

EVIDENCE-BASED MEDICINE

Cataract surgery: Ocular comorbidity as a predictive factor in final visual acuity

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[Abstract] Objective In cataract surgery, to study the relation between the proportions of preoperative ocular comorbidity in the eye to be operated on and the percentage of eyes achieving final postoperative visual acuity of 20/40 or better at discharge. **Methods** Search of MEDLINE for articles published during the last 14 years. We found in these articles the percentage of cataract-operated eyes obtaining final visual acuity of 20/40 or better and the percentage and type of preoperative ocular comorbidity: glaucoma, diabetic retinopathy, and age-related maculopathy and chronic uveitis. Comorbidity is defined as any pre-existing ocular disease that is thought likely to limit corrected visual acuity to 20/50 or worse. **Meta-analysis** was used. **Results** Preoperative ocular comorbidity explains up to 70% of the probability of achieving final visual acuity of 20/40 or better following cataract surgery. In eyes without associated comorbidity, about 95% of operated eyes achieve a vision of 20/40 or better. The regression equation is the percentage of eyes whose final visual acuity is 20/40 or better = 95% - 0.33 (percentage of preoperative ocular comorbidity). **Conclusion** In cataract surgery, each point of increase in the percentage of preoperative ocular comorbidity corresponds to a 0.33% reduction in the probability of achieving a vision of 20/40 or better at discharge.

[Key words] cataract surgery; ocular comorbidity; visual acuity; results; meta-analysis

INTRODUCTION

In cataract surgery, preoperative ocular comorbidity is defined as any pre-existing ocular disease that is thought likely to limit corrected visual acuity to 20/50 or worse^[1,2,3].

The objective of our work was to study the relation between the proportions of preoperative ocular comorbidity in the eye to be operated on and the percentage of eyes achieving postoperative visual acuity 20/40 or better at discharge, in the adult eye^[1-5].

METHODS

We performed a meta-analysis, searching MEDLINE for articles published during the last 14 years. We found in these articles the percentage of cataract-operated eyes obtaining final visual acuity of 20/40 or better and the

preoperative ocular comorbidity.

In cataract surgery, we studied the correlation between ocular comorbidity (%) of each sample and the number of eyes that achieve visual acuity 20/40 or better (%).

We studied the results in 37 samples; A) nine samples of cataract-operated eyes without ocular comorbidity. B) In 19 samples in patients operated for consecutive cataracts, their comorbidity ranges from 11.2% to 42.6% of the total of eyes. C) In 18 samples of cataract-operated eyes with 100% ocular comorbidity; these samples have only one factor which is the same comorbidity factor that is found in all surgeries^[6-10]. The factor could be: glaucoma, diabetic retinopathy, age-related maculopathy or chronic uveitis.

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The authors of these samples are from the United States, Canada, Denmark, Spain, France, Egypt, Singapore, Africa, Czech Republic, Italy, and England.

RESULTS

We found in these articles that the percentage of cataract-operated eyes obtaining visual acuity of 20/40 or better ranges with preoperative comorbidity as follows (Figure 1). In the series of cataracts without ocular comorbidity, between 91.7% and 97.6% of eyes achieve this vision.

If just one comorbidity factor is studied in 100% of the cases, 36% to 46% of operated eyes with diabetic retinopathy and photocoagulated macular edema, Behcet's disease or chronic posterior uveitis achieve this vision^[6-9] and about 80% of operated eyes with high myopia or pars planitis^[10].

In patients operated for consecutive cataracts, between 80% and 91.2% of eyes achieve this vision, depending on the percentage and the severity of pre-existing comorbidity. In these samples, the percentage of preoperative ocular comorbidity ranges from 11.2% to 42.6% of the total of eyes.

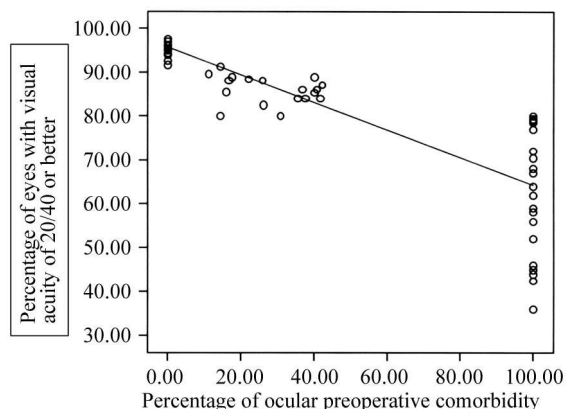


Figure 1 The linear regression analysis studies the correlation between preoperative ocular comorbidity and final visual acuity. Samples without comorbidity (better visual acuity) are located at the top, in the left corner; the series of consecutive surgery and non-selected surgery are more central and dispersed; and the bottom, right-hand side contains samples with 100% comorbidity (worse visual acuity), and great variability depending on the underlying pathology

In cataract surgery, univariate analysis shows a

significant correlation between increased preoperative ocular comorbidity (x) and a reduction in the percentage of eyes that achieve a final vision of 20/40 or better (y). The regression equation is $Y = 94.94 - 0.33X$ ($P < 0.0001$, $R^2 = 0.704$).

DISCUSSION

With regards to cataract surgery in China, the two main priorities are improving cataract surgical coverage and cataract surgical quality^[11,12]. This article summarizes only the impact of ocular comorbidities over the quality in cataract surgery.

We propose this linear regression to serve as a standard to compare the results between different services, for consecutive, non-selected cataracts. The other three significant factors that affect the surgical outcome, apart from comorbidity, are age, technology and surgical complications. These factors are not evaluated with this standard.

Patients with ocular comorbidities are associated with the potential for reduced improvement in postoperative visual acuity. The patient should be adequately informed about the specific impact of their condition on the expected outcome of surgery^[2].

In our meta-analysis, in eyes without associated comorbidity, about 95% of operated eyes achieve a vision of 20/40 or better. The results are very similar to those proposed by Alberta^[13] or the NEON study^[2].

Two important conclusions can be drawn from the regression analysis: 1) In our meta-analysis, preoperative ocular comorbidity explains up to 70% of the probability of achieving final visual acuity of 20/40 or better following cataract surgery. 2) Each point of increase in the percentage of comorbidity in our sample corresponds to a 0.33% reduction in the probability of achieving a final vision of 20/40 or better.

Consecutive and non-selected cataract surgery, in which preoperative ocular comorbidity and corrected final visual acuity are known results, could be compared with other services using the regression equation.

The predicted percentage of success (y) to be attained can be found by applying the preoperative ocular comorbidity (x) to the regression formula, which will give a percentage that would provide a good result. If

the real percentage of patients in our sample who achieve visual acuity of $\geq 20/40$ is lower than the theoretical calculated value and is situated under the regression line, we should then analyse and try to identify possible actions to improve the surgical outcome (improve biometry, reduce postoperative astigmatism, and reduce complications).

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