

Dear Doctor,

Greetings from Micro Labs Limited. We are happy to bring you '**Ophthalmal Focus**' which contains latest and interesting news in the field of Ophthalmology.

This issue contains

- Penetrating keratoplasty for Congenital Corneal Opacities in Children under 3 years old.
- Combined Trabeculectomy–Trabeculectomy in Primary Congenital Glaucoma: Surgical Outcomes
- Infectious keratitis post-27-years of radial keratotomY: a rare case report

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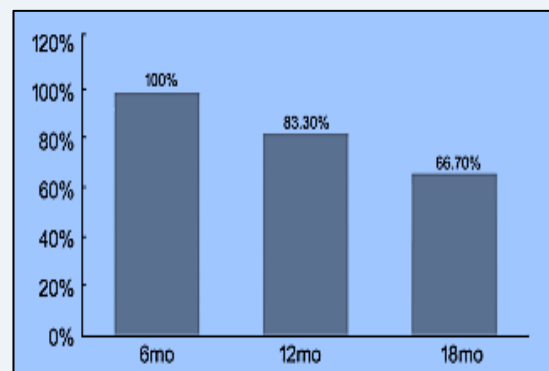
Best Regards,

Medical Team, Micro Labs Limited

Penetrating keratoplasty for Congenital Corneal Opacities in Children under 3 years old.

Penetrating keratoplasty (PK) is regarded as the initial step in preventing irreversible loss of visual function in a child due to amblyopia, even if the prognosis is not as promising as in adults. Congenital corneal opacities (CCO), acquired traumatic and non-traumatic corneal opacities are among the reasons for pediatric PK. [1] Early PK is essential for good visual development and the prevention of amblyopia. Congenital corneal opacities affect roughly 3/100,000 people. Peter's anomaly (40.3%) is the most common cause of congenital corneal abnormalities in industrialized nations, followed by sclerocornea (18.1%), dermoid cyst (15.3%), microphthalmia (4.2%), birth trauma, and metabolic illnesses (2.8 percent). According to earlier studies, the range of indications for pediatric PK is from 14 percent to 64 percent in cases of congenital illnesses, 19 percent to 80 percent in acquired non-traumatic conditions, and 6 percent to 29 percent in acquired traumatic disorders. [2]

Children who received PK were tracked for 5 years in this retrospective cohort research. All patients were children under the age of three who presented to a pediatric ophthalmologist with congenital corneal opacities with or without microcornea and underwent PK. All of the youngsters had already had a complete PK examination. Surgery was not recommended in the case of severe microcornea. In percentages, the visual results and graft survival rate were given. The visual acuity was assessed using the Wilcoxon signed ranks test, while the graft survival plot was provided using Kaplan-Meier.

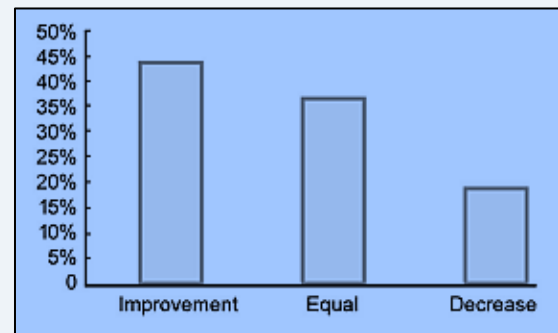


The graft survival rate after keratoplasty

PK was performed on sixteen eyes from eleven individuals (seven girls and four boys). The first 6, 12, and 18 months after keratoplasty, the graft survival rate was 100%, 83.3 percent, and 66.7 percent, respectively. The total mean survival time was 22 months, and there was no significant difference in survival time between patients who had PK before and after 36 months of age. Graft failure was 50%, with cataracts 43.7 percent, band keratopathy 12.5 percent, and scleromalacia 6.25 percent as postoperative sequelae. The Wilcoxon test analysis of visual acuity after keratoplasty was not statistically significant, although the total visual result improved by 44% after 5 years of follow-up.

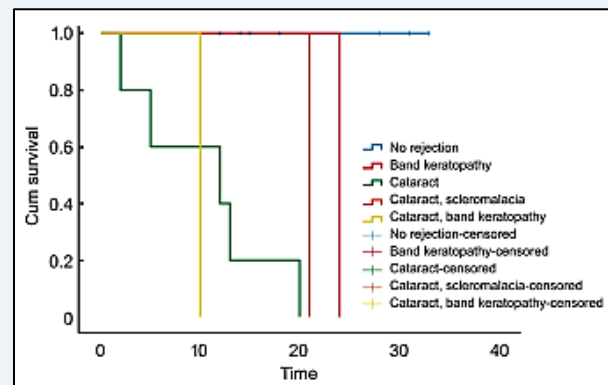
According to a study, CCO was the most prevalent cause of PK in children under the age of 12. The patients were divided into two groups: babies (3 months and 4 years) and children (4 years and 12 years). The majority of the patients in our research were between the ages of 12 and 36 months. Only five patients arrived before the age of six months. Because the indications and symptoms appeared later at 12 months, most parents may not identify them. Due to the availability of the eye donor, the keratoplasty was performed six months to a year following the initial consultation. The majority of the PK was done on babies, while the other three eyes were done at 42, 46, and 56

months. [3] As stated in this study, the oldest patient undergoing surgery was 54 months old, with a problem occurring 12 months later but with improved visual acuity. Despite the fact that the age disparity between the patients in this trial was not large, the keratoplasty effectively supplied a clear graft in the first year. It was hypothesized that conducting keratoplasty on newborns early in life, particularly in bilateral instances, would help them enhance and develop their visual acuity. Future amblyopia severity can be reduced with further follow-up, vigilant monitoring, and visual rehabilitation.



Visual acuity after penetrating keratoplasty

The best-corrected visual acuity of 6/12 or greater was reached by 18.75 percent of children who received PK, according to a 10-year study. Graft rejection, glaucoma, and graft failure were all linked to hazy grafts in 68.75 percent of patients. The existence of vascularized cornea, intraocular inflammation, and combination surgery, all of which were important, contributed to the graft's survival rate at a one-year postoperative period. [4]



Kaplan-Meier graft survival

In a study, children with congenital corneal opacities aged 0 to 7 years old were conducted PK. At the latest follow-up, 43 of 60 eyes (71.7 percent) had reached ambulatory vision (20/960), and 14 eyes (23.3 percent) had visual acuities >20/260. In comparison to unilateral opacity eyes, bilateral opacity eyes acquired much greater ambulatory vision (88.5%). (58.8 percent). The four follow-up subgroups (12mo, 12-36mo, and >36mo after operation) had no significant variations in visual acuity. Corneal astigmatism in ten of the 14 eyes that obtained 20/260 vision was less than three diopters. [5]

Although the visual acuity did not improve considerably after keratoplasty, the graft survival rate was determined to be promising in this study. Overall, the average duration to survival is 22 months, with an 83.3 percent one-year survival rate. Although there is a gap between the ages of timing PK, it allows for the improvement of visual acuity (44%), as well as an excellent survival rate. Furthermore, the primary goal of stabilizing visual function in order to avoid blindness was met. Since the patients in this research were under the age of three, even a simple object or light fixation is sufficient. It was discovered that this study was identical to the prior studies described above in combination with this one.

Corneal surgeons and pediatric ophthalmologists face a difficult task in treating pediatric PK. The delayed surgery will damage the visual system's immaturity, which might lead to severe amblyopia. Visual acuity can be attained (63%) and exhibited improvements (44%) throughout follow-up with an excellent one-year survival rate (83.3%) and a mean survival period of 22 months. Cataract,

graft rejection and failure, band keratopathy, and scleromalacia are all common consequences after pediatric PK. As a result, surgery on a newborn or kid necessitates cautious case selection, thorough pre-operative examination, expert optical correction surgery, close collaboration between the family and the physician, rigorous post-operative care, and post-operative amblyopia maintenance.

Pediatric PK has a high rate of complications. As a result, corneal surgery on newborns necessitates cautious case selection, thorough pre-operative examination, competent surgery (optical correction), close family-physician collaboration, rigorous post-operative care, and future amblyopia treatment.

Reference:

1. Susiyanti M, Mawarasti B, Manurung FM. Penetrating keratoplasty in children under 3 years old with congenital corneal opacities. *International Journal of Ophthalmology*. 2022;15(1):45.
2. Di Zazzo A, Bonini S, Crugliano S, Fortunato M. The challenging management of pediatric corneal transplantation: an overview of surgical and clinical experiences. *Japanese journal of ophthalmology*. 2017 May;61(3):207-17.
3. Zhang Y, Liu Y, Liang Q, Miao S, Lin Q, Zhang J, Pan Z, Lu Q. Indications and outcomes of penetrating keratoplasty in infants and children of Beijing, China. *Cornea*. 2018 Oct 1;37(10):1243-8.
4. Mun-Wei L, Said HM, Punitan R, Ibrahim M, Shatriah I. Indications, clinical outcomes, and survival rate of pediatric penetrating keratoplasty in suburban Malaysia: a 10-year experience. *Cureus*. 2018 Dec 17;10(12).
5. Lin Q, Shi W, Miao S, Zhang Y, Li L, Pan Z. Visual outcomes and prognostic factors of successful penetrating keratoplasty in 0-to 7-year-old children with congenital corneal opacities. *Cornea*. 2018 Oct 1;37(10):1237-42.

Combined Trabeculectomy–Trabeculectomy in Primary Congenital Glaucoma: Surgical Outcomes

Congenital glaucoma is the leading cause of childhood blindness globally, accounting for 10.8% of all visual impairments in children. It has a varying birth incidence in various communities across the world. [1] Surgical therapy is frequently used to treat the condition, with medication treatment serving as a backup or supplement. Several surgical options have been documented, however, surgery in a buphthalmic eye with disrupted anatomy is difficult and is associated with a greater failure rate and numerous complications than surgery in adults. Early and correct surgical intervention can result in a positive outcome and help patients keep their vision. [2]

The objective of this study was to assess the impact of various pre-operative variables on the success of combined trabeculectomy–trabeculectomy (CTT) surgery in patients with primary congenital glaucoma (PCG), in order to identify those who were at higher risk of surgical failure and provide proper parent counselling. Sixty-three eyes of PCG patients were treated with CTT alone, CTT augmented with mitomycin-C (0.2 mg/mL) in both the subconjunctival area and under the scleral flap for 3 minutes, or CTT augmented with a collagen implant under both the scleral flap and the conjunctiva. Surgical failure was reported and examined in connection to several preoperative factors in several cases.

In 52 instances, complete success (IOP 21 mmHg) was obtained (82.5 %). With a P-value of 0.007, Kaplan-Meier survival analysis was used to determine that greater pre-operative intraocular pressure (IOP) was related to higher failure rates (28.6 percent for pre-operative IOP 30 mmHg vs 4.8 percent for IOP 30 mmHg).

Total Number of Eyes According to Pre-Operative Variable (%)	Number of Failures	Probability of Failure	Probability of Success at 95% CI	Log Rank Test	Mean Survival Time (Days)	P-value
IOP-<30 mmHg= 42 (66.7%) -≥ 30 mmHg =31(33.3)	•2 •6	•0.048 •0.286	•0.95 •0.71	7.28	• 349.8 (329.1-370.1) •272.1 (209.3-335)	0.007
Corneal diameter -<13 mm = 25 (39.7%) -≥13 mm = 38 (60.3%)	•3 •5	•0.12 •0.13	•0.88 •0.87	0.017	•326(284.6-367.4) •322.5 (287.7-357.3)	0.897
Corneal clarity -SE = 22 (34.9%) -CE = 32 (50.8%) -TE = 9 (14.3%)	•4 •2 •2	•0.182 •0.063 •0.22	•0.82 •0.94 •0.78	2.68	•305.5 (252.6-358.3) •345.9 (320.4-371.5) •290.6 (199.6-381.5)	0.262

The definitive therapy for PCG is surgery, which can take a variety of forms. However, CTT has shown promise, with greater success rates and better IOP control for a single procedure. CTT has the benefit of being able to treat eyes with severe ocular enlargement and large corneal diameters, which were previously thought difficult to treat with goniotomy surgery. [3]

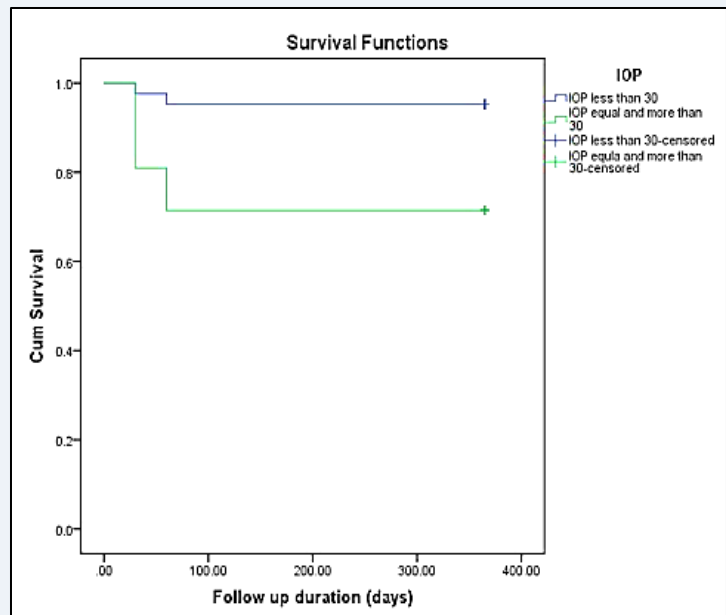
The supplementary outflow path created by CTT explains the procedure's greater success rates, with a lower probability of surgical failure in instances where trabeculectomy was not performed adequately or Schlemm's canal could not

be discovered. Antimetabolites are a controversial addition to CTT surgery since some surgeons feel it increases success rates while also increasing the likelihood of problems. This study found complete success in 52 cases (82.5%), entire success in 55 cases (87.3%), and failure in only eight situations in our research (12.7 %). [4]

Other pre-operative risk variables, such as the patient's age at the time of surgery, sex, family history of PCG, consanguinity, pre-operative corneal diameter, or corneal clarity, were all insignificant when compared to surgical failure. Pre-operative IOP was the only predictor substantially linked with greater failure rates, with patients with pre-operative IOP 30 mmHg (28.6%) compared to those with IOP 30 mmHg (4.8%), with a P-value of 0.007, which was statistically significant. The findings of this study revealed a substantial link between preoperative IOP and surgical failure, with patients with higher preoperative IOP values having a greater chance of surgical failure.

In univariate survival analysis, the only predictor that was statistically significant in relation to surgical failure was pre-operative IOP; other covariates did not exhibit statistically significant differences.

In PCG patients with no sight-threatening complications, CTT is a successful surgical technique. Patients with a greater pre-operative IOP had a higher incidence of surgical failure, according to a univariate survival analysis, while other pre-operative factors were unimportant.



Kaplan-Meier curve showing the success probabilities in relation to pre-operative IOP.

Reference:

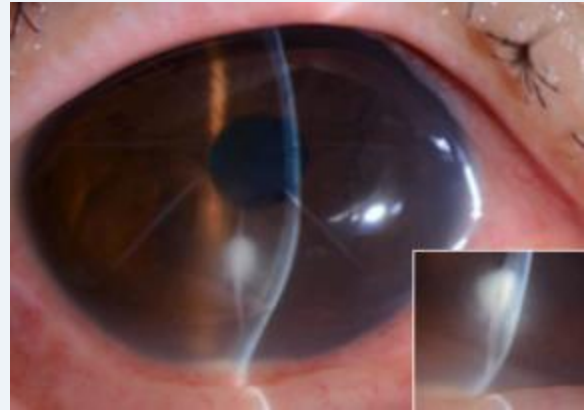
1. Khairy MA, Kenawy S, Fawzi KM, Al-Nashar HY. Factors Affecting Final Surgical Outcome of Combined Trabeculotomy-Trabeculectomy in Primary Congenital Glaucoma. *Clinical Ophthalmology (Auckland, NZ)*. 2022;16:43.
2. Badawi AH, Al-Muhaylib AA, Al Owaifeer AM, Al-Essa RS, Al-Shahwan SA. Primary congenital glaucoma: An updated review. *Saudi Journal of Ophthalmology*. 2019 Oct 1;33(4):382-8.
3. Helmy H. Ab interno goniotomy combined with Ab externo trabeculotomy in advanced primary congenital glaucoma patients: 2-year follow-up. *Clinical Ophthalmology (Auckland, NZ)*. 2021;15:565.
4. Sood D, Rathore A, Sood I, Singh G, Sood NN. Long-term outcome of combined trabeculotomy-trabeculectomy by a single surgeon in patients with primary congenital glaucoma. *Eye*. 2018 Feb;32(2):426-32.

Infectious keratitis post-27-years of radial keratotomy: a rare case report

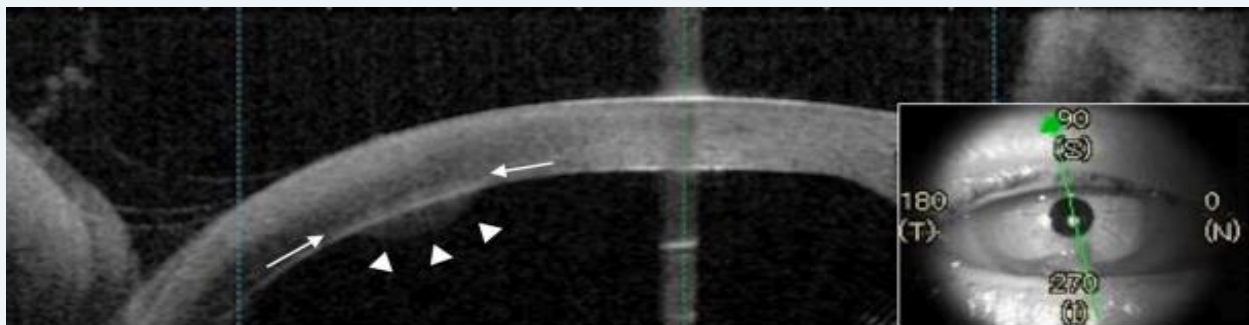
Myopia is corrected via radial keratotomy (RK), a form of refractive surgery. Photorefractive keratectomy, laser-assisted in situ keratomileusis (LASIK), epipolis LASIK (epi-LASIK), tiny incision lenticule extraction (SMILE), and phakic intraocular lens implantation have all largely replaced RK. This is an unusual case of infectious keratitis that occurred after RK 27 years ago. [1]

After being diagnosed with bacterial keratitis by her primary care physician, a 48-year-old female who had had bilateral RK (i.e., 8 corneal incisions per eye) 27 years before came with symptoms of discomfort and vision loss in her right eye. She had discomfort in her right eye 5 days before admission, followed by redness and a foreign body sensation (1 day later) and impaired vision (2 days later). Despite her primary care physician's diagnosis of bacterial keratitis at another clinic, she was not prescribed any eye-drop medicine because the secondary medical care receiving location was closer and simpler for her to attend. The patient had no notable systemic medical history upon presentation, as well as no history of ocular trauma or contact lens use. Her right eye has a best-corrected visual acuity (VA) of 20/40 on the initial assessment.

Slit-lamp examination revealed a focal point in the cornea's deep layer, endothelial plaque, and hypopyon. The patient was started on levofloxacin fortified eye drops and cefmenoxime eye drops. However, there was no improvement two days after starting therapy, therefore anterior chamber irrigation and a bacterial smear/culture were conducted.



Slit-lamp microscopy image of the patient's right eye showing a small-sized focus with inflammatory infiltrates (1.8 × 1.3 mm) and endothelial plaque in the deep site in the radial incision at the 6-o'clock meridian, and hypopyon, and an enlargement of the image (inset).



Anterior segment optical coherence tomography image showing endothelial plaque (white arrowheads), and inflammatory infiltrates (white arrow markers) located at the deep layer of the cornea (inset).

Despite the fact that the smear revealed a large number of gram-positive cocci, no organisms were found in the culture. Due to her work (nursing staff) and the treatment course, it was assumed that the causing bacterium was methicillin-resistant *Staphylococcus aureus* (MRSA). As a result, therapy for suspected MRSA keratitis was started with 0.5 percent arbekacin eye drops, which worked well.

Pain, photophobia, and glare, as well as diurnal variations in VA and refractive errors such as astigmatism and over-or under-correction, have all been reported as postoperative problems following RK surgery.

Infections including keratitis and endophthalmitis, as well as a traumatic perforation and reduced corneal ECD, have all been known to impact VA patients. Infections can happen at any moment following surgery, from the immediate postoperative period to several years afterward, as is well documented. Furthermore, infections with *Pseudomonas aeruginosa*, staphylococci, and fungi have also been documented. [2]

Previous studies on late-onset infections after RK showed that infections were more common in the inferior incision than the superior. In this case, the infection developed in the incision made at 6 o'clock, and the cornea at 6 and 12 o'clock is vulnerable to blinks and eyelid contact, similar to those results. Because of the consequences of dry eye and meibomitis, the 6-o'clock region is regarded to be an environment where superficial punctate keratopathy is more prone to arise. [2] But since gram-positive cocci were detected by smear examination, and the patient worked in healthcare, treatment was carried out while keeping in mind the possibility of a resistant bacteria, such as MRSA, being present, as her job could expose her to MRSA carriage or infection, and the patients she treats are at high risk of developing MRSA keratitis.

In such circumstances, if diagnosis and treatment are delayed, complications such as loss of eyesight might ensue, necessitating corneal transplantation in certain cases. Although early discovery and treatment resulted in a good postoperative outcome with minimal vision impairment in this individual, our data show that long-term follow-up is required following RK since infection can emerge many years after surgery.

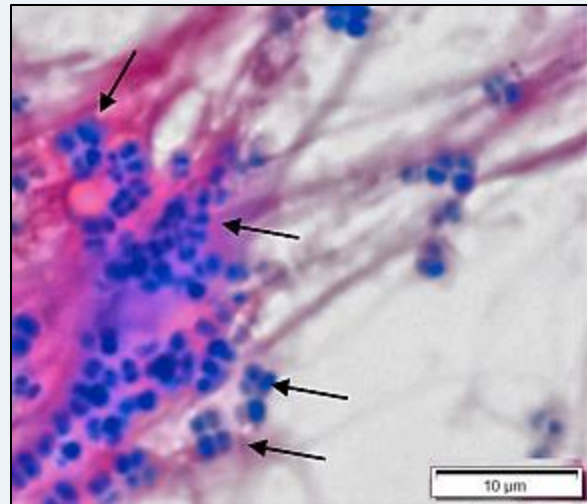


Image of the smear examination of the abscess between the radial incisions showing lots of clustered gram-positive cocci in fibrin formation (gram staining) (black arrow markers).

The findings in this case suggest that the incisions used for RK are delicate/fragile, and that they can easily become infected because they remain unstable for several years after surgery.

Reference:

1. Kawasaki M, Fukuoka H, Kawabata M, Sotozono C. A rare case of infectious keratitis that developed 27-years after radial keratotomy. American Journal of Ophthalmology Case Reports. 2022 Mar 1;25:101240.
2. Chawla B, Mannan R, Sharma N, Titiyal JS. Purse-string suture for management of late-onset infectious keratitis with scar dehiscence after radial keratotomy. Clinical & experimental ophthalmology. 2009 Aug;37(6):630-1.



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