

Risk factors identified for glaucoma following paediatric cataract surgery

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in Paris



Rupal H Trivedi

NEW evidence suggests that early age cataract surgery and micro cornea are high risk factors for the development of glaucoma following paediatric cataract - intraocular lens (IOL) implantation surgery, and that children operated after the age of six months stand a much lower chance of developing ocular hypertension/glaucoma. The investigators noted that common factors to most eyes that did develop glaucoma were eyes with complex microphthalmos or associated ocular anomalies.

In a retrospective database search that involved 251 eyes of children, researchers at the Storm Eye Institute found that 7.2% of eyes developed glaucoma after cataract and primary IOL implantation surgery. Some 28% of eyes operated at age six months or younger developed glaucoma compared with only 2.4% of eyes operated in patients over six months of age, said Rupal H. Trivedi MD, Storm Eye Institute, Charleston, South Carolina, US.

Further evaluation of related risk factors found that microcornea (corneal diameter <math>< 10\text{ mm}</math>) was significantly associated with glaucoma. The average corneal diameter of the total 18 eyes that were diagnosed with pseudophakic glaucoma was 9.9 mm. By comparison, the eyes that did not develop glaucoma had average corneal diameters of 11.0 mm, Dr Trivedi told the audience during her keynote lecture presentation in a paediatric cataract session of the XXII Congress of the ESCRS.

Mean preoperative axial length was 21.4 ± 2.4 mm in eyes without glaucoma compared to 18.6 ± 2.5 mm in eyes diagnosed with glaucoma, a statistically significant difference. Mean K1 keratometry measurements were 44.1 for glaucoma-free eyes compared with 46.3 for those that did develop glaucoma. Similarly, mean K2 measured 45.6 for nonglaucomatous eyes compared 47.3 for glaucomatous eyes.

She pointed out that serial postoperative axial length measurements are helpful in detecting the abnormal axial elongation that may be associated with glaucoma in very young eyes.

Further, she said her review associated piggyback IOLs more often with the development of glaucoma than with single IOLs overall - 8.7% in piggyback cases versus 3.4% with single IOLs. However, this may be because more eyes operated at younger age were implanted with piggyback IOLs.

Paediatric cataracts may carry inherent glaucoma risk

Paediatric ophthalmologists attending the congress argued that although factors such as age and corneal diameter may indeed play an important role, it is the cataract surgery itself that brings complications such as ocular hypertension to the fore in paediatric cases. Dr. Trivedi explained that even with severe microcornea, glaucoma does not seem to occur without the cataract. Cataract may have associated anomalies of the angle structure and surgery to remove the cataract may trigger a cascade of events that may lead to elevated IOP/glaucoma in these predisposed eyes, early on or even 5 to 15 years later.

Dr. Trivedi allowed that not all researchers concurred on this point. For example, an earlier trial performed by Asrani published in J AAOPS (1999) suggests that pseudophakia may protect against glaucoma. Dr. Asrani's results showed that aphakic eyes (mean age 2.7 years, mean follow up 7.2 years) developed glaucoma in 11.3% of cases. Pseudophakic eyes developed glaucoma in only 0.26% of cases (mean age 5.1 years, mean follow up 3.9 years).

Dr. Trivedi pointed out that they have also noted a low incidence of glaucoma in post-cataract patients who have

received implantation of an IOL. However, perhaps this represents a selection bias since the microphthalmic eyes and eyes associated with ocular anomalies are the ones least likely to be implanted with an IOL. The more recent use of IOLs even in these higher risk eyes may lead to higher incidence of glaucoma especially with long-term follow-up.

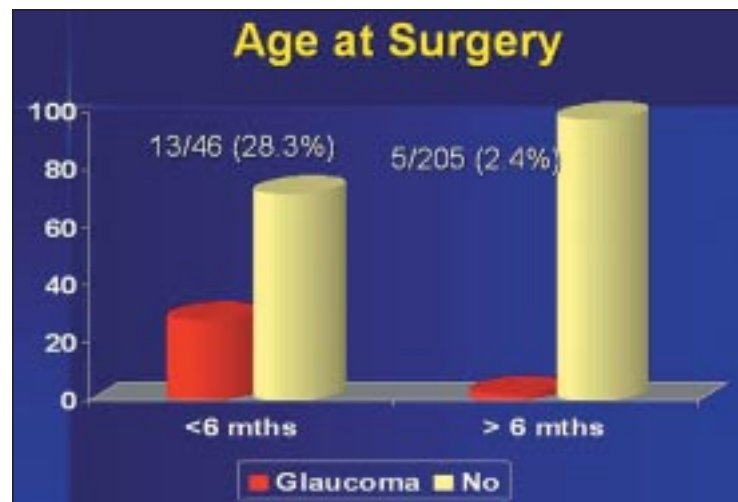
Dr. Trivedi noted that recent literature reported aphakic glaucoma occurred in 21% of eyes, and the crucial age to develop glaucoma was in patients younger than nine months. Dr. Trivedi said the literature has reported the incidence of aphakic glaucoma between five percent and 41%. The duration of the follow up period, age at the time of surgery, diverse inclusion and exclusion criteria and varying definitions of glaucoma itself account for the widespread, she said. Researchers need to devise studies that standardised relevant parameters.

Long follow-up necessary

As paediatric glaucoma lacks both a universally accepted aetiology and treatment, and ranks as one of the leading causes of irreversible vision loss following cataract surgery, she stressed that an awareness of the risk factors is imperative. Eyes operated early in life for cataract-IOL surgery should be routinely followed over the long term, to detect and treat glaucoma at the earliest sign of disease. The risk of asymptomatic glaucoma after paediatric cataract-IOL surgery reinforces the need to follow these children for regular, long-term follow-up. In high risk patients, EUA (at least yearly) for measurement of IOP and examination of the anterior and posterior segments of the eye is recommended until the children get old enough to allow these examinations awake.

The average postoperative follow-up time was 47.0 months (SD 25.8) and 37.7 months (SD 30.9) ($P = 0.21$), following cataract surgery in the 3.5 and 0.2 year age groups respectively. Glaucoma was diagnosed at an average of 9.1 months (SD 13.8 months, median 3.5 months, range 0.8 – 44.0 months) after surgery.

The study included consecutive primary pseudophakic patients who were treated for glaucoma. It excluded all eyes with traumatic cataract,



Age at cataract surgery as a risk factor for glaucoma following paediatric cataract-IOL surgery.

secondary implantation, eyes with preoperative glaucoma and those with less than one month of follow-up.

The investigators looked at probable risk factors such as age at the time of cataract surgery, gender, race, and systemic or ocular anomalies, cataract details (i.e. type of cataract, location), and details of IOL implantation (i.e. site of lens fixation, type of IOL material). They also noted the interval between cataract surgery and diagnosis of glaucoma. They applied Student t-test and Chi-square tests for statistical analyses.

Dr. Trivedi cited the limitations to the study. These included the fact that glaucoma is not merely defined as elevated IOP (fundus, gonioscopy, field); the retrospective nature of the study; and the fact that variable

follow-up times and incomplete screening added to discrepancies in the results. Furthermore, IOP was difficult to measure with accuracy in restless children and was possibly influenced by the anaesthetic.

Dr. Trivedi's co-authors were M. Edward Wilson, MD and John Facciani, MD.

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