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In Vivo Confocal Microscopy of Corneal Insect Foreign Body

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Purpose. To report a case of insect corneal foreign body with in vivo confocal microscopy performed. **Methods.** Clinical presentation, clinical pictures, and treatment are discussed. Confocal microscopy of the injured cornea was performed in areas showing foreign bodies with and without infiltrations seen under the slit-lamp. **Conclusion.** Confocal microscopy is useful in detection of subtle inflammatory reaction, monitoring the progress of the injury and decision of treatment plans.
Key Words: Cornea—Insect foreign body—Confocal microscopy.

CASE REPORT

A 36-year-old man experienced a direct impact injury to his right eye while riding a motorcycle without wearing protective eyewear. He presented with persistent foreign body sensation 2 weeks after the injury. The right eye visual acuity was 0.8 (20/25). Examination revealed multiple fine hair-like foreign bodies embedded in the peripheral corneal stroma (Fig. 1) with various degree of surrounding infiltrations (Figs. 2 and 3). The epithelium was intact with negative fluorescein staining. One of the foreign bodies was found lying on the anterior surface of the lens. The lens was still crystal clear and there was only mild anterior chamber inflammation (Fig. 4). The fundus was also normal. White-light tandem scanning confocal microscopy of the injured cornea was performed in areas showing foreign bodies with and without infiltrations seen under the slit-lamp (Figs. 5 and 6). Corneal infiltrates and anterior chamber inflammation cleared slowly. Topical combined antibiotics and steroid (dexamethasone 0.1% + chloramphenicol) treatment four times per day were gradually tailed off over 4 months. There was no residual corneal scar or posterior migration of foreign body.

DISCUSSION

Eye injury from insect parts is not a rare condition. Caterpillar hair, tarantula hair, bee stings, and insect wings have been reported as insect part injury.[1,2,3] Ophthalmia nodosa is the term used to describe ocular lesions caused by caterpillar hair—the most common type of insect eye injury.

The retained insect parts are usually very tiny and when inflammatory reactions are minimal, they can easily be missed even under slit-lamp biomicroscopy. Confocal microscopy has been shown to provide a noninvasive, detailed, real-time in-vivo visualization of corneal foreign body at a high magnification of 100–500×, compared with that of 50× (upper limit) of slit-lamp biomicroscopy.[4] In our case, white-light tandem scanning confocal microscope (ASL1000-ModelOS-1, New Orleans, USA) with a 24×/0.6 noncontact objective was used, allowing optical sectioning of injured cornea with a depth of field of 10–12 μm. The images were stored on VHS videotapes. The ASL Image Analyzer program was used to analyze the results. Foreign body penetration, activated keratocytes, inflammatory cells, and extracellular matrix

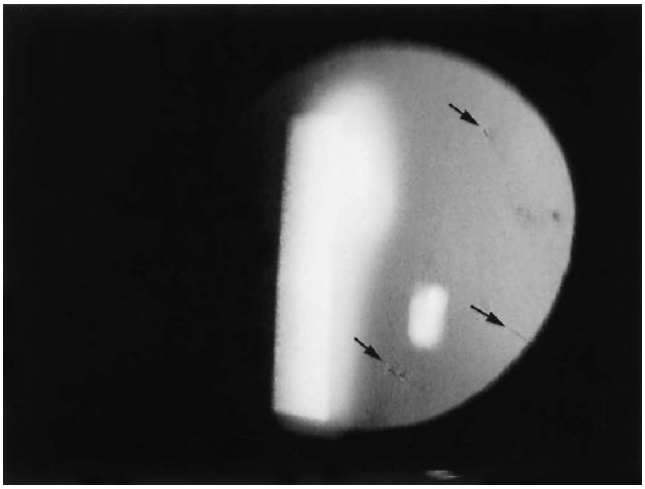

FIG. 1. Slit-lamp photo of the right eye of the patient under retroillumination, showing multiple hair-like foreign bodies (arrows) embedded in the superficial corneal stroma.

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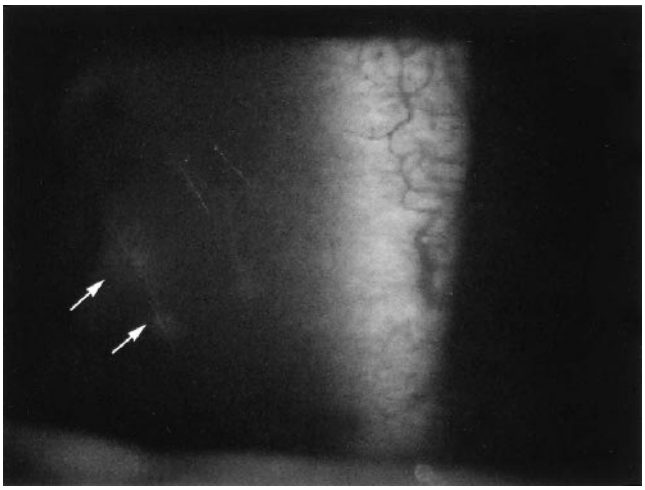

FIG. 2. Arrows showing foreign bodies with surrounding infiltrations visible under the slit lamp.

FIG. 3. Arrows showing foreign bodies with no surrounding infiltration visible under slit lamp.

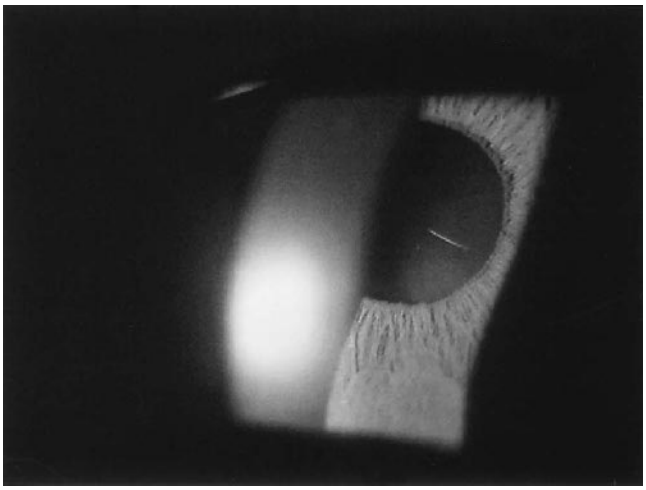

FIG. 4. A foreign body lying on anterior lens capsule without causing anterior chamber inflammation.

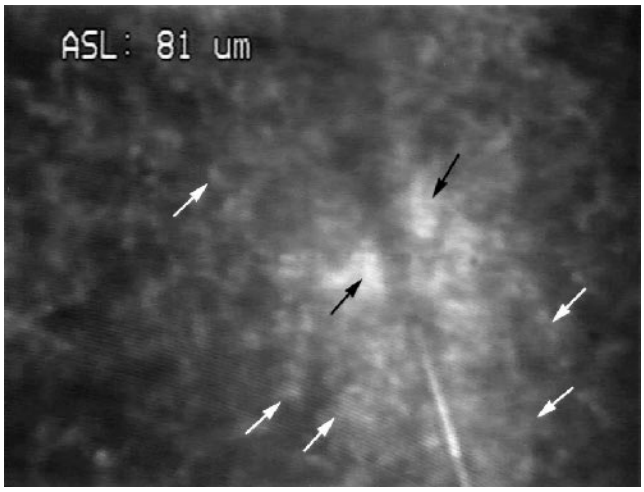

FIG. 5. Confocal microscopy of the anterior stromal foreign body corresponding to the area shown in Figure 2. Acute inflammatory cells (black arrows) are seen along the foreign body with extensive fibrocellular proliferative activities and dense reflective extracellular matrix depositions. The activated keratocytes (white arrows) are highest in density around the foreign body.

could be examined in detail. Our confocal microscopy findings were consistent with the slit-lamp findings in the area showing insect foreign bodies with surrounding stromal infiltrations. However, in area with no inflammatory reaction detected by the slit-lamp, confocal microscopy was also able to reveal activation of stromal keratocytes around the foreign bodies. Confocal microscopy is extremely useful in detection of subtle inflammatory reaction in these cases as its high magnification allows qualitative and quantitative assessments of cellular details that are not possible with just slit-lamp examination. In this case, the activated keratocytes that were invisible under the slit-lamp microscope appeared spindle-shaped, and signified active corneal inflammation. Serial confocal microscopy can thus be used to monitor the progress of anti-inflammatory treatment. Additionally, the confocal mi-

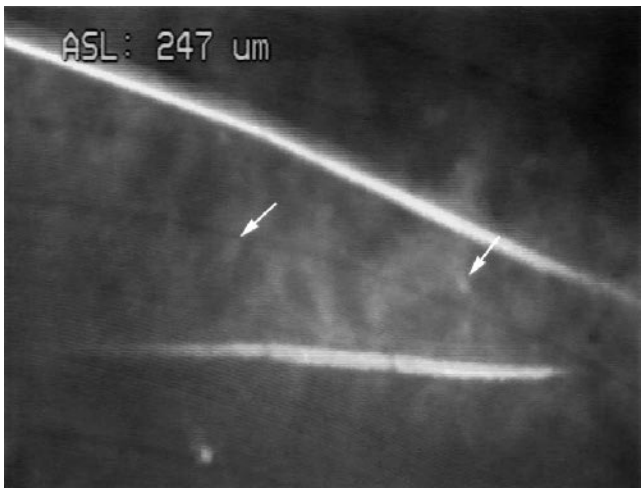

FIG. 6. Confocal microscopy of the foreign bodies corresponding to area shown in Figure 3. The fibrocellular proliferative activities are fewer and the intracellular matrix is clearer compared with those in Figure 5, with only moderate density of activated keratocytes (white arrows) seen along the foreign body.

croscope can accurately measure the depth of the lesion, which is not easily measured with the slit-lamp microscope due to light scattering and low magnification.

The treatment of ophthalmia nodosa has been suggested according to the different levels of ocular involvement.[1] However, there were still different opinions on the need for meticulous removal of foreign body.[1,5,6] As the depth of the foreign bodies inside the cornea can be documented under confocal microscopy, it may also be used to monitor any posterior migration that was generally accepted as an indication for surgical removal.

The use of protective eyewear while riding a motorcycling should be emphasized. Patients should also be advised to avoid eye rubbing when such an injury occurs.

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