may represent a relative reflex bradycardia and decrease in cardiac output consequent upon an initial vasopressor response.

The question as to whether phenylephrine 2.5% is safer than phenylephrine 10% has been addressed by Duffin and co-workers, who found no statistically significant difference in the BP response to phenylephrine 2.5% as compared with phenylephrine 10% in 44 patients being prepared for cataract surgery.[2] Kumar and co-workers,[4] in a study of 24 patients undergoing vitreoretinal surgery, also reported no statistically significant difference in mean systolic and diastolic BP response in patients treated with phenylephrine 2.5% as compared with phenylephrine 10% for pre-operative mydriasis. Fraunfelder and Scafidi[5] collected 33 reports of systemic side-effects thought to be related to phenylephrine 10%, and stated that a pressor response to phenylephrine 2.5% is not seen in the neonate population as compared with that seen with phenylephrine 10%; however, no evidence was provided with regard to comparative safety of the two concentrations in an elderly population.

The sum of these studies would seem to suggest, therefore, that phenylephrine 10% may be better than phenylephrine 2.5% for maintaining intraoperative mydriasis, but while it may not alter mean BP measurements, it may be responsible for some volatility in BP. However, phenylephrine 2.5% seems not yet to have been proven to have any lesser systemic effect in an elderly population than phenylephrine 10%, so that if there remains concern about potential systemic complications, the rational decision must be as to whether – in the age of endocapsular phacoemulsification and topical non-steroidal anti-inflammatory agents to maintain mydriasis – any intraoperative technical advantages are sufficient to justify the use of phenylephrine at all.

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Sir,

We read with interest the comments by Symons *et al.* on our recent paper entitled 'A comparative study of the efficacy of 2.5% phenylephrine and 10% phenylephrine in pre-operative mydriasis for routine cataract surgery'. They raise several points to which we would like to reply in turn.

Firstly, a comment is made as regards the fact that a greater number of patients in the 2.5% phenylephrine group in our study failed to achieve an initial pupil size of 6 mm on dilation. This may be an underlying trend which would become significant with a greater number of patients studied; however, in our study the difference in numbers was not statistically significant, highlighting the similar efficacy of the two concentrations of phenylephrine in this particular patient group.

The authors also make reference to a study by Duffin *et al.* commenting that phenylephrine 10% was found to be significantly better for maintaining mydriasis intra-operatively. Close examination of Duffin *et al.*'s papers revealed that they compared viscous 10% phenylephrine with aqueous 2.5% phenylephrine. The viscous preparation of 10% phenylephrine is thought to increase drug contact time with the eye and possibly result in less systemic absorption. However, viscous phenylephrine is not commonly used in the UK and in our study both concentrations of phenylephrine were in the aqueous form. Furthermore, Duffin *et al.* themselves comment that the greater maintenance of intra-operative mydriasis was significant only for dark irides and not for light or moderately pigmented irides. Duffin *et al.* also studied blood pressure following administration of 2.5% and 10% phenylephrine and found no statistically significant difference between the two groups. However, further analysis with respect to patient age found that older patients did in fact have a statistically significant elevation of blood pressure in both the 2.5% and 10% phenylephrine groups. Their

own conclusion is that a '10% solution offers little benefit over a 2.5% solution in terms of reducing the surgically induced miosis in a patient with blue or grey eyes and some benefit in a patient with hazel, green or tan eyes'.

Symons *et al.* also mention a study by Brown and co-workers where no statistically significant difference was found in mean blood pressure between a group of patients receiving 10% phenylephrine and a group receiving 1% tropicamide. As Dr Symons comments, these patients were not in a pre-operative situation and unfortunately no analysis was performed as regards patient age, which may have revealed an increase in blood pressure in the older patients in this trial.

We agree that Kumar *et al.*'s study reported no statistically significant difference in mean blood pressure but unfortunately compared viscous 10% phenylephrine with 2.5% phenylephrine. They also commented that plasma levels of phenylephrine were consistently higher in the 10% phenylephrine group, and there was a trend to higher blood pressure in the 10% phenylephrine group, with several isolated cases of marked hypertensive response. Blood pressure measurements in this study were done per-operatively which, as we mentioned in our original paper, may be too late to detect marked elevations of blood pressure occurring in conjunction with peak plasma concentrations at approximately 30 minutes following drop instillation.

Symons *et al.*'s own study is interesting in that it appears to highlight significantly greater volatility in blood pressure in the 45 minutes following phenylephrine administration. It is unfortunate that their control group of 14 patients receiving cyclopentolate alone is so small. Nevertheless we would agree that cardiovascular fluctuations are to be avoided over the peri-operative period and may actually be more important than the absolute levels of blood pressure recorded.

We thank Symons *et al.* for providing further information regarding the potential systemic side-effects of 10% phenylephrine and in particular highlighting the volatility of blood pressure in the pre-operative period following 10% phenylephrine instillation. We believe that this adds further weight to our original conclusion that use of 10% phenylephrine is no longer justified on a routine basis in pupil dilation prior to uncomplicated cataract surgery in the elderly. We emphasise that the patients we studied were Caucasian, elderly and undergoing uncomplicated cataract surgery. In a younger patient with a dark iris and no cardiovascular pathology undergoing a more complicated procedure the use of 10% phenylephrine may give additional benefit in terms of mydriasis with minimal risk of significant systemic side-effects. The potential hazards of phenylephrine administration without proper patient screening have been emphasised and we recommend that the cataract surgeon individualises the pre-operative mydriatic regime to reduce risk and maximise benefit for each patient.

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Sir,

Potamitis and colleagues have chosen to address the important issue of suture management in post-operative astigmatism (Astigmatism decay immediately following suture removal. *Eye* 1997;11:84–6), but their results need looking at critically. Weak study methodology and inappropriate data analysis, together with the lack of tabulated individual results, make their conclusions difficult to appreciate.

How was the keratometry done: were serial measurements made and was the observer masked? No mention is made of the number of sutures removed (one or all?), and whether topical steroid was still used at the time of suture removal or afterwards. Although post-operative keratometry has been found to correlate with refraction as a method of determining astigmatism,[1] Butcher recommends the averaging of serial measurements to avoid error.[2] Surely all patients should have undergone suture removal at the same post-operative interval, rather than at a point between 8 and 14 weeks?

The authors propose that cylindrical power decreases most at 5 minutes after suture removal and that the decrease is proportional to initial value. This is not appreciable in Fig. 1, which curiously shows the opposite phenomenon (the 3 higher values decline more extensively after 5 minutes). Furthermore, without access to their original data it is difficult to agree with the authors that cylindrical power changes by 1.29 dioptres at 2 weeks when Fig. 1 shows an upward trend.

Importantly, the authors have not stated how they analysed astigmatic axes, but imply that subtracted axis changes were averaged. Vector analysis is considered essential in any circumstances in which changing astigmatism is of interest because the magnitude and axis of any cylinder are not separable entities but rather a qualifier of each other.[3] Several methods are available for vector analysis but the theorem of obliquely crossed cylinders is commonly