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Research Paper

Global Impact of Cataract and Glaucoma on Children

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ABSTRACT
Even though glaucoma is a leading cause of vision loss and blindness around the world, data is scarce on the true scope of the disease's impact. Glaucoma was included in the need for action against global causes of avoidable blindness when WHO was planning its program for the prevention of blindness, along with cataracts, trachoma, vitamin A deficiency, and onchocerciasis. The World Health Assembly particularly encouraged WHO to "implement sufficient procedures for the early diagnosis and treatment of other potentially blinding disorders such as cataract and glaucoma" in May 1975.Congenital cataracts are a significant source of visual disability in newborns and children. Early cataract surgery is done to prevent amblyopia, however, it can alter the structure of the eye. The cornea is a part of the eye. A diabetic cataract is also a leading cause of blindness among children. The article consists of the impact of cataracts and glaucoma on children and how to deal with these diseases.

KEYWORDS: *Glaucoma, congenital cataract, paediatric*

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I. INTRODUCTION

Childhood glaucoma (CG) is a rare but serious and potentially blinding illness caused by an increase in intraocular pressure (IOP). Primary aqueous drainage pathway defects leading to primary congenital glaucoma (PCG) and more extensive ocular maldevelopment and/or systemic disease such as Axenfeld-Rieger anomaly, aniridia, phakomatoses, and acquired glaucoma after lensectomy for congenital cataract are all common causes of childhood glaucoma. CG has a lot of management issues, and the visual results might be unsatisfactory.Although surgery is the primary treatment for PCG, subsequent glaucomas frequently require surgery to reduce intraocular pressure (IOP) if topical medicines fail. Aggressive postoperative inflammation and scarring can jeopardize surgical outcomes, potentially necessitating repeated surgical operations. Before and after surgery, children frequently require topical medicine to reduce IOP, which can cause discomfort and be a financial burden for families. Ametropia and amblyopia correction in young children necessitates additional monitoring and treatment.

Paediatric cataracts can be congenital, developmental, and traumatic. Congenital cataracts are a common cause of vision loss in children and babies. Early cataract surgery is used to prevent amblyopia; nevertheless, early surgery can have an impact on the eye's structure, including the cornea.Paediatric cataract treatment can have a huge impact on people's lives, their families' lives, their communities' lives, and the country's socio-economic condition. Children with vision impairments face a lifetime of social, emotional, and financial challenges. This has an impact on their schooling, work, and social lives. Childhood blindness causes around 70 million blind-person-years, including about 10 million blind-person-years (14%) attributable to childhood cataracts. India has a big problem with 280,000–320,000 vision handicapped children, resulting in a $3,500 million loss.

II. GENETICS

A congenital cataract is hereditary in 8.3%–25% of cases, with autosomal dominant inheritance accounting for 75% of cases. Penetrance varies across autosomal-dominant cataracts. Hyperferritinemia cataract syndrome, Coppock-like, Volkmann-type congenital, zonular with sutural, posterior polar, anterior polar, cerulean, zonular pulverulent, crystalline aculeiform, and myotonic dystrophy 1-like cataracts are examples of

autosomal-dominant cataracts. Warburg micro syndrome, Hallermann–Streiff syndrome, Martsolf syndrome, Smith–Lemli–Opitz syndrome, Rothmund–Thomson syndrome, Marinesco–Sjogren syndrome, Wilsons disease, and congenital cataract facial dysmorphism are all autosomal-recessive cataracts.

Primary congenital glaucoma (PCG) is an uncommon disorder in which aqueous outflow blockage is caused by isolated trabeculodysgenesis. The typical look of an immature angle on gonioscopy is caused by tissue development stop in the anterior chamber angle. In children, this is the most common cause of glaucoma. The majority of cases are idiopathic, but family cases have been shown to have an autosomal recessive inheritance with varied penetrance. GCL3A is the most common PCG gene, accounting for 85–90% of familial cases and 27% of sporadic cases. In the vast majority of cases, mutations in the CYP1B1 gene, which codes for the enzyme cytochrome P4501B1, are the predominant molecular abnormalities.

III. PATHOGENESIS

PCG's pathophysiology is yet unknown. The immature angle is caused by the development of tissues derived from cranial neural crest cells being halted in the third trimester of pregnancy. It's currently assumed that thick, compacted trabecular sheets are to blame.

With 1/4-1/3 familial heredity, the pathogenesis of congenital cataracts is considered complex.Congenital cataracts can appear on their own or as part of an ocular condition or developmental abnormality. Systemic metabolic illness can affect multi-system function. To complete the coordination duty of the guidance, a mixture of genes and their products must be present in time and place.

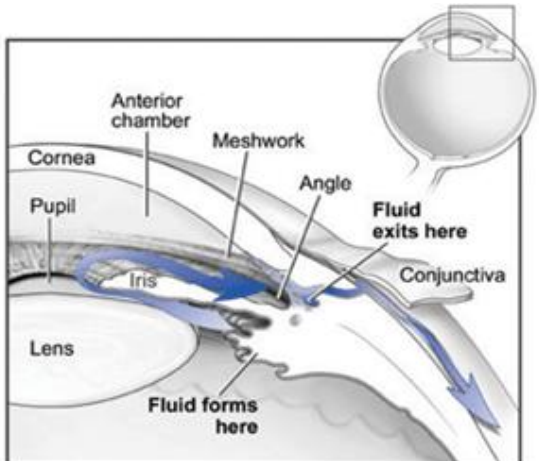

Fig: Pathogenesis of Infantile Glaucoma

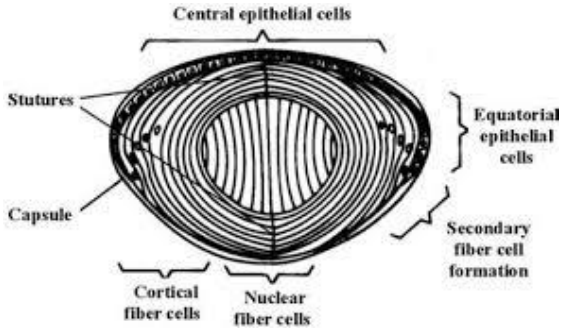

Fig: Molecular genetics of congenital cataracts

IV. MEDICAL THERAPY

Medical therapy is helpful with many different open-angle forms of juvenile glaucoma, even though surgery is the first-line treatment for primary congenital glaucoma. Children with aphakic, uveitic, and juvenile open-angle glaucoma should normally take medication first, and if therapy achieves the goal IOP, they may be able to defer surgery for a long time (or even indefinitely). Medication is especially important in cases when surgery did not effectively lower IOP, as it prevents the need for more extensive (and frequently riskier) surgery.Children with glaucoma frequently follow their doctors' orders, especially if they have strong family support. Complicated dosing regimens, on the other hand, can have a significant impact on the child's and family's quality of life, as well as their ability to adhere to the prescribed therapy. Although the clinician may add medicine if the present regimen isn't producing the target IOP, it's a good idea to re-evaluate the efficacy of

each recommended drug first. A monocular trial and changing one medicine at a time are recommended whenever possible.

Congenital cataracts are removed by ophthalmologists. This happens within a few weeks of the diagnosis, as early as 6–8 weeks of age. The ophthalmologist removes the clouded component of the lens and may replace it with a flexible plastic artificial lens during the surgery. To help the eye focus correctly after surgery, the newborn will likely need to wear a contact lens or glasses.

V. SURGERY

The standard phased approach to primary congenital glaucoma indicated in most textbooks or review papers involves "angle surgery" (goniotomy in instances with generally clear corneas) and trabeculotomy (for those with the cloudier cornea). If the first procedure fails, it can be done as many times as necessary, frequently more than twice with goniotomies and twice with trabeculotomies. The following surgery is either a normal trabeculectomy with antimetabolites or a trabeculotomy/trabeculectomy combo. If this fails, tube implantation is a common next step (in an eye with a reasonable visual potential).The most common types of "angle surgery" are goniotomy and trabeculotomy ab externo. Goniotomy (if the cornea is clear enough to see the goniotomy knife passing across the anterior chamber and incising the trabecular meshwork) or trabeculotomy ab externo (if the cornea is cloudy enough to see the goniotomy knife passing across the anterior chamber and incising the trabecular meshwork) (even when the cornea is clear, if the surgeon prefers this technique due to prior training or expertise with the operation). Both techniques are thought to work by allowing aqueous fluid to enter Schlemm's canal and the outflow system more directly.

The major goal of surgical treatment of cataracts is to clear the visual axis, followed by visual rehabilitation after surgery. Because children have lesser corneal and scleral rigidity, an extremely elastic anterior capsule, a soft lens, and a well-formed vitreous, their surgery differs from that of adults. In trauma-prone childhood years, a superior incision is favored because it permits the wound to be shielded by the eyelid and Bell's phenomenon. Scleral or clear corneal incisions can be employed, and the difference in astigmatism produced by the incision is minimal.In cases of capsulorhexis runoff, optic capture can also be beneficial. In aphakic individuals, peripheral iridectomy should be performed. In uveitic and traumatic cataracts, depending on the presentation, peripheral iridectomy may be explored. Because of the increased risk of anterior-chamber collapse and endophthalmitis in youngsters, surgical incisions must be sutured with 10-0 monofilament nylon. If there is no leak, the side ports can be left sutureless.

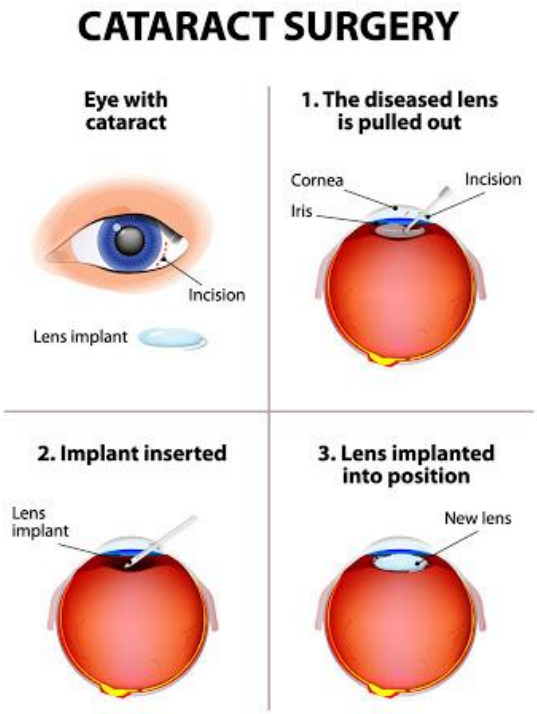

Fig: Cataract Surgery

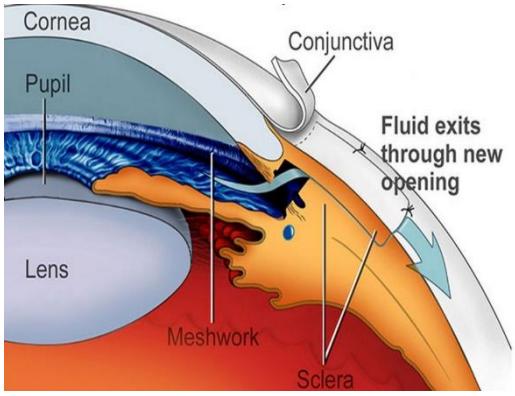

Fig: Incisional Glaucoma Surgery

VI. DISCUSSION

Our research shows that most children with glaucoma require multiple eye drops, have undergone multiple surgical operations, and have received extra general anesthetics. Congenital cataracts obstruct normal visual development and are a significant issue in pediatric ophthalmology. The most essential aspect in deciding the visual result of these eyes is the excision of visually significant cataracts as soon as possible. However, in eyes with removed congenital cataracts, early lens removal causes anatomic and physiologic abnormalities. Acongenital cataract is particularly dangerous since it can obstruct visual development and result in lifelong blindness. Inherited cataracts contribute significantly to congenital cataracts, particularly in developed countries. While cataract is the result of mutations in a wide number of genes operating through various mechanisms, most inherited cataracts have been linked to a subset of genes encoding proteins important for lens transparency and homeostasis.

VII. CONCLUSION

Pediatric glaucoma is fortunately uncommon. In a pediatric child vs. an old adult, treatment approaches take decades longer to exhibit side effects and fail. Furthermore, lowering the IOP in youngsters does not protect them against amblyopia, corneal scarring, or substantial ametropia. Reducing the IOP to a safe level for the optic nerve is thus only one aspect of glaucoma care for a child.Over time, pediatric cataract surgery has improved and become more safe and predictable. Early detection, prompt referral, and appropriate management result in positive outcomes.

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