

CORRESPONDENCE

Effects of irrigation solutions on corneal endothelial function

EDITOR,—Reading Yagoubi *et al*'s article¹ was like experiencing 'Back to the Future'. Seventeen years ago we demonstrated that an infusion fluid containing bicarbonate, calcium with glucose will do well without glutathione.²⁻⁴ The presence of glucose eliminated the need for glutathione in these solutions. We also compared the components present in the so-called BSS Plus with TC Earle and TC199 and found no difference in their effect on corneal swelling.⁴

Unfortunately, the ophthalmic community did not take notice of this work and we have been paying dearly all these years for those glutathione additives! Yagoubi *et al*'s paper does not give credit to our research nor to our endothelial cell staining technique⁵ used by them. However, the conclusion drawn from their study that 'the two solutions that contained bicarbonate, glucose, and glutathione—namely, BSS Plus and TC199 with Earle's salts, did not cause corneal swelling' is only partially correct. This statement might imply incorrectly that glutathione is an important component of these infusion fluids, even in the presence of glucose. However, the amount of glutathione in TC199 Earle and TC199 Hank is extremely negligible (2 µM) to account for its efficacy; nor does more than 1000-fold increase in glutathione (3 mM) in the BSS Plus add to its effect.

It is time to separate apples from oranges and not fall for a commercial hype. As shown previously,²⁻⁴ an infusion fluid containing bicarbonate, calcium with glucose will do well without glutathione additive.

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- 5 Spence DJ, Peyman GA. A new technique for the vital staining of the corneal endothelium. *Invest Ophthalmol* 1976; **12**: 1000-2.

Reply

EDITOR,—The purpose of our paper was to compare the effects of a range of intraocular irrigation solutions on corneal endothelial function. The intention was not necessarily to determine precisely which components of the solutions were important for maintaining corneal thickness; rather we aimed to highlight some of the deficiencies of solutions such as BSS, Hartmann's, and 0.9% sodium chloride. We observed that the two solutions that contained glucose, bicarbonate ions, and

glutathione (that is, TC199 and BSS Plus) were the only ones that did not cause corneal swelling. Those three components have all been associated with maintenance of endothelial function, and hence the control of stromal hydration, since the work of Dikstein and Maurice,¹ Hodson and Miller,² and others.

By reference to some of his earlier experiments, Peyman questioned the implied necessity for irrigation solutions to contain glutathione. From our experiments, however, we were not in a position to comment on whether glutathione was an essential component, merely that it was present, albeit at very low concentration in TC199, in the solutions that maintained corneal thickness. The question of glutathione, therefore, awaits further investigation, taking into account the observations of Peyman as well as those of Dikstein and Maurice, and others.

We did not intentionally overlook Peyman's work in this area. Our experiments differed in one important respect from previous work on irrigation solutions. We did not rely on corneal thickness changes during exposure to the various solutions as the sole means of assessing the efficacy of the irrigation solutions: corneas were also subjected to a standardised period of perfusion after exposure to the irrigation solutions during which both the barrier properties and the pump function of the endothelium could be assessed.

As far as the staining method was concerned, we cited the reference by Taylor and Hunt³ which described in detail the actual method we used. Taylor and Hunt do refer to the work of Spence and Peyman,⁴ but they introduced an important modification to the technique by pointing out that adjustment of the pH of the alizarin red S solution to 4.2 optimised the efficiency of the dye-lake reaction. Taylor and Hunt also suggested brief fixation in glutaraldehyde to stabilise the stained endothelial mosaic.

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Traditional healers in primary eye care

EDITOR,—We were pleased to see the editorial by Foster and Johnson¹ accompanying our article on corneal disease and traditional eye medicine use in Malawi.² We feel strongly that cooperation with traditional healers may lead to benefits in the area of primary eye care, and so established an interactive training programme with the healers in Chikwawa. The development of initial activities at the local level has led to a firm basis of learning and trust between healers and biomedical personnel. Healers in need of cataract or trichiasis surgery are being targeted for surgical

correction under the assumption that this will lead to a greater acceptance of surgery by their patients. The most distinct difference between our programme and the impressive work of Chana in Zimbabwe is the structure of the collaboration: in Chikwawa, the ophthalmic medical assistant is the primary health professional involved in the collaborative relationship. He has conducted a number of training sessions for groups of healers. Healers refer patients to him at the local district hospital (to which a cataract surgeon travels) rather than a distant central hospital. We have not distributed Western medicines to healers. The problems inherent in sustaining distribution of products such as tetracycline 1% ointment and the danger of healers mixing herbs with the ointment to increase its 'potency' have concerned us.

Over the past 2 years about 240 healers have participated in this pilot project and an evaluation is under way. We are attempting to measure the role healers can play in encouraging cataract patients to accept surgery as well as detect changes in detrimental practices. Early results are encouraging. From September 1990 to March 1992 (pre-intervention) an average of 5.3 cataract blind patients per month presented at Chikwawa District Hospital. From October 1993 to October 1994 (post-intervention) this figure increased by 80% to 9.6 patients per month.

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Argon laser treatment of trichiasis in Hong Kong

EDITOR,—A total of 107 lids with trichiasis were treated with argon laser photocoagulation (one session only). We excluded those with gross entropion and more than 10 abnormal lashes per eyelid. The laser variables were: 100 µm, 0.2 seconds, and 1.0-1.2 W.

Initially, we started without anaesthesia; however, if the patient could not tolerate this, we applied a topical anaesthetic (oxybuprocaine). If it did not work, we change to infiltration anaesthesia (2% lignocaine with adrenaline 1:100 000). The reason for giving different types of anaesthesia according to an individual's need was to try to clarify the dispute on this issue.¹⁻³ The distribution of anaesthesia used was: infiltration 62 (57.9%); nil 39 (36.4%); topical 6 (5.6%). Thus, if a patient could not tolerate the treatment without anaesthesia, a topical anaesthetic would not be beneficial in most of the cases.

Among the different causes of trichiasis, trachoma carries a significantly low success rate (27.7%) ($p < 0.05$, χ^2 test) because it causes scarring and disturbs the lid anatomy so that aiming during treatment is more difficult; blepharitis has a success rate of 47.8%; and idiopathic trichiasis is most successfully treated with a 69.4% success rate.