

## ASPIRATION OF SOFT CATARACTS\*

By K. H. Lim

### SYNOPSIS

**A technique of aspiration of the substance of the lens, shown in the U.S.A. and the U.K. to be simpler and having decided advantages over conventional methods of lens removal, was adopted in Singapore from July, 1968 and, whenever it could be applied, it was performed without choice of other methods, on 92 cases. Visual restoration was found to be satisfactory in cataracts of traumatic causation but in congenital cataracts the results were not better than with conventional methods that had been performed prior to 1968. The technique, moreover, failed to remove the hard lens matter of congenital rubella.**

Knowledge and skills continually innovated when applied with a fresh mind and new thinking on to old problems can make the commonplace exciting. Such example may be seen in cataract surgery, itself an art as ancient as the history of ophthalmology. Cataract surgery so epitomises ophthalmology that in a recent text, Theodore (1964) wrote: "No other major eye operation is more frequently performed and no other operation is done by more ophthalmologists." Yet, aspiration of the substance of the lens had been practiced by the Arabs as early as the second century, A. D. (Garrison, 1929) and Ammar, an Arab, has left a graphic description from the tenth century, A. D. (Wood, 1913). In recent years there has been a revival and quickening of interests, notably in the U.S.A. (Scheie, 1960) and the U.K. (Rice, 1967) and, on July 10, 1968 lens aspiration was performed for the first time in Singapore at the Ophthalmic Unit, Outram Road General Hospital, when a complicated cataract caused by irradiation for retinoblastoma in the second eye of a seven-year-old boy was successfully aspirated.

### MATERIAL AND METHODS

The method popularly employed in the U.S.A. and the U.K. is as follows: under general anaesthesia, through a dilated pupil, a vertical capsulotomy is performed and the lens matter aspirated through a No. 17 (25 B.W.G.) hypodermic needle. A peripheral iridectomy may be performed and the

lens aspirated through the iridectomy instead. When two needles or cannulae are inserted simultaneously, one for flushing the anterior chamber and the other for aspiration, the method is described as an aspiration-irrigation (Girard, 1967).

We use a double cannula devised by Dr. G. Sutherland of Melbourne (Fig. 1). Constructed like a miniature double-barrel weapon, it has an aspirating cannula 30 mm. long with a 1 mm. bore through which a stylet may be inserted, while an attached side cannula allows for simultaneous irrigation. It maintains the anterior chamber by the hydrostatic principle (Sutherland, 1969). The great advantage that I found of such an arrangement is that the single unit can be handled by the operator who controls the aspiration while a nurse helps in irrigation.

The pupil is dilated pre-operatively and the operation performed preferably under general anaesthesia. A limbal-based triangular conjunctival flap is raised and bleeding secured with a hot-probe or cautery (Fig. 2). Through a 4-5 mm. corneo-scleral incision placed 3 mm. behind the limbus the double cannula is introduced into the anterior chamber (Fig. 3), care being taken to protect the cornea and iris, using an iris reposer if necessary to guide the entry of the cannula. The anterior lens capsule is broken, if needed, with the stylet. Care again is exercised not to break the posterior capsule and, for this, magnification through a binocular loupe or microscope is employed. While saline is introduced into the anterior chamber, the lens substance is aspirated. It may be necessary to stroke the corneal surface with an iris reposer or squint hook to bring out any lens matter from the posterior chamber. On completion of aspiration a peripheral iridectomy is routinely performed (Fig. 4), air is introduced to reform the anterior chamber and the corneo-scleral incision closed with one or two 8-0 virgin silk sutures. Likewise, the

\*Read at the Fifth Annual Combined Meeting, Singapore Surgical Society and Chapter of Surgeons, Academy of Medicine, Singapore on December 4, 1971.

Ophthalmic Unit, Outram Road General Hospital, Singapore.

K. H. LIM, M.B., B.S., D.O., F.R.C.S.I., A.M., Ag. Senior Ophthalmic Surgeon and Head.

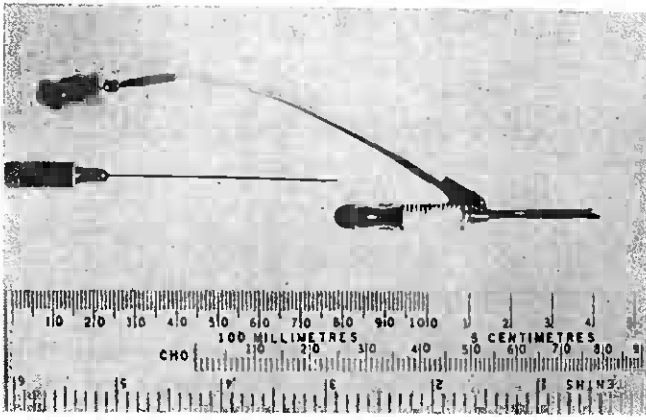


Fig. 1. Sutherland's double cannula.

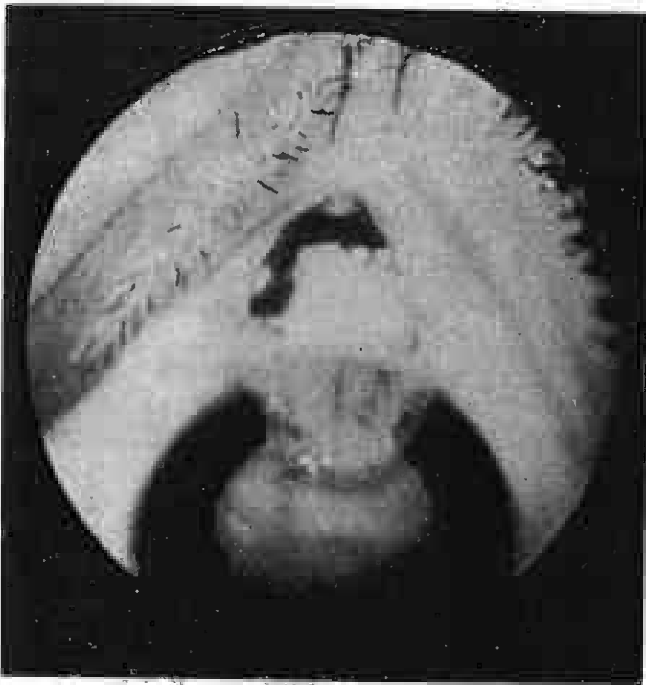


Fig. 2. A limbal-based conjunctival flap is raised.

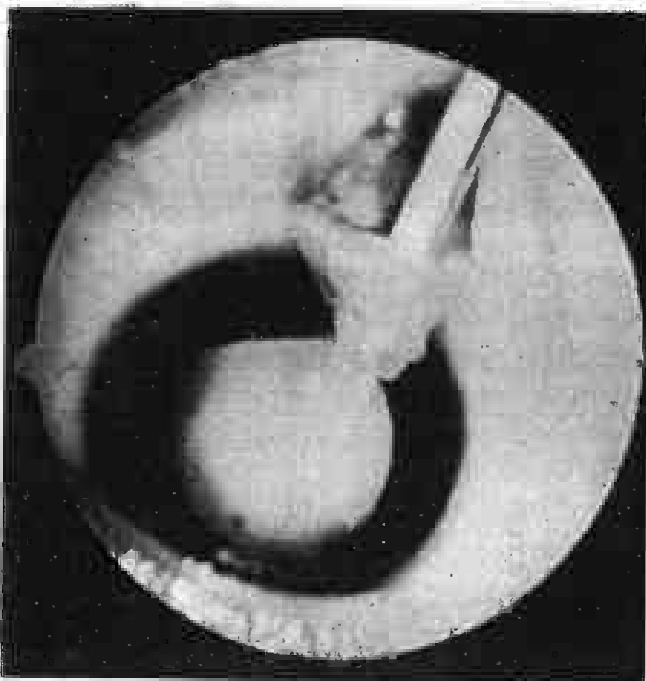


Fig. 3. Double cannula inserted and aspiration in progress.

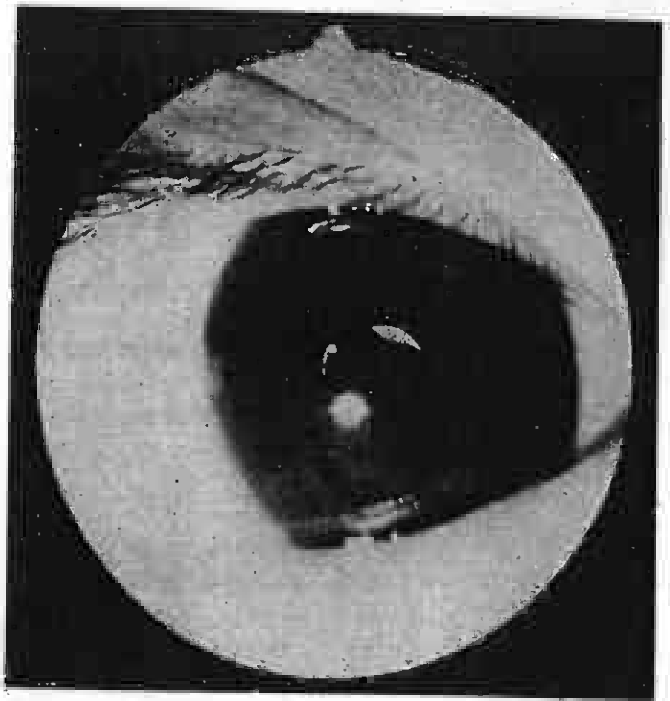


Fig. 4. Post-operative clear view through the pupil. A peripheral iridectomy is seen.

conjunctival flap is secured and a subconjunctival injection of framycetin completes the operation. The patient is allowed up the next day. Mydriasis is maintained and eye-drops of steroid and antibiotic given for one to two weeks. Refraction is attempted after six weeks.

## RESULTS

92 lens aspirations were performed by the method described from July, 1968 to December, 1971 (Table I). Compared with 2,595 total cataract operations of all types for the same period, this formed only 3.54%, a small figure considering the theoretical possibility that aspiration can be performed in all cataracts without a nucleus, i.e. in children and young adults below 40 years of age. The majority of our operations, however, were for senile cataracts in which the method could not be employed.

An analysis of the 92 lens aspirations (Table II) showed that 55 were for cataracts of congenital origin and 32 for trauma. Of the 5 others, 2 were for complicated cataracts following uveitis; 1 following irradiation, and 2 for senile morgagnian cataracts.

A two-staged procedure, consisting of needling followed by aspiration one week later, was adopted in 45 of the 55 congenital cataracts but only in 6 of the 32 cataracts of traumatic causation that were operated upon. Two-staged procedures were performed for the latter when it was found that there had been insufficient dissolution of lens matter from the original injury.

TABLE I

CATARACT OPERATIONS, OPHTHALMIC UNIT, OUTRAM ROAD GENERAL HOSPITAL JULY 1968 TO DECEMBER 1971

	Lens Aspiration	Cataracts, All Types
1968	17	410
1969	21	783
1970	19	739
1971	35	663
<b>TOTAL</b>	<b>92 (3.54%)</b>	<b>2,595</b>

Of the 55 congenital cataracts, 12 were operated upon within the age of 1 year, 26 within 1 to 10 years, and 16 within 11 to 20 years of age. Of the traumatic cataracts operated upon, the majority were in the 11 to 30 year age groups, while a surprisingly large number was also encountered in children below 11 years of age.

There was no significant difference between males and females in congenital cataracts although a larger number of traumatic cataracts occurred in males. Visual results are shown in Table III.

DISCUSSION

**Congenital Cataracts**

Good (visual acuity better than  $\frac{6}{12}$ ) results were achieved in 25% and moderate (V.A.  $\frac{6}{12}$  to  $\frac{6}{60}$ ) results were achieved in 24% of cataracts of congenital origin. In 31%, vision could not be ascertained because of infancy, mental defect, nystagmus and associated ocular malformation, while in another 20%, the results were poor (V.A. worse than  $\frac{6}{60}$ ). Failure was due to inability to remove hard lens matter, a small non-dilating pupil, or vitreous spillage into the anterior chamber.

Moreover, the method was found to be inadequate for the removal of calcareous lens matter, especially those associated with congenital rubella. It was also found that multiple, staged procedures were desirable when dealing with hard cataracts.

Visual results in 7 lens aspirations in this series compared in the same patients who had conventional methods of lens removal (that is, needling and curette evacuation) in the fellow eye performed prior to 1968, showed that in 4 of the patients visual results were equal while in the remaining 3 vision was better with the conventional methods (Table IV). However, the numbers compared are too small to be conclusive.

TABLE II

ANALYSIS OF 92 LENS ASPIRATIONS

	Congenital	Traumatic	Others	Total
<b>Race:</b>				
Chinese	47	29	5	81
Malay	2	2	0	4
Indian	6	1	0	7
<b>Sex:</b>				
Male	33	24	4	61
Female	22	8	1	31
<b>Age:-</b>				
Less than 1 year	12	0	0	12
1 - 10	26	8	2	36
11 - 20	16	10	0	26
21 - 30	1	8	0	9
31 - 40	0	2	0	2
41 - 50	0	3	0	3
Over 50	0	1	3	4
<b>Staged procedure:</b>				
One	10	26	1	37
Two	45	6	4	55
<b>TOTAL</b>	<b>55</b>	<b>32</b>	<b>5</b>	<b>92</b>

It was also found, in going through case records, that two patients who had operations for congenital cataracts during their first 2 years of life developed retinal detachment after 20 years of age.

**Traumatic Cataracts**

Good results were achieved in 15%, moderate results in 25% of cataracts of traumatic causation, while poor results were seen in 60%. Failure was due to associated ocular injury (viz. vitreous haemorrhage, endophthalmitis, retinal detachment, retained intraocular foreign bodies, hyphaema, corneal opacification and vascularization) and also to inability to remove hard lens matter or reformation of lens opacification.

Notwithstanding successful aspiration, the problem of monocular aphakia was also encountered.

ILLUSTRATIVE CASES

**Case 1 (V 109399):**

A fourteen-year-old Chinese schoolgirl, was injured in a laboratory explosion in school on July 28, 1971. She was admitted into hospital for emergency toilet and suture of wounds. Her left eye was blinded by the injury due to multiple lacerations and intraocular haemorrhage and became phthisical,

TABLE III  
VISUAL RESULTS IN 92 LENS ASPIRATIONS

Type of Cataract	Good		Moderate		Poor		Unknown		Total
	No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent	
Congenital	14	25	13	24	11	20	17	31	55
Traumatic	5	15	8	25	19	60	0	0	32
Others	0	0	1	20	4	80	0	0	5
<b>TOTAL</b>	<b>19</b>		<b>22</b>		<b>34</b>		<b>17</b>		<b>92</b>

Good: Better than 6/12; Moderate: 6/12 to 6/18;

Poor: Worse than 6/60; Unknown: infancy, mental defect, associated malformation.

with permanent loss of sight. Her right eye was also injured, sustaining multiple corneal lacerations caused by glass splinters, and a total hyphaema. The corneal wounds were stitched. 5 days after the injury the hyphaema began to clear and a cataract was noticed. There was no vision in that eye and projection of light was vague. Lens matter continued to spill into the anterior chamber and on September 1, 1971 (5 weeks after injury) aspiration of lens matter with a peripheral iridectomy was performed. She continued to have a prolonged convalescence in hospital and, when discharged, visual acuity in her right eye was  $\frac{6}{36}$  to  $\frac{6}{60}$ , unaided, but with a spectacle correction of  $+9.25/+0.50 \times 90^\circ$  she could see  $\frac{6}{12}$  to  $\frac{6}{18}$  and read N10 with an additional  $+3.00$  D. sph. The poor vision was due to associated corneal opacities (Fig. 5).

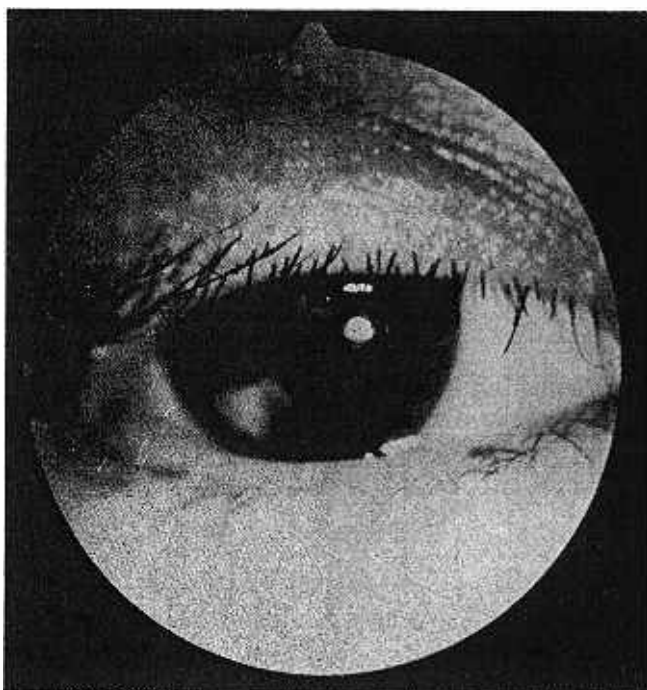


Fig. 5. Case 1. Aspiration of traumatic cataract. Corneal wounds are seen.

TABLE IV  
VISUAL RESULTS OF LENS ASPIRATION  
AND CURETTE-EVACUATION  
COMPARED IN THE SAME PATIENTS  
WITH THE FELLOW EYE

Case No.	Lens Aspiration	Curette Evacuation (Prior to 1968)
1	6/6	6/6
2	6/9	6/9
3	6/24	6/24
4	6/36	6/18
5	<6/60	6/24
6	<6/60	6/24
7	<6/60	<6/60

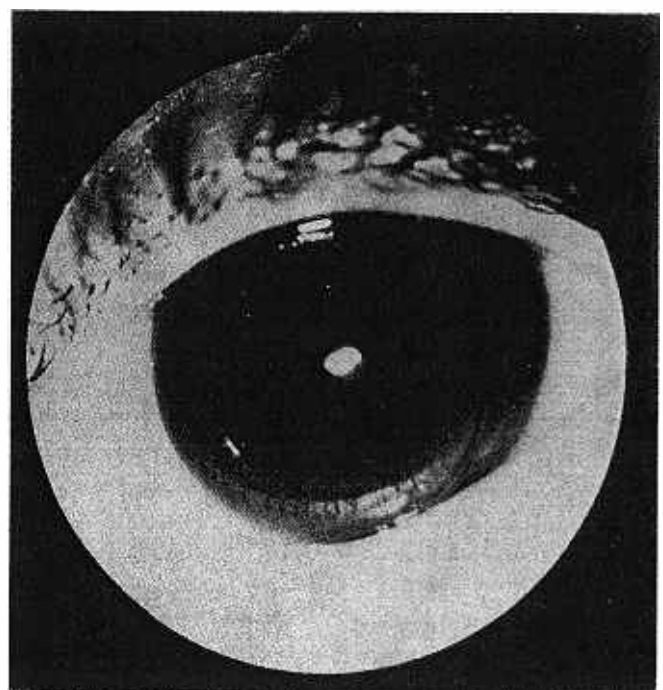


Fig. 6. Case 2. Contact lens worn after aspiration of traumatic cataract.

**Case 2 (V 104381):**

A seventeen-year-old Chinese male industrial trainee was injured in a factory on February 18, 1971 while using a hammer. He sustained a left corneal wound, which was stitched.

Roentgen films showed an intraocular foreign body situated 3 mm. behind the inferior portion of a limbal ring marker. He was myopic: visual acuity of his right, uninjured eye was  $\frac{6}{36}$ , which could be corrected to  $\frac{6}{6}$  with a  $-2.75$  D. sph. lens and visual acuity of his left injured eye was  $\frac{6}{38}$  unaided, which could be corrected to  $\frac{6}{12}$  partly, with a  $-0.75/-1.50 \times 90^\circ$  lens. Following his discharge from hospital, a posterior capsular cataract was noticed to form in the injured lens and by May, 1971 vision in his left eye was reduced to counting fingers. The cataract matured and on June 11, 1971 (4 months after the injury) needling and aspiration of the traumatic cataract was performed, with a peripheral iridectomy. A magnet was applied but there was no response. Post-operative roentgen films showed no evidence of opaque foreign body and presumably the foreign body was aspirated with the lens matter. The posterior capsule was intact. Visual acuity wearing a  $+9.00/-2.75 \times 180^\circ$  correction was  $\frac{6}{6}$  and, with a contact lens, vision was  $\frac{6}{5}$  (Fig. 6). As he could also wear a

contact lens for his right myopic eye and could tolerate the lenses on both eyes he was able to achieve binocular vision. Orthoptic assessment demonstrated simultaneous macular perception with full fusional reserve and he has since returned to his job as a draughtsman.

**ACKNOWLEDGEMENT**

Grateful thanks to Mr. S. L. Fung for photographic assistance and to Miss Margaret Pang for typing the manuscript.

**REFERENCES**

1. Garrison, F. H.: "Introduction to the History of Medicine." 4th edition, p. 109, Saunders, Philadelphia, 1929.
2. Girard, L. J.: "Aspiration-irrigation of Congenital and Traumatic Cataracts." *Arch. Ophthalm.*, 77, p. 378, 1967.
3. Rice, N. S. C.: "Lens aspiration: A method of treatment for soft cataracts." *Transactions of the Ophthalmological Societies of the United Kingdom*, Vol. 86, p. 491, Churchill, London, 1968.
4. Scheie, H. G.: "Aspiration of congenital or soft cataracts." *American Journal of Ophthalmology*, Vol. 50, p. 1048, 1960.
5. Sutherland, G.: "Anterior Chamber Microsurgery." *Transactions of the Australasian College of Ophthalmologists*, 1, 33, 1969.
6. Theodore, F. H.: "Complications after Cataract Surgery." 1st edition, p. ix, Little, Brown, Boston, 1964.
7. Wood, C. A.: "American Encyclopedia and Dictionary of Ophthalmology." p. 316, Kimpton, London, 1913.