Conflict of interest

The authors declare no conflict of interest.

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Sir,

Interval censoring for survival curves when reporting the results of glaucoma surgery

I read with interest the study by Anand and Wechsler[1], reporting the outcomes of deep sclerectomy in eyes with previous surgery. In common with many studies in the literature, however, they have failed to take account of interval censoring when plotting survival curves.

Interval censoring occurs when we do not know the exact time an event occurs, but only the interval in which it occurs. This is relevant to failure in glaucoma surgery because when we detect that the intraocular pressure has risen above a predetermined level at follow-up, we do not know exactly when this occurred, only that it occurred in the interval between two clinic visits.

This effect must be taken into account when plotting survival curves.[2,3] By failing to take it into account, the survival curve is effectively shifted to the right and the apparent survival is increased.

Many statistical packages do not allow for the analysis of interval-censored data. However, the freely available statistical package R has a survival plotting function that can correctly account for such data.[4]

For reference, my instructions for plotting an interval-censored survival curve using R are presented here, for those who want to plot interval-censored survival curves in their research.

Create a Microsoft Excel spreadsheet with the headings 'lefttime', 'righttime', and 'myevent' in cells A1, B1, and C1, respectively. Then enter survival data into each row (ie create a 'life table').

Righttime = the clinic visit where the patient 'failed' (time is usually measured in months after surgery; leave blank if the patient did not fail). Lefttime = the clinic visit immediately before the visit where the patient failed, or the final follow-up visit if the patient did not fail. Myevent = '0' if they have not failed and '3' if they have failed.

Save this as a .csv file in the R working directory—for example survival.csv. Open up the R console and type the following:

```
library(survival)
data1 <- read.csv(''survival.csv'', header = TRUE)
mysurv <- with(data1, Surv(lefttime, righttime, myevent, ''interval''))
```

To plot the survival curve type:

```
mysurvfit = survfit(mysurv ~ 1)
plot(mysurvfit)
```

This will plot an interval-censored survival curve with 95% confidence intervals for the data in the life table.

Conflict of interest

The author declares no conflict of interest.

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Sir,

Comment on 'Deep sclerectomy with mitomycin C in eyes with failed glaucoma surgery and pseudophakia'

We read with interest Anand and Wechsler's recently published article on deep sclerectomy with mitomycin C[1] and would like to congratulate the authors on their excellent outcomes. We have retrospectively analysed the long-term outcomes of trabeculectomies with selective 5-fluorouracil (5-FU) enhancement performed by a single district general hospital ophthalmologist (author APM) and would like to share our results as they are remarkably similar.

We performed trabeculectomies on 48 patients (53 eyes) attending a UK district general hospital and used 5-FU enhancement in 36% of the patients. Our entire cohort was caucasian and just 13% of it previously had cataract extraction. The mean preoperative intraocular pressure was 26.4 (SD 6.72) while by 12 months and 5 years postoperatively, the pressures had come down to 14.9 (SD 3.90) and 14.0 (SD 3.52), respectively. We defined success as intraocular pressure at the last follow-up appointment of $\leq$16 off all medication, which we achieved in 77.4% of our cohort.

During our mean follow-up period of 5.04 years, one patient developed endophthalmitis (1.9%), seven patients (13%) had postoperative choroidal effusions and five patients (9%) postop hyphaemas. In all, 34% of our cohort had early postop hyptony, all of which settled spontaneously and none led to hypotony maculopathy.

Like the authors, we have reservation about routine MMC enhancement of trabeculectomies in view of the reported increased risk of hyptony and endophthalmitis.[2] We never made use of it in our cohort; 5-FU enhancement proved adequate. In tertiary centres with large numbers of patients at high risk of bleb failure, MMC enhancement is likely to be frequently necessary; but for the unselected patient attending a UK district general hospital, we would advocate caution in its use as the 'default' option in glaucoma surgery.

Deep sclerectomy with MMC enhancement appears safe and effective and produces similar results to trabeculectomy with low potency antimetabolite enhancement. In appropriately selected cases, we feel it should be a considered procedure where trabeculectomy and MMC carry potentially higher risks as concluded by Anand and Wechsler.

Conflict of interest

The authors declare no conflict of interest.

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The data in this letter have been presented at the North of England Ophthalmological Society Meeting, March 2011.

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Sir,

Response to Dulku and de Klerk and Moriarty

We would like to thank Dulku[1] and de Klerk and Moriarty[2] for their comments on our article.[3] Both authors have made pertinent and valuable comments.

We agree with Dulku[1] that lack of interval censoring will introduce a right-sided bias and the success rates may be overestimated. This is applicable to all studies on glaucoma surgery, including the recently published tube versus trabeculectomy (TVT) trial.[4] This right-sided bias in survival outcomes may become more pronounced with later failures as patients are usually longer, about every 6 months. To mitigate this bias, 95% confidence intervals (CIs) for outcomes of survival analyses should be considered. We did not provide CI data in the article. However, figure 2 illustrates the complete success rates with 95% CIs. At 3 years after surgery, complete success rates with 95% CI were 70–85%.[3]

de Klerk and Moriarty[2] have raised an important point on the routine use of MMC with glaucoma filtering surgery in Caucasian patients. A randomized controlled trial in the USA has failed to show a benefit of MMC over 5-FU in primary trabeculectomy in the long term.[5] The evidence for routine use of MMC in primary trabeculectomy is tenuous. It is important to note that in our study most patients were at a higher risk to failure than in their cohort, where 13% had previous cataract surgery. In our study, all patients had previous intraocular surgery and more than half had a previous failed glaucoma surgery. In fact, our patients had a higher number of surgeries per eye than in the aforementioned TVT trial. Our findings suggest that pseudophakia, unlike for trabeculectomy, is not a risk factor for failure of DS. Medication-free success rates at 3 years were 82% for eyes with previous cataract surgery, 71% with previous trabeculectomy and 60% for eyes with both trabeculectomy and cataract surgery. Interestingly, all eyes with delayed hypotony in our study had previous glaucoma surgery. This may be because of aggressive postoperative management in these eyes, such as early laser goniopuncture and needle revision with MMC.

We continuously audit outcomes of surgery performed in our department. Primary DS procedures are now augmented with subconjunctival bevacizumab. After 2 years, we were unable to find any difference in IOP outcomes between bevacizumab and MMC-augmented DS. A long-term audit on combined phacoemulsification and DS showed no significant benefit of MMC supplementation. MMC should be reserved for eyes, which have a high risk for subconjunctival fibrosis. In the endeavor to achieve IOPs in the low teens or even lower, patients are often exposed to sight-threatening complications.

Conflict of interest

The authors declare no conflict of interest.

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