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Does Cataract Morphology Affect the Risk of Glaucoma Following Cataract Surgery in Infants with a Unilateral Congenital Cataract

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Glaucoma develops in about 20–30% of patients after surgery for congenital cataracts, with increasing risk over time following cataract removal.¹ While the pathogenesis has been debated, factors that have been studied include age at cataract detection², age and corneal size at surgery, type of cataract, the presence of persistent fetal vasculature (PFV), the use of an IOL, the need for additional surgeries, and the time elapsed since surgery.^{1,3–5} Parks et al. proposed that fetal nuclear cataracts were associated with a higher risk of glaucoma.⁶ Chak and Rahi, found a strong univariant association between age of detection of congenital cataracts and the risk of open angle glaucoma.² Since congenital fetal nuclear cataracts are often detected during infancy, age at detection may have been a confounding factor in Parks series.

We reviewed the type of cataract in patients enrolled in the Infant Aphakia Treatment Study (IATS) to evaluate whether fetal nuclear involvement was correlated with the development of glaucoma-related adverse events following early unilateral cataract surgery.

METHODS

Inclusion criteria for the IATS included a visually significant congenital cataract in one eye and cataract surgery between 1 to 6 months of age. Patients were followed longitudinally to age 5 years. A video analysis of cataract type was performed by three examiners to determine the type of cataract.⁷ Eyes with mild forms of PFV were not considered to have nuclear cataracts even if there was nuclear involvement.⁷ We have previously reported the

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criteria we used to define glaucoma and glaucoma suspect.⁵ Glaucoma status was determined at the five-year visit.

Logistic regression was used to determine the effect of Fetal Nuclear involvement on glaucoma status measured as Neither, Glaucoma Suspect, or Glaucoma. These estimates were adjusted for age and for corneal diameter.

RESULTS

Table 1 summarizes the incidence of glaucoma-related adverse events in 83 patients with various types of unilateral congenital cataracts. For this study, eyes were labeled as having PFV if they had one or more of these features: persistent fetal iris vessels, patent persistent hyaloid vessels, or stretched ciliary processes. In 7 eyes with nuclear involvement, PFV was also found. We have not included those eyes in our fetal nuclear group. Instead, they appear in Table 1 under the label of PFV.

By the five-year visit, of the 39 patients with fetal nuclear cataracts, 8 (21%) had glaucoma, 5 (13%) were glaucoma suspects, and 26 (67%) had neither glaucoma nor were glaucoma suspects. Of the 44 patients who did not have fetal nuclear cataracts, 8 (18%) had glaucoma, 7 (16%) were glaucoma suspects, and 29 (66%) were neither. There was no evidence that nuclear cataracts were related to glaucoma status measured at 3 levels (glaucoma, glaucoma suspect and neither, $p=0.90$).

Of the 14 patients with PFV, 4 (29%) had glaucoma, 1 (7%) was a glaucoma suspect, and 9 (64%) were neither. Of the 69 who did not have PFV, 12 (17%) had glaucoma, 11 (16%) were glaucoma suspects, and 46 (66.7%) were neither. There was no evidence that PFV was related to glaucoma status ($p=0.49$).

DISCUSSION

We were unable to find an increased risk of glaucoma or glaucoma suspect in infantile eyes that underwent unilateral congenital cataract surgery with the diagnosis of PFV or fetal nuclear cataract. Unlike other cohorts, the IATS had the advantage of detailed analysis of fetal nuclear involvement based on unedited operating microscope videos.

In a large retrospective study of 174 eyes Parks et al. noted that 16 of 26 eyes that developed glaucoma had fetal nuclear cataracts; however, all but four of these patients had bilateral cataracts.⁶ Other genetic or developmental factors that may contribute to the development of glaucoma following cataract removal could be involved in glaucoma developing in patients with bilateral cataracts and hence not applicable to patients with unilateral cataracts. The IoLunder 2 cohort study also did not find an association between cataract type and the development of glaucoma.⁸

The limitations of the present study include the relatively small sample size and a follow-up of only 5 years.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1

Type of Cataract vs. Glaucoma Status in Study Cohort

Type of Cataract	Number of patients	Glaucoma	Glaucoma Suspect	No Glaucoma
Nuclear	39	8 (21%)	5 (13 %)	26 (67%)
PFV	14	4 (29%)	1 (7%)	9 (64%)
Cortical	12	4 (33%)	1 (8%)	7 (58%)
Posterior	8	0 (0%)	1 (12%)	7 (88%)
Absorbed	7	0 (0%)	4 (57%)	3 (43%)
Total	3	0 (0%)	0 (0%)	3 (100%)
	83	16 (19%)	12 (14%)	55 (67%)

PFV (Persistent Fetal vasculature) refers to eyes that had evidence of mild remnants of the fetal vasculature in addition to other types of lens opacities. Eyes with PFV and nuclear opacities were not included in those designated as nuclear.