but atypical bacteria,³⁴ chlamydia, and a herpes-like virus³⁵ are possible. The scratches on the homolateral eyelid that the patient received six and a half months before the ophthalmia nodosa, the histological appearance of the adenopathy, and the presence of a positive antigen test to cat scratch disease all suggest the presence of this disease, whose causal agent, as in herpes infection, remains latent. So far as we know this report provides the first description of the association of ophthalmic nodosa and the oculoglandular syndrome of Parinaud.

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