

Risk Factors Associated with PCO Following Cataract Surgery: Real-World Outcomes Study In the United Kingdom (UK)

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Background

- One of the most common complications patients experience after cataract surgery is Posterior Capsule Opacification (PCO)^{1,2}
- PCO involves lens epithelial growth and proliferation, leading to reduced visual acuity, impaired contrast and glare disability
- Previous studies have explored risk factors associated with PCO^{2,3} or its only available treatment (Nd:YAG)^{4,5} following cataract surgery. However, most of these studies included relatively small samples of patients
- Risk factors that were identified in previous studies included age, intraocular lens (IOL) material, gender, IOL edge type, use of single vs. multi-piece IOL
- This study was designed to confirm findings from previous studies that assessed PCO risk factors and to explore the impact of any additional risk factors on a large retrospective cohort of post-cataract patient population in the UK

Objectives

- The objective of this analysis was to identify factors which are associated with the development of posterior capsule opacification following cataract surgery in eyes implanted with monofocal acrylic IOLs

Methods

Study Design

- This analysis was conducted as part of a large retrospective cohort study using NHS electronic medical records captured using Medisoft EMR platform
- The population included patients undergoing cataract surgery in 7 UK ophthalmology clinics
- This analysis included data for eyes that underwent cataract surgery between 1st Jan 2010 and 31st Dec 2013, and followed up for at least 3 years until the end of 2016
- PCO incidence during this follow-up was then analysed, adjusting for different combinations of potential confounders/covariates

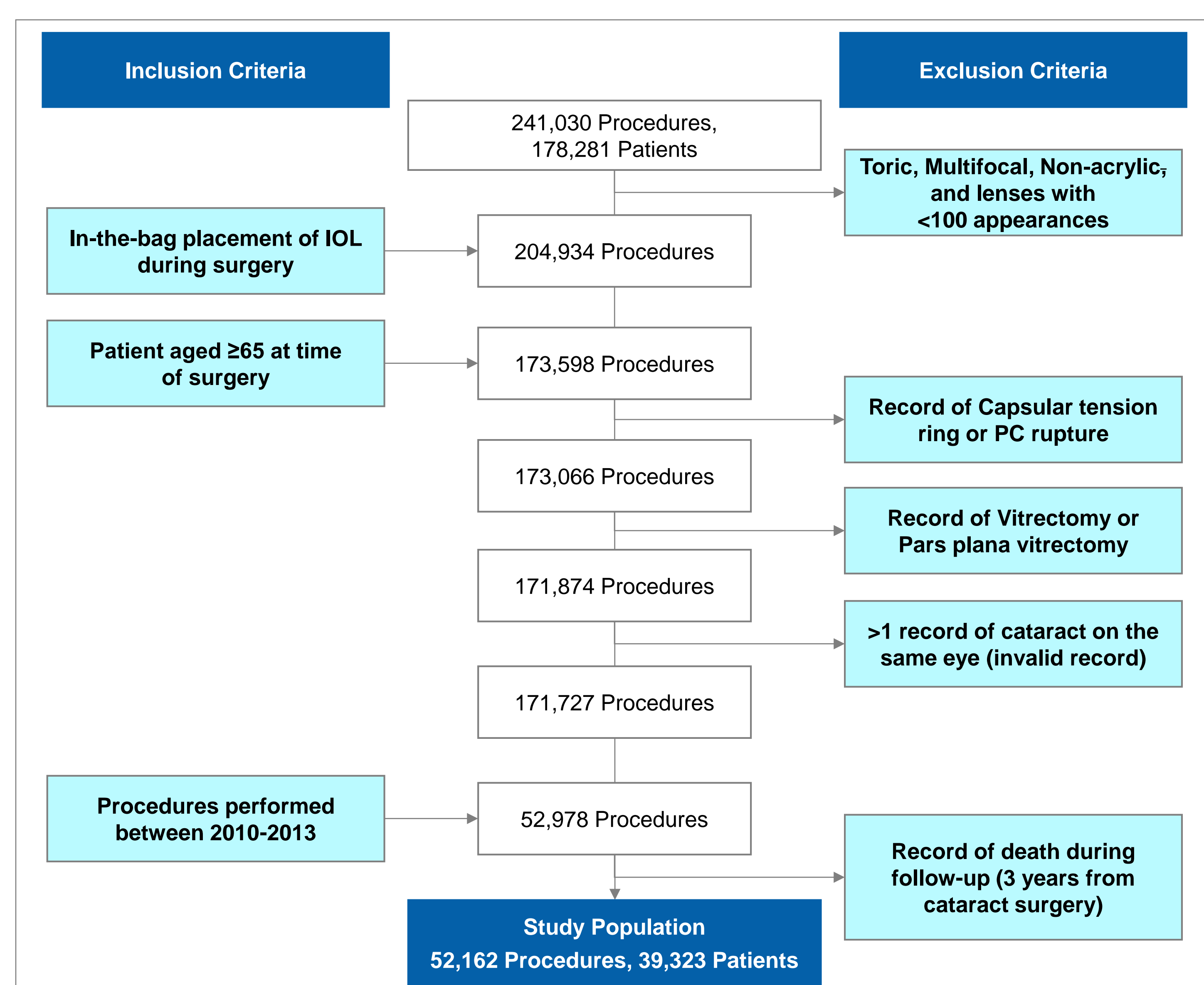
Statistical Analysis

- In order to explore the risk factors associated with PCO, several logistic regression models were estimated, each using a different set or combination of covariates.
- The covariates considered in these models included:
 - Demographics → age, gender
 - IOL characteristics → 360° vs. non-360°; hydrophobic vs. hydrophilic; single vs. multi-piece
 - Surgery related factors → incision site, year of surgery, IOL power, surgeon seniority
 - Clinical characteristics → visual acuity, presence of co-pathologies, complications
- To obtain a model with higher predictive ability, the sample was split into training (~60%, 5 sites) and validation (~40%, remaining 2 sites)
- The model was built on the training dataset and validated on the remaining data
- The best fitting model was determined based on AIC (Akaike Information Criteria) in both the training and validation data, and validity shrinkage (reduction in predictive ability of a model when moving from training to validation data)

Results

The study population included 52,162 cataract procedures (eyes) from 39,323 patients

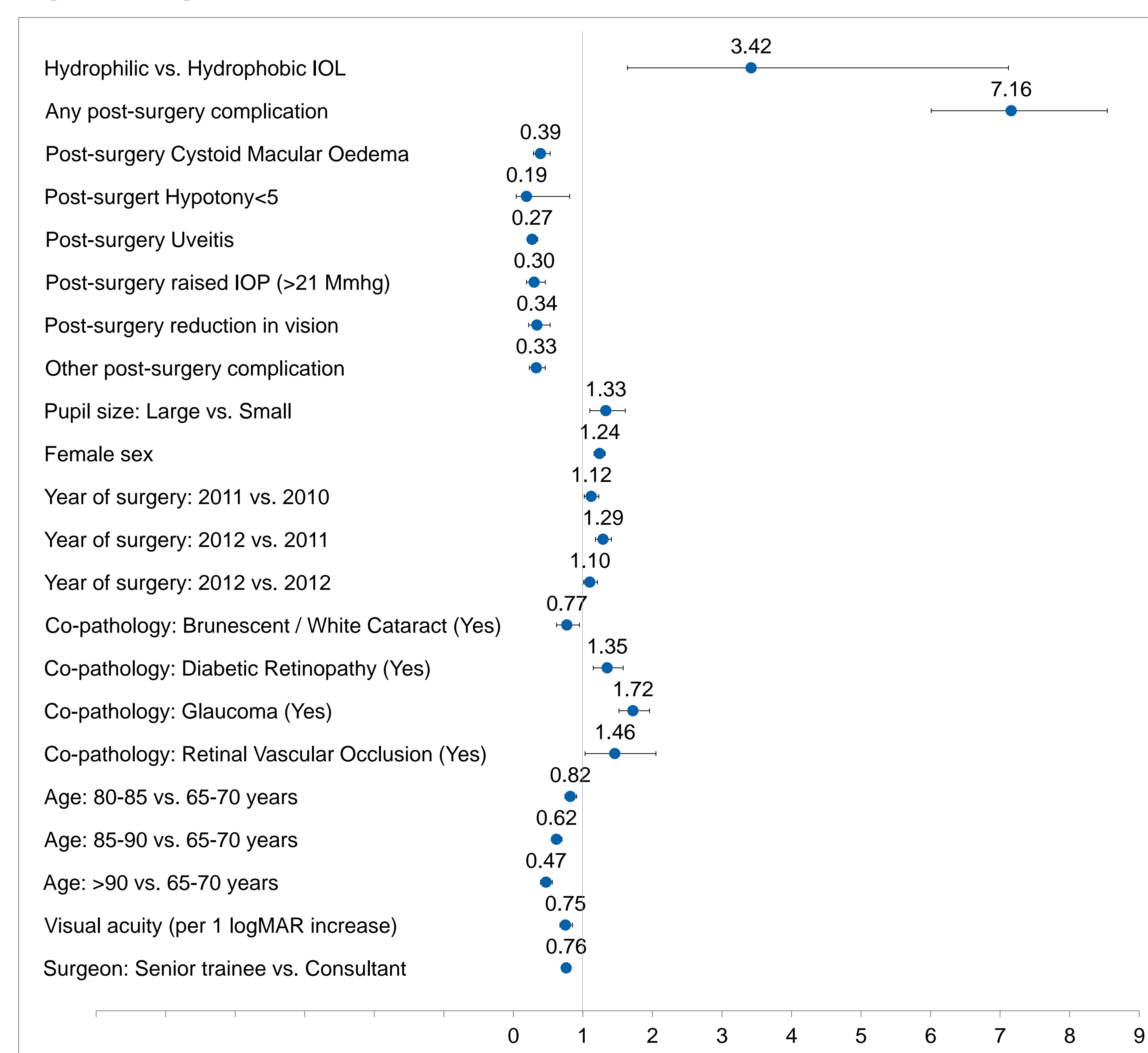
Figure 1: Study Population Inclusion and Exclusion Criteria



Results (contd.)

Figure 2 shows the ORs from the best fitting model (only the significant effects were included in the figure)

Figure 2. Significant Risk Factors for PCO



Note: only ORs which were statistically significant were included in the plot

The model identified the following factors to have a positive effect on the risk of post-surgery PCO (Figure 2):

- Presence of any post-operative complications (OR 7.16, 95% CI 6.01-8.54)
- Hydrophilic type of IOL (OR 3.42, 95% CI 1.64-7.12)
- Presence of the following co-pathologies:
 - Diabetic Retinopathy (OR 1.35, 95% CI 1.15-1.58),
 - Glaucoma (OR 1.72, 95% CI 1.52-1.96),
 - Retinal Vascular Occlusion (OR 1.46, 95% CI 1.03-2.05)
- Larger pupil size (OR 1.33, 95% CI 1.10-1.61)
- Female gender (OR 1.24, 95% CI 1.16-1.32)
- Index year category (OR 1.12 '2011 vs. 2010', 95% CI 1.02-1.23; OR 1.29 '2012 vs. 2010', 95% CI 1.18-1.41; OR 1.10 '2012 vs. 2010', 95% CI 1.01-1.21)
- Better visual acuity (i.e. lower logMAR value) (OR 0.75, 95% CI 0.67-0.85)
- Younger age (OR 0.82 '80-85 years' vs. '65-70 years', 95% CI 0.74-0.91; OR 0.62 '85-90 years' vs. '65-70 years', 95% CI 0.55-0.70; OR 0.47 '>90 years' vs. '65-70 years', 95% CI 0.39-0.56)

Conclusions

- This study used a large population to identify risk factors associated with PCO following cataract surgery
- The use of Medisoft EMR, a validated source of data which allows for longitudinal track of patients and eye information in time, was a strength of this study
- Our findings confirmed that PCO is a complication that is affected by several factors; the use of robust modelling techniques allowed to identify the best set of predictors of PCO post-cataract surgery
- The risk factor analysis confirmed previous findings that hydrophilic acrylic IOLs are associated with significantly greater risk of PCO compared to hydrophobic acrylic IOLs
- Additional factors associated with higher risk of PCO include: co-pathologies (glaucoma, diabetic retinopathy, retinal vascular occlusion), demographics (female gender and younger age) and other post-operative complications
- Our findings indicate the non-360° edge was not associated with increased risk of PCO vs. 360° edge
- The lack of primary care data could represent a limitation due to potentially missing information on additional co-pathologies and other relevant risk factors for PCO
- Difficulties in estimating follow-up time accurately was another limitation of the study, as most of the patients only visited the clinic for their post-operative follow-up visit, or in case of any complication

References

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