LETTERS TO THE EDITOR

Cowpox virus

SIR,—In 1889 Parinaud[1] described a uniocular conjunctivitis acquired by close contact with infected animals. It was a granular conjunctivitis accompanied by swollen eyelids and a mucopurulent secretion. The parotid region was swollen and inflamed. The granulation tissue persisted for months and histologically there were epithelioid and mast cells present.

A variety of agents have been implicated – for example, cat-scratch disease, tularaemia, tuberculosis, blastomycosis, coccidioidomycosis, syphilis, and actinomycosis, etc.[2]

We report a necrotic granulomatous conjunctivitis caused by the cowpox virus, a virus closely related but not identical to vaccinia.[3] There is no recorded case of cowpox conjunctivitis occurring in the United Kingdom.

A 15-year-old boy who lived on a farm was referred with 1 week's history of swollen sore left upper and lower eyelids with inflamed conjunctiva. Initially he noticed slight erythema on the left lower lid. One day later the conjunctiva had become inflamed and both lids swollen and the GP noticed a small red spot on the lower lid and tiny blisters on the conjunctiva. The lid swelling had increased until after 7 days he could not open the eye and the left side of his face became swollen (Fig 1). There was no history of trauma to the eye and the condition had not responded to systemic antibiotics.

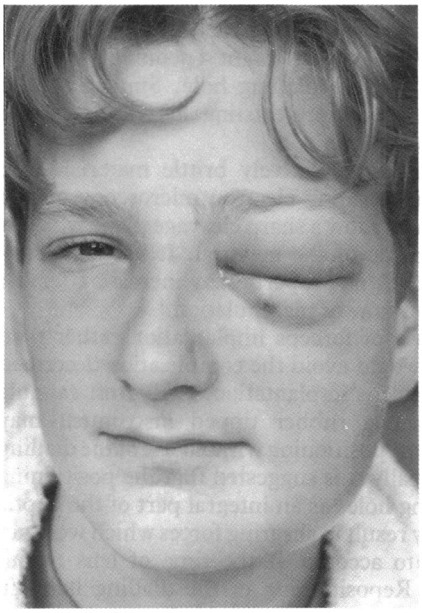

Figure 1 Appearance of patient 7 days after onset of conjunctivitis.

Using Desmarre's retractors a very chemosed conjunctiva with mucopurulent discharge on the surface was exposed. The cornea was covered by the swollen conjunctiva. A provisional diagnosis of purulent conjunctivitis with preseptal cellulitis was considered. The following day the patient was examined under general anaesthesia. Despite appearances both upper and lower lids were of normal thickness and the fornices were totally free of adhesions. The bulbar conjunctiva was approximately 7 mm thick and there was a 5 mm cuff of perilimbal necrotic conjunctiva. This was excised and an area of thickened conjunctiva was sent for histology. The cornea, the fundi, and the media were normal. Swabs were taken for viral tissue culture and smear for inclusion bodies.

A diagnosis was made of acute fulminating necrotic conjunctivitis due to herpes simplex. Two days later he developed indurated areas of bulbar conjunctiva palpated through the upper and lower lids.

The patient left hospital before further histological examination. The histological report confirmed a severe conjunctival infection with areas of necrosis and epithelioid and round cell infiltration. The indurated areas were considered to be granulation tissue with a marked fibrotic response. The tissue culture grew a cowpox virus. The carrier of cowpox virus is thought to be a domestic cat.[4]

Three months later the visual acuity was 6/6 in each eye and the bulbar conjunctiva under the superior and inferior eyelids remained swollen, red and indurated, but not tender. There was a 7 mm area of symblepharon affecting the lower lid and a 5 mm polypoid excrescence of bulbar conjunctiva in the superior temporal quadrant.

W N DUGMORE
Z M DABIR
Department of Ophthalmology, District General Hospital, Burnley

1 Parinaud H. Infective conjunctivitis of animal origin. *An d'Oc Sci* 1889; 252.
2 Duane TD. *Clinical ophthalmology: Parinaud's oculoglandular conjunctivitis.* Hagerstown: Harper and Row, 1982.
3 Harper L, Bedson HS, Buchan A. Identification of orthopoxviruses by polyacrylamide gel electrophoresis of intracellular polypeptides – I Four major drippings. *Virology* 1979; **93**: 435.
4 Thomsett LR, Baxby D, Denham EM. Cow-pox in the domestic cat. *Vet Rec* 1978; **103**: 567.

Segmentation of fluorescence in the retinal microcirculation – is it a valid indicator of blood cell flow?

SIR,—We read with interest the article of Arend *et al* on the use of scanning laser ophthalmoscopy for retinal capillary blood flow studies.[1] Perifoveal capillary blood cell velocities were found to be reduced in diabetic patients compared with normal subjects. The basic assumption for the blood flow measurements was that the segmentation in the fluorescence intensity corresponded to segments of erythrocytes in the form of rouleaux formation (low fluorescence) and cell-free plasma (high fluorescence).

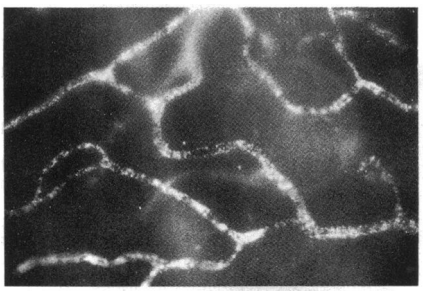

Figure 1 Retinal vascular net of a rat. Stable fluorescence of the capillary lumen by circulating microspheres of 0·022 μm in diameter. Intensity of fluorescence is not homogeneous along the vessels.

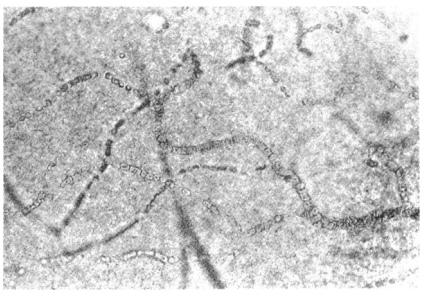

Figure 2 The same retinal location as in Figure 1 illuminated with white light to show the red blood cells. The density of the blood cells in the capillaries does not necessarily correlate with the alterations in the fluorescence intensity.

Using our vascular trichrome method[2] we noticed that segmentation in fluorescence intensity does not necessarily correspond to the erythrocytes versus plasma assumption. Figure 1 shows a retinal capillary (rat) with alterations of the fluorescence intensity along the vessel. In Figure 2 the same vessel is illuminated with white light, demonstrating that erythrocytes are seen throughout both high and low fluorescence areas. We might have regarded these findings as post mortem artefacts were they not supported by other experimental data. We recently developed a new method, named fluorescent blood cell angiography, for in vivo dynamic observation of fluorescent labelled erythrocytes in the retinal capillary net.[3] By changing the filter setting of the imaging system a conventional fluorescein angiography of the same capillary net can also be performed.

These observations were recorded on a video tape for later analysis. Using this new method we found that the fluorescein segmentation velocity in the capillary net does not necessarily correspond to the blood cell velocity. While in some capillary paths the labelled blood cell velocity did correspond to the segmentation velocity, in other capillary paths in the same retina these velocities did not correspond. Moreover, factors such as systemic blood pressure, hyperglycaemia, intraocular pressure, and capillary architecture seem to have an unpredictable effect on the ratio between blood cell flow and the phenomenon of fluorescent segmentation. In summary, we think that the scanning laser ophthalmoscope is a promising tool in future analysis of capillary blood flow. Nonetheless, capillary fluorescence segmentation has to be better understood if this phenomenon is to be used for quantitative retinal capillary blood cell flow measurements.

JOSHUA BEN-NUN
IAN J CONSTABLE
The Lions Eye Institute and Department of Surgery, University of Western Australia, Nedlands, Australia

1 Arend O, Wolf S, Fung F, Bertram B, Postgens H, Toonen H, Reim M. Retinal microcirculation in patients with diabetes mellitus: dynamic and morphological analysis of perifoveal capillary network. *Br J Ophthalmol* 1991; **75**: 514–8.
2 Ben-nun J, Alder AV, Constable JI, Roberts EC. The patency of the retinal vasculature to erythrocytes in retinal vascular disease. *Invest Ophthalmol Vis Sci* 1990; **31**: 464–70.
3 Ben-nun J, Alder AV, Thompson D, Constable JI. Flow patterns of blood cells in the retinal capillaries. *Int Ophthalmol* (accepted).

Reply

SIR,—Biomicroscopic recordings of conjunctival (Fig 1) and periungual capillaries[1 2] clearly show segmentation corresponding to erythrocytes versus plasma. From these findings and our experience in conjunctival video