Original Article

The Incidence of Vitreous Loss and Visual Outcome in Patients undergoing Cataract Surgery in a Teaching Hospital

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Purpose: To determine the incidence of vitreous loss in patients undergoing cataract surgery and the visual outcome in a tertiary teaching hospital.

Methods: Hospital records of 2095 consecutive patients undergoing cataract surgery between July 1999 and June 2000 were reviewed in this non-concurrent cohort study. Incidence and visual outcome of vitreous loss managed using standard vitrectomy techniques were assessed for different cataract surgical techniques (extracapsular, Blumenthal technique and phacoemulsification) as well as at different levels of surgical training. The outcome was compared with matched cases without vitreous loss (controls).

Results: Vitreous loss occurred in 160 of 2095 eyes (7.63%; CI -7 to 9.3): 8.3% for ECCE, 8.1% for the Blumenthal technique and 5% with phacoemulsification. Vision ≥ 6/18 was achieved in 85% of cases and 95% of controls. For experienced surgeons, 95% of the cases and controls had vision ≥ 6/18. 5.8 % of cases and 0.7% of controls had vision < 6/60. One patient in each group was blind following cataract surgery; both had operable cataracts in the fellow eye.

Conclusions: The vitreous loss rate in this tertiary teaching hospital is relatively high. This complication, managed with standard surgical techniques, is compatible with good visual outcome. In eyes with vitreous loss, the final visual acuity achieved by experienced surgeons was similar to that in uncomplicated cases.

Key Words: Cataract surgery, vitreous loss, visual outcome, anterior vitrectomy, posterior capsule tear

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Despite great advances in surgical techniques of cataract extraction, we continue to face a multitude of complications that can compromise the results of cataract surgery. The most common and significant complication that can affect the final visual acuity in cataract surgery is vitreous loss. It is more frequent in a training program.[1] In this otherwise uncomplicated surgery, the incidence of vitreous loss has been variably reported as 0% – 19.[2-4] Jaffe has proposed that an acceptable figure would be less than 3%.[5] An National Program for Control of Blindness (NPCB) survey showed that vitreous loss was the commonest complication of cataract surgery, amounting to in 6% of cases.[6]

The World Health Organization (WHO) guidelines for reasonable quality of visual outcome after cataract surgery state that 80% of patients should have presenting visual acuity of 6/18 or better,[7] and including preexisting pathology, less than 5% should have an presenting visual acuity of < 6/60. In an NPCB survey, the proportion of patients who had vision less than 6/60 was over 30% in 6 out of 7 states in the country.[6] It is felt that more than half of the cases with poor best corrected visual acuity (BCVA) were due to surgery-related complications.[8] These results fall far short of fulfilling the WHO guidelines. The Madurai Intraocular Lens Study reported 90.7% of intracapsular cataract extraction with aphakic glasses (ICCE-AG) patients and 96.3% of extracapsular cataract extraction-posterior chamber intraocular lens (ECCE/PC-IOL) patients attained BCVA of 6/12 or better at 12 months.[9] We can analyse this study including the missing cases in a best case (all missing cases had good outcome), and worst case (all missing cases had bad outcome) scenario. The best case scenario would have only 10% (ICCE-AG) and 0.8% (ECCE-PC IOL) of cases with poor outcome and in the worst case scenario the percentages would rise to 27.6% and 14.1% respectively.

Several studies report incidences of vitreous loss and the visual outcome of cataract surgery with unintended vitreous loss. These studies span a period from 1971 till the present, covering the era of conversion from ICCE to

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standard ECCE and to small incision cataract surgery.[10] Smith and Seiff[11] reported vitreous loss in residency training at various level of experience. Vitreous loss occurred in 16% of eyes operated on by first-year residents, in 10% of eyes operated on by second-year residents, and in 6% of eyes operated on by third-year residents. Allinson[12] reported 14.7 % vitreous loss in cases operated by third-year residents learning phacoemulsification.[12] Davitt and Cohen[13] found that of 184 surgeries handled by residents learning temporal clear corneal phacoemulsification, 14 % had posterior capsular rupture and 11 % had vitreous loss. Best corrected visual acuity of 6/12 or more could be achieved in 86 %.

The purpose of our study was to determine the overall vitreous loss rate and determine the final visual outcome of cataract operations complicated by vitreous loss and managed by standard microsurgical techniques in a tertiary care training center in India.

Materials and Methods

Study population

The study population was identified from the operating room register and the medical record of each patient was retrieved from the medical records department (MRD). The surgical details were obtained from the cataract surgery data sheet and operation notes. Details of the postoperative period and follow-up were abstracted from the patient's record.

Inclusion criteria for cases with vitreous loss were as follows: patients of either gender, age 40 years or more, undergoing routine cataract surgery; age-related or steroid induced cataracts; and cataract surgery performed by residents or members of the faculty of the institution.

Exclusion criteria for cases of vitreous loss were as follows: posterior capsular rupture without vitreous loss; traumatic or complicated cataract; preoperative morbidity that could account for poor visual outcome (these patients contributed to the vitreous loss rate but were excluded from the visual outcome data); and lens-induced glaucoma and cataract associated with glaucoma.

Controls

Each case of vitreous loss was individually matched for age ± 5 years; gender; technique of cataract surgery (ECCE/Blumenthal/Phacoemulsification) and surgeon. Similar inclusion and exclusion criteria were applied. Surgeon matching was done by applying the above matched variables to the population of cataract surgery patients operated upon by the same surgeon on his or her operating day nearest to the day on which the case with vitreous loss occurred. In those few cases where a suitable control could not be obtained, we used a control matched in a similar way with a surgeon who had the same level of experience.

Sample size

The WHO guidelines state that at least 80 % patients should achieve best-corrected visual acuity of 6/18 or more. We assumed that in uncomplicated cases 90 % of patients would achieve a visual acuity of 6/18 or more. Assuming a 10 % difference in visual outcome between the two groups, we calculated the sample size using the following formula:

$$N = 2x \frac{(p1q1) + (p2q2)}{(p1\text{-}p2)^2} \text{ x } (Z\alpha \text{ X} Z\beta)$$

p1 = Proportion of interest (visual acuity ≥ 6/18) in patients without vitreous loss = 90%

p2 = Proportion of interest (visual acuity ≥ 6/18) in patients with vitreous loss = 80 %

q1 = 100-p1, q2 = 100-p2

$Z\alpha$ =1.96, α = 0.05

$Z\ \beta$=0.84, β = 0.2

N = 140. Each group comhrised 140 patients.

Surgical Methods

Retrobulbar or peribulbar anaesthesia was used for all patients. The technique used for a standard ECCE was as described in standard texts.[5] The modified Blumenthal's technique we use has been described.[14] Phacoemulsification was performed by the four-quadrant divide-and-conquer method as described by Gimbel or by the stop-and-chop technique of Koch.[15, 16]

Vitreous loss was defined as prolapse or anterior displacement of the vitreous gel into the anterior chamber beyond the plane of the posterior capsule. Confirmation of vitreous loss mandated examination with an endoilluminator. If vitreous prolapse was not present, the surgery was continued as planned.

Management of vitreous loss

Use of an endoilluminator was mandatory. All instruments were removed from the anterior chamber (AC); if an AC maintainer (ACM) was in use, the height of the infusion bottle was lowered immediately; the goal was to provide the minimum infusion required to keep the chamber formed and perform a "closed" anterior vitrectomy. The nucleus, epinucleus and cortex were managed appropriately.

A mechanical vitrectomy instrument was introduced through a paracentesis and a partial anterior vitrectomy was performed. Irrigation was separated from the cutting. When in use (phacoemulsification and Blumenthal technique), the ACM provided the irrigation. For standard extracapsular surgery, a canula connected to a bottle of balanced salt solution (BSS) and introduced through the sutured wound was used for irrigation. The goal was to remove all vitreous from the anterior and posterior chambers and prevent any contact with the iris. As much of the capsule as possible was preserved.

The endoilluminator was used once again to confirm that the anterior chamber and posterior chambers had been adequately cleared of vitreous. An intraocular lens (IOL) of appropriate design was implanted either in the ciliary sulcus or in the anterior chamber depending on the amount of capsular support available for safe implantation. In order to ensure that there was no vitreous in the wound (or side ports), these incisions were swept with a nucleus spatula introduced from one of the side ports. After pupillary constriction with intracameral pilocarpine the endoillumi-nator was used for a final check to detect residual vitreous strands.

On the first postoperative day, the uncorrected and pinhole visual acuity were checked for all patients. The anterior segment was examined by slitlamp and applanation IOP was measured. Distant direct ophthalmoscopy was performed and the fundus was examined with a 90D lens on a slitlamp; an indirect ophthalmoscope was used when indicated.

Routine follow-up visits were planned at 1 week, 3 weeks and 6 weeks postoperatively. When required, inpatient hospital stay was prolonged and visits were made more frequent.At each visit the examination included refraction, IOP measurement, slitlamp and fundus check. Indirect ophthalmoscopy with depression and stereobiomicroscopic examination of the posterior pole was performed at 6 weeks. If the BCVA at any of the follow-up visits was not consistent with anterior segment findings, a dilated stereo biomicroscopic examination was performed at that time. All patients were maintained on topical corticosteroids and chloramphenicol eye drops three times a day till at least 6 weeks after surgery. Cycloplegics and nonsteroidal anti-inflammatory drugs (NSAIDs) were used as indicated. In patients with sulcus fixated IOLs and ACIOLs cycloplegics were not routine but were employed for posterior segment examination. Diagnosis of cystoid macular oedema (CME) was made when the BCVA was < 6/9 and the macula on stereobiomicroscopic examination using an appropriate lens had typical findings. The diagnosis was confirmed by a vitreoretinal specialist and the patient was treated appropriately. Flourescein angiography was not routinely done to confirm the diagnosis.

For purposes of analysis of visual outcome, the surgeons were divided into three groups based on their level of surgical experience in our hospital.

Level 1: 1-3 years' experience in our hospital.
Level 2: 3-5 years' experience in our hospital.
Level 3: More than five years'experience in our hospital.

Chi-square test was used to compare the groups where needed.

We recorded vision as the last line read without difficulty; this would underestimate rather than overestimate the true visual acuity. Visual outcomes were divided into four categories, based on the WHO definition of cataract outcomes:

Category 1: (Good vision): BCVA ≥ 6/18.
Category 2: (Economic blindness): BCVA < 6/18.
Category 3: (Blindness in India): BCVA < 6/60.
Category 4: (Blindness): BCVA < 3/60.

These categories were not mutually exclusive as category 3 contains all of category 4 and category 2 contains all of 3 and 4. Differences in visual acuity were compared using the students' "t" test. All cases with pre-existing pathology that accounted for poor postoperative visual acuity outcome were excluded from the visual outcome analysis.

Results

The charts of 2095 patients aged ≥ 40 years undergoing routine cataract surgery and fulfilling the inclusion criteria between 1 July 1999 and 30 June 2000 were reviewed. The age ranged from 43 to 84 years with a mean age of 61 years. There was no difference in the distribution of patients in the study group (vitreous loss) according to gender and level of skill of the operating surgeon. As the control group for vitreous loss was matched to the study group, no difference was expected here and none was obtained. The total number of patients who had vitreous loss was 160, an overall incidence of this complication of 7.63% (95% CI 7-9.3 %).

The study group had a significantly ($p < 0.05$) longer postoperative stay in hospital (range 1 -16 days; mean 3.06 days) compared to the control group (1 - 5 days; mean 1.43 days).

The follow-up in the control group ranged from 7 to 380 days (mean 88.6). In the study group postoperative follow-up ranged from 4 to 380 days (mean 107.3 days).

The distribution of patients in the study group for different surgical techniques is shown in Table 1. Clearly, the Blumenthal manual small incision technique at 69% was the preferred technique of cataract surgery in the hospital.

Table 1. Surgical technique used and incidence of vitreous loss

	Blumenthal	ECCE	Phaco	Total
Number of cases	1455 (69.45%)	300 (14.32%)	340 (16.33%)	2095 (100%)
Incidence of vitreous loss	118 (8.1%)	25 (8.3%)	17 (5%)	160 (7.63%)

ECCE – Extra capsular cataract extraction.
Phaco – Phacoemulsification.

Table 2. Visual outcome comparison between the study group and the control groups

	(Category 1) ≥ 6/18	(Category 2) < 6/18	(Category 3) < 6/60	(Category 4) < 3/60
Controls (N=141)	96.5% (n=136)	3.6% (n=5)	0.7% (n=1)	0.7% (n=1)
Study (N=141)	85.8% (n=121)	14.2% (n=20)	6.00% (n=8)	5.00% (n=7)

Table 3. Visual outcome for different levels of surgical experience in the study and control groups

	≥ 6/18 Category 1 Study	< 6/18 Category 2 Study	< 6/60 Category` 3 Study	<3/60 Category 4 Study	≥ 6/18 Category 1 Control	< 6/18 Category 2 Control	<6/60 Category 3 Control	<3/60 Category 4 Control
Level 1 (n=75)	80% (n=60)	20% (n=15)	8% (n=6)	6.7% (n=5)	96% (n=72)	4% (n=3)	1.3% (n=1)	1.3% (n=1)
Level 2 (n=25)	88% (n=22)	12% (n=3)	4% (n=1)	4% (n=1)	96% (n=24)	4% (n=1)	0% (n=0)	0% (n=0)
Level 3 (n=41)	95.1% (n=39)	4.9% (n=2)	2.4% (n=1)	2.4% (n=1)	97% (n=40)	2.4% (n=1)	0% (n=0)	0% (n=0)

The vitreous loss rate for all techniques was 7.63 %. The vitreous loss rates distributed by technique used are shown in Table 2. There was a statistically significant difference in the incidence of vitreous loss between ECCE/Blumenthal versus phacoemulsification techniques ($p< 0.05$). The confidence interval of these three techniques does not overlap.

A total of 26 AC IOLs were implanted in absence of adequate capsular support in patients with vitreous loss. Two patients received scleral fixated IOL. The AC-IOLs were preferred over a scleral fixated IOL due to the simplicity of the technique. However, a scleral fixated IOL was used in patients with preoperative angle synechiae, angle recession and suspected poor endothelium. Twenty-four patients in the study group did not receive IOL implantation.

Visual outcome analysis was done in 141 of 160 patients who had vitreous loss. Nineteen patients were excluded because of the pre-existing pathology that could have contributed to the poorer outcome in these patients. The matched controls of these patients were used for analysis. The final visual outcome was measured in terms of best-corrected visual acuity (BCVA) and uncorrected visual acuity (UCVA) at the last visit.

The overall visual results in study and control patients are shown in Table 2. Visual outcome in the control group was significantly better ($p<0.05$). A better result was associated with higher level of surgical experience, as shown in Table 3. The difference in visual outcome between the levels of surgical experience was statistically significant ($p< 0.05$) in the vitreous loss group where the complication was possibly better managed by more experienced surgeons. There was no significant difference in visual outcome in patients with and without vitreous loss for these more experienced surgeons.

Table 4 shows the visual outcome distributed by surgical techniques in the two groups. From this it appears that visual outcome is best in the phacoemulsification group. The confidence interval of these three techniques does not overlap, but the gross inequality of numbers in the various categories renders any comparison meaningless.

The figures for BCVA at 1 week, 6 weeks and final visit (Table 5) show that the patients in the study group took a longer time to reach their final best-corrected visual acuity compared to the control group.

The prevalence of clinical CME was 11.35% (16 of 141 patients) in patients with vitreous loss and 5.67% (8 of 141) in the control group. Corneal decompensation occurred in 7.1% (10 patients) of the vitreous loss patients in the study.

Nine patients had BCVA < 6/60 in the operated eye (8 in the study group and 1 in the control group). Of these seven had undergone Blumenthal surgery and

Table 4. Percentage of patients with visual acuity ≥ 6/18 distributed according to surgical technique

Surgical technique	With vitreous loss	Without vitreous loss
Blumenthal (n=107)	86.9% (95 % C.I. 86.8-87 %) (n=93)	96.3% (95 % C.I. 92.6-100 %) (n=103)
ECLX (n=17)	64.7% (95 % C.I. 43-86.7 %) (n=11)	94.1% (95 % C.I. 83.1-100 %) (n=16)
Phaco (n=17)	100% (95 % C.I. 97-100 %) (n=17)	100% (95 % C.I. 97 100 %) (n=17)

Table 5. BCVA in the control and vitreous loss group over time

BCVA	Control group 1 week (n = 141)	Control group 6 weeks (n = 137)	Control group At last follow-up (n=141)	Study group 1 week (n = 139)	Study group 6 weeks (n = 130)	Study group Last visit (n=141)
≥ 6/18	94.3%	94.2%	96.5%	66.9%	84.6%	85.8%
<6/18	5.7%	5.7%	3.6%	33.1%	15.4%	14.2%
<6/60	0.7%	0.7%	0.7%	11.5%	3.9%	5.7%
<3/60	0.71%	0.73%	0.71%	10.8%	2.3%	5.00%

BCVA – Best corrected visual acuity.

two, ECCE. In five of these an IOL was not implanted. The causes of poor vision were corneal decompensation in six and macular scar, vitreous haemorrhage and expulsive haemorrhage in one each.

The uncorrected visual acuity (UCVA) in the control and study group for the patients in whom an IOL was implanted are shown in Table 6. Table 7 shows the best-corrected visual acuity (BCVA) in patients with PC-IOL, AC-IOL and "no" IOL in the study group.

Discussion

The commonest complication of cataract surgery that leads to poor visual outcome is vitreous loss.[1] Recent studies on visual outcome after cataract surgery in patients with vitreous loss managed by the standard microsurgical techniques report that 65 – 90% achieve a visual acuity of better than 6/18.[17-19] This is a definite improvement over management with just a Weck-cell sponge vitrectomy or simple vitreous aspiration.[20]

The incidence of vitreous loss in routine cataract surgery reported from western countries has varied from 0% to 20% (Tables 8 and 9). In our study we found an overall vitreous loss rate of 7.65 %. This incidence is higher than that reported in the current literature. There could be several reasons for this. The sample size of studies reporting the incidence of vitreous loss is as small as 25 (Tables 8 and 9). We find that most of these rates overlap the 95% confidence limits of our study (7.0 – 9.3%). Our vitreous loss rates are actually comparable to those in the above-mentioned studies. Other series may not be comparable in terms of the skill levels of the surgeons. In this regard, many studies (Table 9) have reported a high rate of vitreous loss among trainee surgeons. As we are a teaching center, a higher rate of surgical complications is expected.

The method of ascertainment of vitreous loss may make a difference. During the days of intracapsular surgery, vitreous loss was defined as vitreous in the cataract wound.[5] The diagnosis was almost entirely based on identifying vitreous strands in the cataract incision or on a misshapen pupil. Most series did not define what they meant by vitreous loss. We used an endoilluminator for the diagnosis of vitreous loss and hence are likely to report a higher rate. The smaller number of cases with PC rupture without vitreous loss in our series as compared to others, seems to suggest this.[10] We believe that in the event of vitreous disturbance, the endoillumniator is the ideal method to examine the posterior capsule and anterior vitreous face; it is also ideal to determine the end point of vitrectomy. Other methods of determining vitreous loss are indirect and may lead to some underestimation.

Table 6. UCVA in the control and vitreous loss group over time

UCVA	Control group 1 week (n = 141)	Control group 6 weeks (n = 137)	Control group At last follow-up (n=141)	Study group 1 week (n = 139)	Study group 6 weeks (n = 130)	Study group Last visit (n=141)
≥ 6/18	51.3 %	54.3%	67.5 %	29.6 %	30.9 %	39.3 %
<6/18	49.7%	45.7%	32.5 %	70.4 %	69.1 %	60.7%
<6/60	7.7%	6.1%	5.4 %	11.5%	7.9%	6.8 %
<3/60	2.7 %	1.6%	1.4%	10.8%	6.3%	5.1 %

Table 7. BCVA with PC IOL versus AC IOL and No IOL in patients with vitreous loss

	≥ 6/18	<6/18	<6/60	<3/60
PC IOL (n=91)	94.5% (95 CI 89.6-99.4 %) (n=86)	5.5% (n=5)	0% (n=0)	0% (n=0)
AC IOL (n=26)	76.93% (95 CI 61.8-93.0 %) (n=20)	23.07% (n=6)	11.54% (n=3)	11.54% (n=3)
No IOL (n=24)	62.5% (95 CI 43.1-81.9 %) (n=15)	37.5 (n=9)	20.83 (n=5)	16.67 (n=4)

The vitreous loss rate is in this study is higher than in other reports as we have surgeons learning phacoemulsification all the time in the hospital. We have reported 13.7% vitreous loss for a senior surgeon learning phacoemulsification, while it was 10% for residents.[21, 22]

The Blumenthal technique had higher vitreous loss rates and poorer visual outcomes compared to phacoemulsification. Except for the most senior, several surgeons were in the learning curve for this technique. This could be one explanation for the higher vitreous loss rate. It could also be related to the manoeuvre used to dislodge the superior pole of the nucleus.[14] Achieving this by hydrodissecting from below may be safer in the hands of trainee surgeons.

A higher vitreous loss rate can be expected in surgical eye camp settings particularly if junior surgeons and surgeons-in-training also operate. Operating room facilities in these camps may be less than optimal, making detection of vitreous loss difficult and management inadequate. Inappropriately managed vitreous loss could have been a major factor among 30% cases with <3/60 in the NSPB survey of 7 Indian states. In the absence of proper instrumentation to manage such complications it is likely that a large number of cases could have gone either unrecognised or ignored. The same survey showed that 42 of 66 sites did not have a vitrectomy machine, an instrument that is accepted as the ideal for management of this complication. Our results demonstrate that if properly managed, vitreous loss decreases morbidity and leads to better outcomes. In the hands of experienced surgeons, the visual outcome was nearly similar to controls. All centers performing cataract surgery should be equipped to handle vitreous loss by standard microsurgical techniques.

Poor visual outcome was more commonly associated with ECCE compared to the Blumenthal technique or phacoemulsification in both the control and study groups. There may be several explanations for this. Firstly, level one surgeons who are expected to have more problems perform most of the ECCEs in our hospital. Second, in cases with a non-dilating pupil, endothelial guttae and other preexisting problems that could lead to intraoperative difficulty, a standard ECCE was preferred by some surgeons because they were more proficient in the technique. Third, the higher astigmatism possible with this technique can reduce both the aided and unaided acuity. However, with more surgeons acquiring enough experience in the Blumenthal technique, this bias for standard ECCE is now changing in favour of the former method. We too feel that vitreous loss is better managed with a small

Table 8. Vitreous loss rates compared with confidence limits reported in the literature

Investigator	Vitreous loss rate (%)	Sample size	95% C.I.
Our study	7.6	2095	7 – 9.3%
Percivial [10]	4	50	0 – 10%
Watts[10]	0	56	0 – 6%
Moscho s[10]	0	60	0 – 6%
Browning and Cobo[28]	9	25	0 – 20%
Naeser et al[10]	1.5	66	0 – 5%
Acheson et al[10]	2	100	0 – 5%

Table 9. Vitreous loss rates reported by learning surgeons

Investigators	Sample size	Vitreous loss rate	95% CI
Browning and Cobo[28]	25	9%	0 – 20%
Pearson et al[29]	936	10.3%	8 –12%
Allinson et[12]	136	14.4%	8.4 – 21%
Thomas et al[21]	70	10%	3 – 17%
Cotlier and Rose[30]	61	19.7%	10 – 29%

incision technique and a more "closed" anterior chamber compared to a sutured "standard" ECCE wound.[23, 24]

In uncomplicated cases, there was minimal (if any) difference in outcomes between the levels of surgeons. The visual outcome in the control group for Level 1 and Level 2 surgeons was similar to that of Level 3 surgeons. More than 95% of patients achieved a visual acuity > 6/18 in uncomplicated surgery regardless of the surgeon's level of experience; there was no statistical or clinically significant difference here. It is only in the vitreous loss group that the surgeon's experience really makes a difference.

The literature suggests that even if managed well, vitreous loss is associated with higher morbidity and a poorer visual outcome than an uncomplicated case.[1, 25] It also leads to significantly longer hospitalisation for study patients compared to controls. In our patients the commonest identifiable cause for vision <6/18 after vitreous loss was cystoid macular oedema. The commonest cause was corneal decompensation should we consider vision less than 6/60 only. Of the 8 such patients in the study group, 5 had corneal decompensation, one had suprachoroidal haemorrhage, one had vitreous haemorrhage and one developed a macular scar. One patient in the control group also had postoperative visual acuity less than 6/60 and corneal decompensation. Greater corneal endothelial loss reportedly occurs in eyes concurrently treated with anterior vitrectomy and in eyes with ACIOL.[26-27] In this study the BCVA was significantly greater in patients with vitreous loss who received a PC-IOL compared to those in whom an AC-IOL was implanted. This probably reflects the severity of the complication (and associated surgical manipulations) in cases that required an AC-IOL. Poor BCVA in the No-IOL group probably reflects this same trend, with poor visualisation leading to a decision to abort primary lens implantation.

The poor outcome following vitrectomy in inexperienced hands (mainly due to corneal causes) suggests that teaching needs improvement. The extra manipulations in a case with vitreous loss compounded by unskilled hands performing vitrectomy, is probably the cause for the poor outcome. We teach management of vitreous loss in the same stepwise manner that we teach cataract surgery. Currently, however, we do not take over the case unless considered absolutely necessary. Our threshold for taking over the management should be lower. If a decision is made to implant an IOL in this scenario, it may be safer for the senior surgeon to perform this step. Naturally, such decisions will need to be individualized.

In summary, vitreous loss in our teaching hospital is high, but similar to that reported in the literature for surgeons-in-training. Differences in rates can partly be explained by differences in definitions and methods of ascertainment. Vitreous loss does lead to a poorer outcome compared to an uncomplicated cataract operation. However, appropriately managed cases do obtain good vision. Part of the poor visual outcomes of cataract surgery reported nationally could be due to lack of recognition or inappropriate management of vitreous loss. If outcomes are to be improved, mechanized anterior vitrectomy instruments should be made available at all cataract surgical sites and surgeons must be trained in their use. Any surgeon performing cataract surgery should be well versed with the management of this complication.

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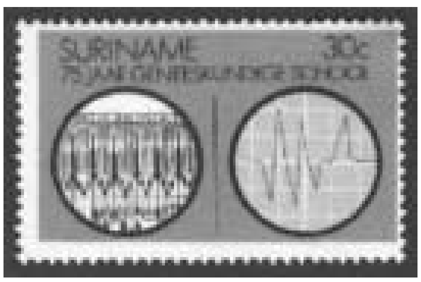
Stories from stamps

Technological innovations drive scientific discovery and vice versa. Now instrumentation is essential for accurate diagnosis



Electro-retinogram

Ocular Microbiology 'Halberstaedter-Prowazek' bodies in trachoma

Magnetic Resonance Imaging

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