

SURGERY OF CATARACT IN CHILDREN & YOUNG ADULTS

Dr. J AGARWAL
Dr. Mrs. T. AGARWAL
Madras, India

No other surgical speciality has been so dominated by a single operation as has ophthalmology by a cataract operation.

Great advances have been made in the surgery of congenital cataracts. In deciding about surgery of cataract in children, the most important point to bear in mind is that operative failure will result in blindness in the child for his whole life with all its social and economic problems.

First of all, before we go into the different techniques of congenital cataract, we shall first discuss the criteria of an ideal cataract extraction in children.

1. Ideal cataract extraction in children should be in a single operation to avoid more than one general anaesthesia.
2. All, or majority of lens material should be removed to prevent iridocyclitis, secondary membrane formation and secondary glaucoma.
3. There should be no interference with the pupil and danger of iris incarceration should be minimised. Round and active pupil gives best functional and cosmetic results.
4. Anterior chamber should remain formed during entire procedure. This gives good visualisation and helps in preventing damage to corneal endothelium, iris, posterior capsule and vitreous.
5. Pupil should remain dilated.

6. There should be no interference with posterior capsule or vitreous. The danger of vitreous loss or adherence of vitreous to the wound should be minimised.
7. Since children are difficult to examine, or treat, there should be minimum after care and hence absorbable sutures should be used.
8. There should be minimum danger of infection.

The techniques now available for treatment of congenital and traumatic cataracts are.

1. *OPTICAL IRIDECTOMY:*

The earliest operation done on congenital cataract was optical iridectomy. It is a simple and safe operation, but the visual results are not as good as those following complete removal of lens. This method can be used in retarded children who do not require maximum visual acuity. We personally have never liked this operation.

2. *DISCISSION:*

Earliest operation on the lens for congenital cataract was discission. It is simple and safe and the results are good. But multiple operations are usually necessary. Repeated needling may lead to adhesion of iris to the lens remnants with subsequent thick pupillary membrane. The results of this operation depend entirely on the capacity of the eye to absorb the lens and the surgeon gets the credit or the discredit. Pupillary block, glaucoma, secondary pupillary membrane, after-cataract, fibrovascular vitreous membrane and retinal detachment are its complications.

3. *LINEAR EXTRACTION:*

Linear extraction also has many advocates. The success is more, but vitreous disturbance is fairly common. Further more, a relatively larger incision is dangerous in young people due to low scleral rigidity.

4. *THE ZEIGLAR THROUGH AND THROUGH DISCISSION* of lens does not have many supporters but it is useful in the management of membranous cataract.

5. *INTRA-CAPSULAR EXTRACTION OF CATARACT*, particularly congenital in young individuals is contra-indicated. A large incision must be made and vitreous loss is the rule. Even with the use of Alpha Chymotripsin, ligamentum hyaloido-capsulare that attaches the lens to the face of the vitreous remains intact, resulting in vitreous being withdrawn from the eye with the lens.

The favoured surgical techniques in management of congenital, juvenile cataracts has decidedly turned from discission and linear extraction to aspiration.

6. *ASPIRATION*:

Aspiration has been used since antiquity for removing cataracts. It was practised by Antyllus in 2nd Century and by Arabs in the year 1000 A.D. It was Schie who nearly re-introduced aspiration in 1960. In this technique, after a wide cruciate incision is made through the anterior lens capsule with Zeiglar type knife-needle, aspiration needle is introduced and the lens matter is aspirated.

With the advent of aspiration, newer methods have been evolved on the same principles. The methods that have evolved are;

1. Aspiration.
2. Suction and Evacuation with the use of double needle.
3. Phaco-fragmentation or phaco-emulsification-diffusion and suction.

The choice of operation in cases of children and young adults should be such, that will try to fulfill the criteria mentioned earlier. This means it will produce least trauma with minimum complications and good visual results.

Initially, in my early years of practice, we had been doing discission and linear extraction. When Tofique described his twin needle aspiration in 1972, we switched on to aspiration. But since 1975, we are only doing phaco-fragmentation in all types of cataracts in infants, children and young adults.

Our results or phaco-fragmentation have been most rewarding with least amount of complications. There has never been necessity for a second operation where as in all other types of operations several sittings were needed.

Although the technique can be performed with a magnifying loupe, undoubtedly this is one of the operations where surgical microscope serves the most. Under the magnification and the bright light even small thin capsule fragments can be visualised and fragmented and sucked.

The essentials of operation are;

1. Phaco-fragmentation or Phaco-emulsification.
2. Infusion.
3. Suction.

For emulsification of the cataracts, we have been using a mechanical phaco-emulsifier manufactured by "Optikon" of Italy. This instrument does not work on ultrasonics but has a mechanical motor and hence the revolutions produced by it are 10.000 min. Infusion and suction can be regulated with the valve.

All connections between the instrument and the various accessories have been made with silicon or teflon and are thus very easily sterilized.

PHACO-EMULSIFICATION:

The use of ultra-sonic energy for the emulsification of the lens and its aspiration from a small corneal incision has caused a great deal of interest among the ophthalmologists. This method was first described by C.D. Kelman of New York in 1967. The Kelman procedure as it is commonly called is an ingenious method of performing cataract surgery through a 2 to 2.5 mm incision. In this technique the emulsifier is attached to the rotary power supply and is introduced into the anterior chamber after a capsular incision. It has the advantage to start emulsification of lens material only after suction and infusion have started.

In order to bring about emulsification it is therefore necessary that the lens matter comes into contact with the blade itself which is placed in a protective tube. Aspiration and infusion can be used independently without using emulsifier.

SELECTION OF CASES:

Congenital cataract generally accounts for 11.5% in pre-school children. Hence it is very important to select the cases properly and decide when to perform the surgery. The most important indication for early surgery

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is complete bilateral congenital cataract. These should be operated on almost any time after birth so that the child can have normal development without developing amblyopia.

In cases of incomplete bilateral congenital cataract, if the child is able to catch the objects and play with his toys, we can wait until the child reaches pre-school age and the operation can be performed any time when the parents or the pediatrician or the ophthalmologist feel that the development of the child is hampered due to poor vision. Generally a child with incomplete bilateral congenital cataract does not develop nystagmus or amblyopia. It also will not cure nystagmus if already present.

It should be remembered that good functional result after operation does not mean that the child has good visual acuity on Snellen's chart. Children with nystagmus rarely get good acuity after operation, but they generally do well in every-day life especially in near work. The prognosis for bilateral congenital cataract is good when the eyes are healthy except for cataract without nystagmus and any other congenital abnormality.

When one eye has been operated the other eye should be operated early to prevent amblyopia.

Unilateral Congenital cataract-whether complete or incomplete should be operated immediately. The child is fitted with soft contact lenses by taking Keratometer readings under general anaesthesia.

Secondary Cataract: The indications for operating secondary cataracts in children and young adults vary greatly with the cause. Traumatic cataracts are treated along with the injuries and may have to be removed early if the other portions of the eye are intact. If the cataract is due to Uveitis, the disease must be treated first before operating on the cataract.

PREPARATION OF PATIENTS:

The pupils are dilated with atropine tincture of the previous night and with neosynephrine 10% drops before operation. All patients receive the routine pre-operative medications.

An ab externo 3 mm incision is made at the limbus at about 11 O'clock position. A peripheral iridectomy is done. If pupil is not well dilated, a sector iridectomy must be done. The anterior capsule is pierced with a cystotome and it is hooked out and cut when over possible. The tip of the probe is introduced and with a foot switch phaco-fragmentation, infusion

and suction are started. The Saline wich flows in, keeps the chamber formed all through the surgery and maintains the pressure thus minimising the damage to the cornea. The lens matter is fragmented and sucked out simultaneously. The wound is closed with one suture.

There is no need to rush. The surgeon should take it calmly and remove each and every bit of lens matter and capsule slowly and completely under the microscope.

Occasionally unsightly cataractous remnants are present in traumatic cataract. In these cases we do expect a vitreous loss, and after emulsification, a vitreophage is used and anterior vitrectomy is preformed. The use of vitreophage in these cases is very satisfactory. Post-operative detachment, glaucoma or collapse of the eye ball are thus avoided.

COMPLICATIONS:

1. Incisional opacity, a linear corneal opacity identical to any healed corneal wound is seen when the incision is placed anterior to corneo-scleral limbus. There is no opacity when the incision is properly place at the limbus.
2. Striate Keratitis, on a small incision, the instrument causes transient force on Descemet's membrane, not associated with stromal oedema.
3. Micro-cystic Oedema, This is a consequence of disturbing the endothelial cells.
4. Endothelial damage, In a very few percentage of cases, the instrument may damage the endothelium. This can be easily avoided by working more carefully under microscope.
5. Iris atrophy, This complication can occur if the movements of the instruments are not carefully watched.
6. Minimum cortical remnants may be left behind the iris.
7. Rupture of vitreous phase, generally the vitreous phase is not disturbed, but this complication can occur if care is not taken to protect the posterior capsule.
8. Peaking of pupil.

We have not seen complications like hyphaema, secondary glaucoma, after-cataract, flat chamber, iris prolapse and epithelisation after this procedure.

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ADVANTAGES:

1. Immediate physical and visual rehabilitation.
2. Minimal corneal astigmatism as the incision is only 3 mm.
3. No iris prolapse.
4. No incidence of hyphaema, flat chamber and down growth of epithelium.
5. Single procedure is sufficient in most of the cases. No need for repeated surgery.
6. If there occurs any vitreous disturbance, anterior vitrectomy can be done immediately, thus avoiding many of the late complications including retinal detachments.