

On detection, treatment and prevention of complications in paediatric cataract surgery

Akademisk avhandling

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av

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Avhandlingen baseras på följande delarbeten

- I. Alf Nyström, Kristina Lundqvist, Johan Sjöstrand. Longitudinal change in aphakic refraction after early surgery for congenital cataract. *J AAPOS*. 2010 Dec;14(6):522-6.
- II. Madeleine Zetterberg, Alf Nyström, Lada Kalaboukhova, Gunilla Magnusson. Outcome of surgical treatment of primary and secondary glaucoma in young children. *Acta Ophthalmol*. 2015 May;93(3):269-75.
- III. Alf Nyström, Nawaf Almarzouki, Gunilla Magnusson, Madeleine Zetterberg. Phacoemulsification and primary implantation with bag-in-the-lens intraocular lens in children with unilateral and bilateral cataract. *Acta Ophthalmol*. 2018 Jun;96(4):364-370.
- IV. Alf Nyström, Gunilla Magnusson, Madeleine Zetterberg. Secondary glaucoma and visual outcome after paediatric cataract surgery with primary bag-in-the-lens intraocular lens. *Acta Ophthalmol*. 2019 Sep 11.
- V. Alf Nyström, Birgitte Haargaard, Annika Rosensvärd, Kristina Tornqvist, Gunilla Magnusson. The Swedish national paediatric cataract registry (PECARE): incidence and onset of post-operative glaucoma. *Manuscript 2019*.

**SAHLGRENKA AKADEMIN
INSTITUTIONEN FÖR NEUROVETENSKAP
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Abstract

Purpose: To find and validate methods for diagnosis, treatment and prevention of complications in paediatric cataract surgery.

Background: Cataract and glaucoma are major treatable blinding conditions in children. Surgery for cataract in children and for its major complications, secondary glaucoma (SG) and visual axis opacification (VAO), are performed in general anaesthesia in the child. Knowledge on detection, indication and treatment as well as complication rates and risks are important to make the right decisions.

Methods: Data on diagnosis, treatment and outcome for children subjected to surgery was retrieved from medical records or from the Paediatric Cataract Registry (PECARE).

Results: Refractive change mapping is an effective method to follow development after early cataract surgery enabling detection of SG. Glaucoma treatment with chamber angle surgery and shunt draining device is safe and reduces pressure levels adequately. Visual acuity (VA) levels seems good. With primary implantation of bag-in-the-lens intraocular lens (BiL-IOL), the rate of VAO is low, 4.6%. Comorbidity is common and SG more frequent in eyes with early surgery for congenital cataract; Surgery in infants before 5 weeks of age has a high SG rate but results in higher corrected distance visual acuity levels compared to surgery between 5 and 12 weeks of age. Performing surgery between 5 weeks and 2 years of age resulted in a SG rate of 6.7% with primary implantation of a BiL-IOL. In a Swedish registry cohort of paediatric cataract surgeries <8 years of age and a mean follow-up of 3.31 years, the incidence of surgically treated SG was 23.7%. The majority was early-onset (< 1 year after surgery). With 58.3% infants (surgery within 3 months of age) this rate is fair. The incidence of late-onset glaucoma was low but the time span too short for prediction.

Conclusion: Early detection and treatment of congenital cataract and SG are important for good VA results during childhood. Chamber angle surgery and shunt draining device lower pressure adequately in cases of SG. With primary implantation of a BiL-IOL the VAO rate was 4.6% in children from 2 weeks to 16 years of age. High rates of SG are obtained when performing surgery during the first 5 weeks. Postponing surgery to after 5 weeks of age seems to reduce the rate of early-onset secondary glaucoma. The low SG incidence for surgery after 5 weeks of age indicates safety from a glaucoma perspective for implantation of BiL-IOL in children over 5 weeks of age.

Keywords: paediatric cataract, paediatric glaucoma, primary intraocular lens, visual axis opacification.