Impact of Axial Length on Diabetic Retinopathy

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Introduction

Decades of research have shown an inverse relationship between myopia and severity of diabetic retinopathy.[1-6] Multiple hypotheses have been proposed to explain the protective effects of increased myopia on diabetic retinopathy, but none are conclusively proven. Due to final refraction dependence upon numerous factors, research is predominantly focused on axial length as the key prognostic factor.[2-5] Many of the previous studies have based their severity grading on a single clinic encounter, failing to account for potential fluctuations in severity of non-proliferative diabetic retinopathy.[1, 3-5] Additionally, many of these studies make assessment of glycemic control based on a single HbA1c; failing to account for the impact of previous glycemic control on a patients current diabetic retinopathy status.[1, 3-5] This study sought to further medical knowledge by looking at the progression of diabetic retinopathy over an extended period.

Methods

Retrospective review of 188 cataract surgeries performed on diabetic patients at Loyola University from 2008-present who were followed in the ophthalmology clinic for >1yr prior to their cataract surgery. These charts were then reviewed and Diabetic Retinopathy status was determined from dilated eye exams prior to cataract surgery, and all HbA1c values in the medical record prior to date of cataract surgery were recorded.

Right Eye Left Eye

Increase in Axial Length by 1mm Decreases Odds of PDR

46% 53%

Patients with No Macular Edema After Cataract Surgery

93% Less Likely to have PDR 93% Less Likely to have NPDR

88% Less likely to have NPDR 88% Less Likely to have PDR

Non-Insulin Dependent

86% Decreased Odds of NPDR 87% Decreased Odds of PDR

83% Decreased Odds of PDR 79% Decreased Odds of NPDR

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The project described was supported in part by the Loyola Clinical Research Office (CRO) at Loyola University Chicago, Health Sciences Division, 2160 S. First Ave., Maguire Building, Room 3368, Maywood, IL 60153. The work is the responsibility of the authors and does not necessarily represent the views of the CRO.

Results

Compared to patients without diabetic retinopathy, for every 1mm increase in axial length the odds of PDR in the right eye decreased by 46% (OR=.54, **p=.02**) and the odds of PDR in the left eye decreased by 53% (OR=0.47, **p=.003**). Patient without clinically identified macular edema after surgery were 88% (p=.07) less likely to have Non-proliferative diabetic retinopathy (NPDR) and 93% less likely to have PDR in their right eye; additionally they were 93% less likely to have NPDR (**p=.02**) and 88% (p=.07) less likely to have PDR in their left eye. Patients not using insulin had 86% decreased odds (**p=.001**) of having NPDR and 83% decreased odds (**p=.005**) of PDR in their right eye, as well as 79% decreased odds (**p=.007**) of NPDR and 87% decreased odds (**p=.001**) of PDR in their left eye.

Conclusion

This study supports the current literature's reports of increased axial length's association with less severe diabetic retinopathy (DR). Additionally, this study found the severity of DR before cataract surgery significantly impacted the presence or absence of clinically identified macular edema after surgery, and that insulin use was a strong predictor of DR status.