Comments

Primary adenocarcinoma of the lacrimal gland is much less common than in salivary glands and represents 5–7% of epithelial malignancies in this location.[3] Previous reports of lacrimal adenocarcinoma have classified these tumours together as a single entity of adenocarcinoma or adenocarcinoma not otherwise specified.[4] However, recently ductal type of lacrimal adenocarcinomas have been reported [1,2] similar to histological subclassification of salivary gland carcinomas.[5] Lacrimal ductal carcinomas have a highly aggressive nature similar to salivary ductal carcinomas.[1]

In the first case, the patient underwent modified en bloc orbitectomy with postoperative radiation therapy, and the patient was alive and well without evidence of tumour recurrence 10 months after surgery.[1] In the second case, the tumour recurred in the subdural space after 2 years and it was removed.[2] The three cases including our case had rapid growth of the tumour, and had sought medical evaluation within 2 years of onset. Neurofibromatosis represents a major risk factor for the development of malignancy, particularly orbital meningiomas, both primary and secondary, nerve sheath tumours and optic nerve gliomas.[6]

In conclusion, malignant orbital tumours have to be considered in the differential diagnosis of proptosis in patients with underlying neurofibromatosis. Lacrimal gland carcinomas have to be subtyped, to predict the biological behaviour of the tumour and the prognosis. The invasive nature of the primary ductal adenocarcinoma of the lacrimal gland dictates aggressive therapy. Combination therapy of wide surgical excision, or even orbitectomy followed by radiation therapy is sometimes required.

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Sir,

Confocal microscopy in bee sting corneal injury
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A case of corneal bee sting injury with persistent corneal infiltrate was investigated with confocal microscopy, which showed multiple insect foreign bodies invisible under slit-lamp biomicroscopy. This report illustrates the additional value of confocal microscopy in detecting and perhaps identifying retained insect parts.

Case report

A 39-year-old Chinese male was stung in the right central cornea by a bee at work. He suffered immediate eye pain, tearing, blurred vision, and eye redness. He was referred to an ophthalmologist 2 h after the injury. His best corrected visual acuity was 20/30 (0.7) in the affected eye. There was a well-defined area of infiltrate, measuring $2 \times 2\,mm^2$ in diameter, just temporal to the central visual axis. It extended into the mid-stroma of the cornea with overlying epithelial defect. No foreign body, however, was visible even under the highest magnification ($\times 50$) of slit-lamp biomicroscopy (Figure 1). There was only mild anterior chamber reaction. Topical chloramphenicol 0.5% and steroid four times per day were given. The infiltrate slowly decreased in density over 1 month and the visual acuity improved to 1.0. However, the residual infiltrate persisted despite continued use of topical steroid four times per day. Confocal imaging was performed to aid detection of foreign bodies in the corneal stroma that might be responsible for the persistent corneal inflammation. White-light tandem scanning confocal microscope (ASL1000-ModelOS-1, New Orleans, USA) with a $\times 24/0.6$ noncontact objective was used, allowing optical sectioning of the cornea with a depth of field 10–12 μm. Magnification was up to $\times 750$. The images were stored in sVHS videotapes. The ASL Image Analyzer™

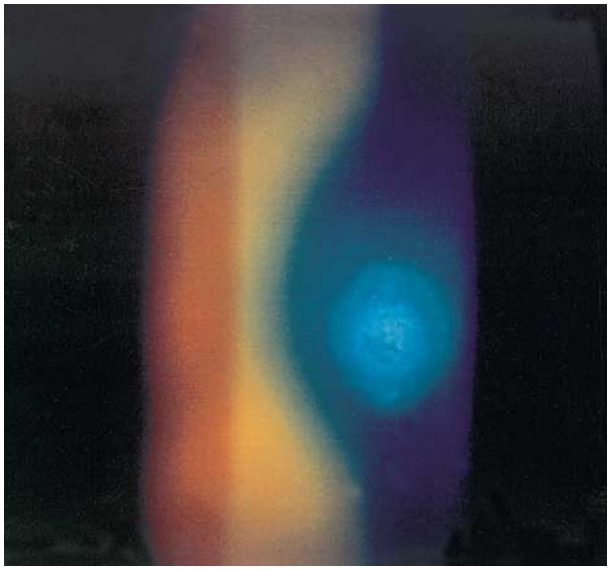

Figure 1 Slit-lamp photo on the day of injury showing a $2 \times 2\,mm^2$ corneal infiltrate with no visible foreign bodies under highest magnification ($\times 50$).

Figure 2 Confocal image showing multiple foreign bodies (arrowed) with surrounding activated keratocytes located at 190 μm in the corneal stroma.

program was used to analyse the results. Multiple fine foreign bodies (measured about 20 μm in size) were found scattered in the corneal stroma (Figure 2), distributing in a star configuration and seemingly arising from the same centre. The surrounding keratocytes appeared activated, indicating the presence of acute inflammation. Unactivated keratocytes appear oval-shaped with only the nuclei visible. Their surrounding matrix intercellular space appears dark and clear. Activated keratocytes are larger. Their highly refractile nuclei are visible with the confocal microscope and appear to be spindle shaped of different sizes. Their lateral processes often extend to other cells and their surrounding matrix is hazy. The appearance and distribution of the foreign bodies shown in the confocal images were highly suggestive of tiny teeth covering the surface of sting that were left behind in the cornea as the sting was withdrawn.[1]

Since the patient was asymptomatic and the visual acuity had returned to normal, surgical exploration was not suggested. Over the next 6 months, the vision remained stable and there was no migration of the foreign bodies as shown by serial confocal imaging. The infiltrate became corneal scar, and the foreign bodies remained invisible under slit-lamp examination.

Comment

Corneal injury by insect is rare but not uncommon, and is sometimes associated with retained insect parts.[2–4] Up to date we are still uncertain of the long-term consequence of retained bee sting in human eyes.[5] Whether it may behave like caterpillar setae, which are well known of their ability to migrate and lead to posterior segment inflammation, is uncertain.[6,7] It is therefore important not to miss any of such foreign bodies, so that appropriate management plan can be made. Slit lamp has the limitation of optical magnification only up to $\times 50$, which is inadequate in this case because of the extremely small size of the insect parts. The presence of infiltrate in the background further masks the foreign bodies and reduces the chance of their detection. Confocal microscopy is able to provide optical sectioning and images of high resolution up to a magnification $\times 750$.[8,9] This property has made it extremely useful for detection of retained insect parts in the corneal stroma. The highly refined image also helps in identifying the possible insect involved when the history is uncertain. Detection and identification of the type of retained insect foreign bodies carry both diagnostic and therapeutic values. The patient may require more frequent and longer follow-up in case of retained corneal foreign bodies, especially if caterpillar setae are suspected, as they have the potential of posterior migration. If observation is decided, confocal microscopy can also help to detect early and to provide accurate documentation of any migration of the foreign bodies. Fraser *et al*[7] has reported the use of confocal imaging to observe penetration of Tarantula hairs into anterior chamber in animal models. This case demonstrates the importance of meticulous search for possible retained foreign bodies in insect-related corneal injury. Confocal microscopy provides an additional and sometimes the only tool capable of doing so. In addition, with its accurate measurement one can precisely monitor

the status of insect foreign bodies, so that intervention is offered at appropriate time.

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