For Private Circulation only

ISSN 0972-0723

DOS Times

Volume 14 - No. 5, November 2008

A Bulletin of Delhi Ophthalmological Society

Phacoemulsification in difficult situations

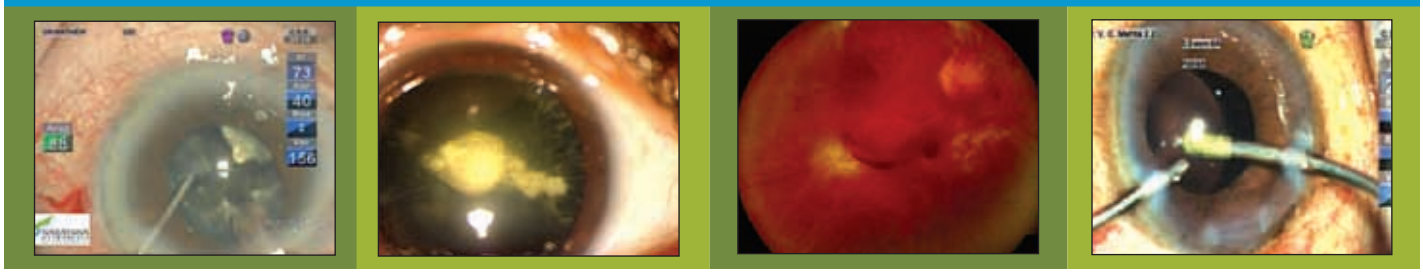
- Subluxated Cataract
- Posterior Polar Cataracts
- White Cataract
- Brown Cataract
- Phacomorphic Glaucoma
- Small Pupil
- Soft Cataract
- Eyes with Corneal Opacity
- Pseudoexfoliation Syndrome

Includes 2 CD's on Phaco in Difficult Situations & OCT

SPECIAL NATIONAL ISSUE

DOS Times • Volume 14 - No. 5, November 2008

Contents



Executive Members
Delhi Ophthalmological Society

Sudhank Bharti MS
President
drsbharti@bhartieyefoundation.org

Sharad Lakhotia MS
Vice-President
drsharadl@yahoo.co.in,

Namrata Sharma
MD, DNB, MNAMS
Secretary
namrata103@hotmail.com

Amit Khosla MD, DNB
Joint-Secretary
amitkhosla@hotmail.com

Sanjay Chaudhary MS
Treasurer
chaudhary@spectacleremoval.com

Rajpal Insan MD
Editor
drrajpal2001@yahoo.co.uk

Vinay K. Garodia
MD, DNB, FRCS
Library Officer
vinay@visitech.org

Alkesh Chaudhary
DO, MS, FMRF
Executive Member
achaudhary18@gmail.com

Zia Chaudhuri
MS, MNAMS, FRCS
Executive Member
drzia72@yahoo.com

Angshuman Goswami
MS, DNB
Executive Member
dragoswami@rediffmail.com

Rajiv Gupta MS
Executive Member
docrajiv99@hotmail.com

Sanjeev Gupta MD, DNB
Executive Member
sgupta31@hotmail.com

Rajendra Prasad MD
Executive Member
drprasadr@hotmail.com

Anita Sethi
MD, DNB, FRCS
Executive Member
dranitasethi@gmail.com

Cyrus M. Shroff MD
Executive Member
cyrus_shroff@hotmail.com

Rishi Mohan MS
DOS Representative to AIOS
rishimohanb@yahoo.co.in

Sudershan Khokhar MD
DOS Representative to AIOS
skhokhar38@yahoo.com

Lalit Verma MD
Ex-Officio Member
lalitverma@yahoo.com

Harbansh Lal MS
Ex-Officio Member
harbansheye@gmail.com

Dinesh Talwar MD
Ex-Officio Member
dineshtalwar@yahoo.co.uk

Editorial

Dear Friends,

Medical Education in Ophthalmology

India has the highest number of medical colleges in the world and consequently the highest number of medical teachers. The unprecedented growth of medical institutions in India in the past two decades has led to a shortage of teachers and created a quality challenge for medical education. In recent years, though medical advances have been understood and adopted by many institutions, the same is not true for educational planning and implementation.

There is a need for well-trained faculty who will help improve programs to produce quality graduates. The globalization of education and India's potential as a destination for higher education has brought the issue into sharper focus. Though recommended by the Medical Council of India, the training in educational techniques is not compulsory for medical teachers in India. Additionally, we have not kept pace with the emerging trends in medical education or the advances in educational research.

Student's evaluation of any teaching curriculum is a firmly recommended part of the teaching-learning process and is aimed at achieving the desired objectives. However, it also has to be remembered that such an exercise is useful only if the students evaluation is analyzed and implemented to further overcome the shortcomings of teaching curriculum.

Microteaching is one such mode of improving teaching performance. Microteaching, which was evolved by Alien to improve the skills of teachers is an excellent vehicle of providing medical teachers with an opportunity to improve their teaching skills. Microteaching is so called since it is analogous to putting the teacher under a microscope so to say while he is teaching so that all faults in teaching methodology are brought into perspective for the observers to give a constructive feedback.

Teacher training programs will serve two needs. The first, and perhaps the more visible, need is to improve the quality of medical teachers. The second, and more important from the long-term point of view, is to train a part of the medical faculty to become leaders who will generate solutions to meet the inevitable challenges faced by existing health care and medical education. Medical educators must stand up to meet this challenge.

In an attempt to teach post graduate students we have started the yearly exercise of doing a comprehensive post graduate teaching program that is DOST so that students not only from Delhi and national capital region are benefited but also students from all over India are avail this opportunity. The vision of this program is that from a didactic teaching we should graduate to clinical case presentations, evaluation and assessment for students, possibly with a mock exam.

Wishing you all a very happy Christmas and a happy new year

Thanking you,

Namrata Sharma
Secretary,
Delhi Ophthalmological Society

Cover Design by Amit Chauhan
Layout Design by R.S. Mahendru
Published by Dr. Namrata Sharma for Delhi Ophthalmological Society
Printers, Sharp Prints G-5 Red Rose Building, Nehru Place,
New Delhi - 110 019, E-mail: raman@sharppr.net

Online Journal Available

Many New Journals at DOS Library

Dear DOS Members,

We are pleased to announce that DOS has subscribed to online access of the following 18 journals. We are also in the process of adding a few more journals. These journals can be accessed at the DOS library situated at 4th floor of Dr. R.P. Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi-110029. The timings are from 9.30 A.M. to 6.00 P.M. on week days and 9.30 A.M. - 2.00 P.M. on Saturday. The Library will remain closed on Gazetted Holidays. Members are requested to utilise the available facilities i.e. Computer with Video Editing & Conversion facility VHS to VCD, Journals Viewing, Books and Journals etc. The DOS members can get the full text articles of the current issues as well as many back issues of these subscribed journals.

- Archives of Ophthalmology
- Acta Ophthalmologic Scandinavica
- British Journal of Ophthalmology
- Clinical & Experimental Ophthalmology
- Contemporary Ophthalmology
- Cornea
- Current Opinion in Ophthalmology
- Evidence-Based Ophthalmology
- International Ophthalmology Clinics
- Journal of Glaucoma
- Journal of Neuro-Ophthalmologica
- Journal of Pediatric Ophthalmology & Strabismus
- Journal of Refractive Surgery
- Ophthalmic Surgery, Lasers and Imaging
- Ophthalmology Management
- Retina
- RETINAL Cases & Brief Reports
- Techniques in Ophthalmology

Also we have also bought the books for the DOS library which include American Academy of Ophthalmology Basic and clinical science course (2008-2009) & Albert & Jakobiec's Principles & Practice of Ophthalmology (4 Vols.) 2008 apart from many others. The list of these will be available very soon.

You are welcome to give any more suggestions for the improvement of the library facility and making the process simpler for us.

Looking forward to hearing from you and hope this facility would be of benefit to all of us.

Regards.

(Dr. Namrata Sharma)
Secretary, DOS

(Dr. Vinay Garodia)
Library Officer Incharge
Mob: 9811084552
Email: vinay@visitech.org, doslibrary@gmail.com

!! Attention MD/MS/DNB/DO Ophthalmology Students!!

DOS TEACHING PROGRAMME

Delhi Ophthalmological Society

PREPARATORY COURSE FOR POST GRADUATE EXAM

The Delhi Ophthalmological Society organizes **"DOST"** which is **"Delhi Ophthalmological Society Teaching Programme"** aimed at teaching the post graduate (MD/MS/DNB/DO Ophthalmology) students all over India.

DOST-1 (by Dr. Pradeep Sharma), DOST-2 (by Dr. Ritu Arora) & DOST-3 (by Dr. Harsh Kumar) & DOST-4 (by Prof. V.P. Gupta) were very well received by the members.

Seeing, the overwhelming response, DOST is now organizing a 2 day exhaustive course for all post-graduate students which will help them in preparation of exams. All members and students are welcome to attend it!

Date	:	10th & 11th January, 2009 (Saturday & Sunday)
Time	:	8.30 a.m. - 5.30 p.m.
Venue	:	Jawaharlal Auditorium, All India Institute of Medical Sciences, Ansari Nagar, New Delhi-110029

Dr. Sudhank Bharti
President

Dr. Namrata Sharma
Secretary

Secretariat:
Dr. Namrata Sharma, Organising Secretary
Room No. 474, 4th Floor,
Dr. Rajendra Prasad Centre for Ophthalmic Sciences,
AIIMS, Ansari Nagar, New Delhi-110029
Tel.: 91-11-65705229 Fax: 91-11-26588919
E-mail: dosonlin@vsnl.net
for more details Log on
Website: www.dosonline.org

DOST Teaching Schedule

Basic Sciences

- Ocular Microbiology
- Ocular Pathology
- Community Ophthalmology
- Ocular Pharmacology

Refraction

- Refraction, contact lens and orthoptics
- Orbscan/Videokeratography

Cornea

- Eye banking (Setup, Storage media, Processing, Grading)
- Corneal Transplantation techniques
- Corneal Ulcer: Diagnosis & Management
- Refractive Surgeries
- Investigative modalities in anterior segment

Lens

- Phaco Machine & Phacodynamics
- Premium IOLs
- SICS
- Pediatric Cataract

Glaucoma

- Imaging in glaucoma
- Tonometry and Visual fields – Goldman & Humphrey
- Glaucoma Drainage Devices
- Gonioscopy
- Role of drugs which & when to use?

Squint

- Strabismus simplified
- Neuro-Ophthalmology-Approach to diagnosis
- Nystagmus

Oculoplasty

- Skin Grafts (Site, Types, Colour Changes, Post Op. Management)
- Proptosis – D/D and Management
- Lids-Ptosis
- Aesthetic Oculoplasty

Retina

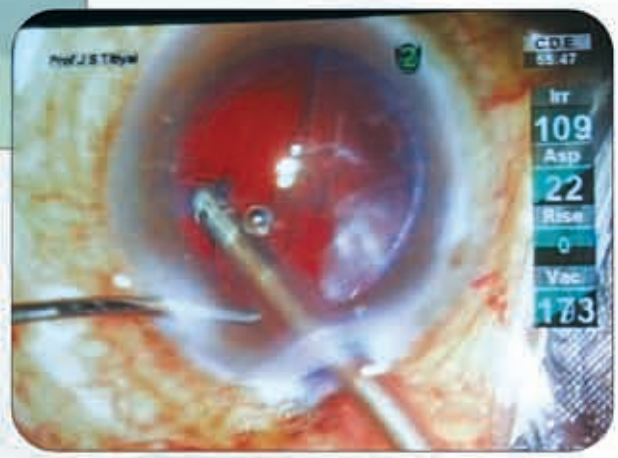
- Uveitis: Differential Diagnosis & management
- ARMD & its Management
- Anti VEFG – Role in Ophthalmology (ARMD, Vascular Occlusion, ROP, Diabetic Retinopathy, NVG, Anterior Segment)
- Direct & Indirect Ophthalmoscope
  Operating microscope
- Endophthalmitis
- Diabetic Retinopathy
- Fluorescien Angiography /ICG angiography and lasers

Mid Term Conference

22nd & 23rd November, 2008 - Saturday & Sunday
The Ashok Hotel, Chanakyapuri, New Delhi

Delhi Ophthalmological Society

Live Surgery



Mid Term Conference

22nd & 23rd November, 2008 - Saturday & Sunday
The Ashok Hotel, Chanakyapuri, New Delhi

Delhi Ophthalmological Society

Major Sponsors

Mid Term Conference

22nd & 23rd November, 2008 - Saturday & Sunday
The Ashok Hotel, Chanakyapuri, New Delhi

Delhi Ophthalmological Society

Major Sponsors

Mid Term Conference

22nd & 23rd November, 2008 - Saturday & Sunday
The Ashok Hotel, Chanakyapuri, New Delhi

Delhi Ophthalmological Society

Dinner & Lunch

Mid Term Conference

22nd & 23rd November, 2008 - Saturday & Sunday
The Ashok Hotel, Chanakyapuri, New Delhi

Delhi Ophthalmological Society

Mid Term Conference

22nd & 23rd November, 2008 - Saturday & Sunday
The Ashok Hotel, Chanakyapuri, New Delhi

Delhi Ophthalmological Society

Mid Term Conference

22nd & 23rd November, 2008 - Saturday & Sunday
The Ashok Hotel, Chanakyapuri, New Delhi

Delhi Ophthalmological Society

Mid Term Conference

22nd & 23rd November, 2008 - Saturday & Sunday
The Ashok Hotel, Chanakyapuri, New Delhi

Delhi Ophthalmological Society

Vitreous Surgery for Diabetic Retinopathy- Principles & Practical Tips

Atul Kumar MD, FAMS, *Rajvardhan Azad* MD, FRCS, *Y.R. Sharma* MD, *Parijat Chandra* MD

The indications for Diabetic Retinopathy broadly include induced media opacities and vitreoretinal traction. The indications for surgical intervention may be grouped in these two general categories (Table 1)[1]. The indications for diabetic vitrectomy have been refined as improvements in surgical instrumentation have resulted in improvements in surgical technique.

Diabetic Vitreous Hemorrhage

The earliest indication for diabetic vitrectomy was severe nonclearing diabetic vitreous hemorrhage, lasting up to 12 months. As timely application of pan retinal photocoagulation become more wide-spread and newer techniques and instrumentation allowed surgery on more complex cases, the distribution of cases undergoing vitrectomy for nonclearing vitreous hemorrhage decreased. As results have improved, surgical intervention now usually is considered at an earlier time point. The Diabetic Retinopathy Vitrectomy Study (DRVS)[2,3,4] demonstrated that vitrectomy 1 to 4 months after the onset of severe vitreous hemorrhage for type 1 diabetics yields final vision greater than or equal to 20/40 in 36% of this sub-group as compared to only 12% with conventional management (p =.001)[5, 6]. However, the rate of no light perception (≥5/200 and ≥20/200, respectively) was similar for both groups. The better results are postulated to be due to the tendency for type 1 diabetics to have more extensive and aggressive neovascularization.

Several features may modify the timing of vitrectomy for diabetic vitreous hemorrhage. Earlier surgical intervention is advocated when no laser treatment has been performed, when the extent of the proliferation is more extensive, or when the fellow eye of the patient had rapidly progressive visual loss. The presence of rubeosis in a patient with a recent vitreous hemorrhage (progressive rubeosis iridis), especially when no previous pan-retinal photocoagulation has been applied, constitutes an indication for more urgent intervention.

Table 1: Indications for Vitrectomy due to complications of Diabetic Retinopathy

Media Opacities
• Nonclearing hemorrhage:Vitreous, Subhyaloid, premacular hemorrhage
• Anterior-segment neovascularization with vitreous heme.
• Cataract preventing treatment of severe proliferative diabetic retinopathy
Tractional Defects
• Progressive fibrovascular proliferation,
• Traction retinal detachment involving the macula
• Combined tractional and rhegmatogenous retinal detachment
• Macular edema associated with taut, thickened, persistently attached posterior hyaloid
Other Indications (typically following previous vitrectomy)
• Ghost-cell glaucoma
• Anterior hyaloid fibrovascular proliferation
• Fibrinoid syndrome

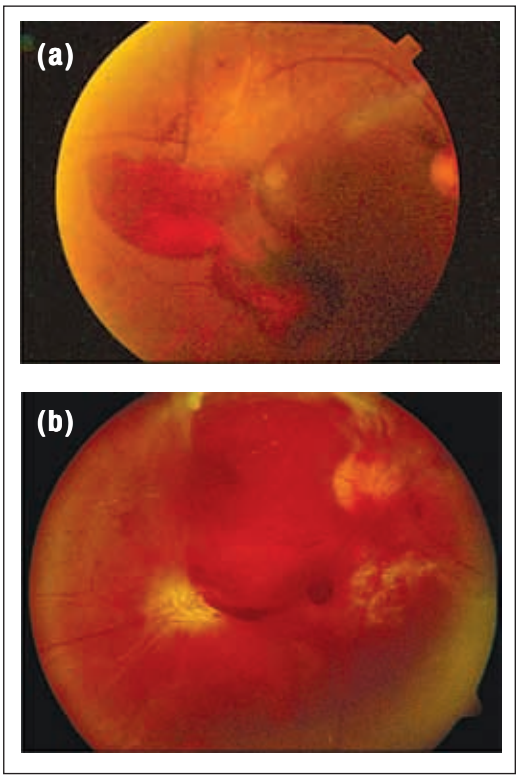


Figure 1a &1b: *Both eyes show premacular hemorrhage with fibrovascular proliferation and traction indicating need for vitrectomy*

Vitreous-Retina Service
Dr. Rajendra Prasad Centre for Ophthalmic Sciences,
All India Institute of Medical Sciences, New Delhi

Table 2: Results of diabetic vitrectomy			
Indication for Vitrectomy	**Improved vision (%)**	**Visual Acuity ≥ 20/200 (%)**	**No Light Perception (%)**
Vitreous hemorrhage	59-83	40-62	5-17
Fibrovascular proliferation	70	70	11
Traction retinal detachment	59-80	21-58	11-19
Combined traction and rheegrnatogenous retinal detachment	32-53	25-36	9-23

Source: Compiled from GW Blankenship, Proliferative retinopathy: principles and techniques of surgical treatment. In: Ryan SJ, ed, Retina. St Louis: Mosby. 1989:515-539.

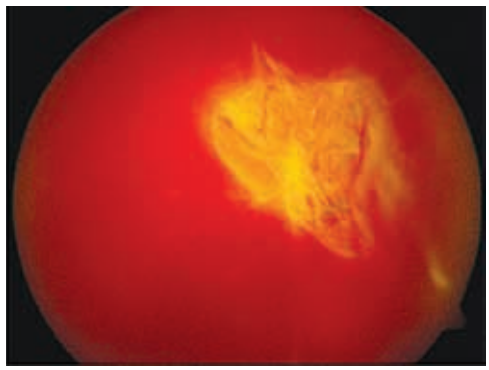


Figure 2a: *Tractional RD with retrohyaloid hemorrhage*

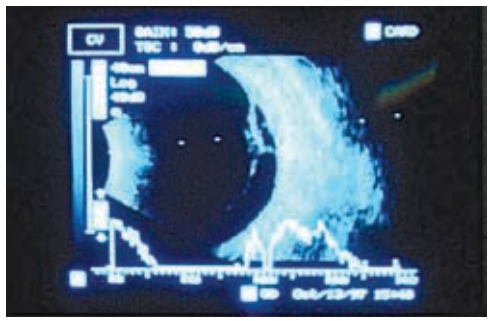


Figure 2b: *B-Scan shows focal TRD*

The results of vitrectomy for nonclearing diabetic hemorrhage have been reported and reviewed elsewhere (Table 2). The vision improves in 59 to 83%, with a final vision equal to or greater that 20/200 in 40 to 62%. The comparability of different series and the prognosis in a given patient are confounded by varying degree of concomitant traction and ischemia, which may not be quantifiable. Surgical intervention may be deferred more safely at least temporarily in the event of a posterior vitreous detachment, when extensive prior panretinal photocoagulation has been placed, and when other labile medical conditions coexist. Patients with labile hypertension or poorly controlled systemic diabetes should be promptly and aggressively treated by the physicians for these systemic conditions. If the patient or the doctor decides to defer surgery, echographic monitoring of the posterior retina should be considered so that if further complications (e.g., retinal detachment) ensue, a more aggressive treatment approach can be invoked.

Another indication in this class of media opacities includes the entity of a subhyaloid hemorrhage. All too often, these hemorrhages clear extremely slowly and are accompanied by confinement of the blood in the subhyaloid space, indicating that the posterior hyaloid has not separated (Figure 1a&1b). Characteristically, this condition coexists with or even facilitates vascular proliferation along the posterior hyaloid surface, creating wide-based areas of vitreoretinal adhesions. Excellent surgical results have been reported.

In some cases, lens opacities are sufficient to impair not only the pa-tient's vision but the physician's ability to diagnose, monitor, and treat the retina.In such cases, cataract removal should be considered either as a separate procedure or as a combined procedure. Early reports documented a poor prognosis in aphakic patients or in those undergoing lensectomy at the time of vitrectomy. However, more recent experience with phacoemulsification techniques in combination with the ability to deliver intraoperative photocoagulation have defined a role for lens removal and intraocular lens implantation during vitrectomy in selected cases. Asesment of nuclear sclerosis can be very deceiving in eyes with vitreous hemorrhage.

Progressive Fibrovascular Proliferation and Traction Retinal Detachment

The second general class of indication for diabetic vitrectomy includes preretinal fibrovascular proliferation that has induced traction on the retina (Figure 2a&2b)[7,8,9]. As mentioned, this class of cases now comprises the majority of patients undergoing vitrectomy for complications of diabetic retinopathy. As an ongoing complication macular heterotopia, progressive fibrovascular proliferation without retinal detachment, tractional retinal

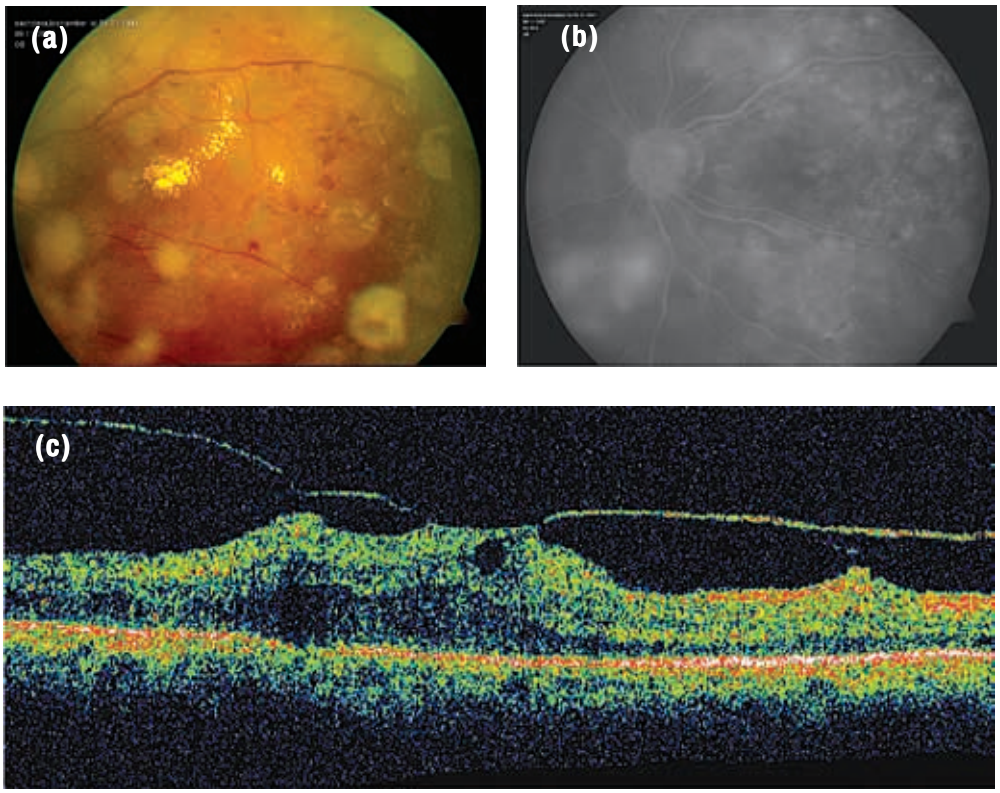


Figure 3a & 3b: *Shows CSDME both eyes with asteroid hyalosis right eye*
Figure 3c: *OCT of the right eye reveals vitreomacular traction syndrome (VMTS) requiring surgery*

detachment with rhegmatogenous retinal detachment, the retinal break formed owing to the traction occur.

Type I diabetics are noted for having progressive fibrovascular proliferation despite aggressive and appropriate panretinal photocoagulation[10, 11, 12]. The first report of the DRVS showed that the natural history of such cases involved a very high rate of progression to severe visual loss. Those results justified a prospective study of 370 patients with severe neovascularization assigned randomly to early vitrectomy or conventional management. The rate of final vision equal to or greater than 20/40 was 44% for the early vitrectomy group as compared to 28% in the conventional group with 4 years· follow-up (p <.05). Other investigators have found that pre-operative factors indicating more favorable postoperative result include age younger than 40, preoperative vision of at least 5/200, absence of iris neovascularization, and preoperative photocoagulation. Thus, patients with rapidly progressive fibrovascular proliferalion should be considered for vitrectomy once vision has dropped severely and, in selected cases, even if the visual acuity is relatively good (even in the 20/40-20/80 range). *Pre-operative Avastin (1.25mgs) can be injected a week prior to surgery to reduce the risk of per-operative bleeding.*

Traction retinal detachment probably is the most common specific in-dication for diabetic vitrectomy. The pathogenesis of retinal detachment involves fibrous transformation and contraction of neovascular tissues. Some caution is advised in recommending vitrectomy, as non macular detachments progress to involve the macula in only perhaps 15% of cases per year, and complication rates with vitrectomy still are substantial. Therefore, vitrectomy is reserved only for cases in which the macula is threatened or involved. As with cases of nonclearing diabetic vitreous hemorrhage, several factors may influence the timing of surgical intervention. Type 1 cases in which coexisting media opacities have prevented delivery of suitable panretinal photocoagulation and patients in whom a rapidly progressive course ensued in the fellow eye-should be considered for earlier intervention. Chronic macular detachment leads to thinner, more atrophic retina, with more extensive and more tightly adherent fibrovascular membranes. Consequently, the anatomical and visual prognosis is poorer in such cases. Accordingly, when macular detachment clearly has been present for more than 6 months or so, the visual prognosis is so poor that careful consideration must be given before proceeding with surgery.

The results of vitrectomy for diabetic, macula-involving tractional retinal detachment are somewhat worse than those for vitreous hemor-rhage, as might be expected. Visual improvement has been reported in 59 to 80% of cases, but vision equal to or greater than 20/200 is achieved in only 21 to 58% (see Table 2)

Traction and Rhegmatogenous Retinal Detachment

A third indication for diabetic vitrectomy in the class of complications caused by traction includes the combined tractional

Figure 4: *Xenon Light Source*

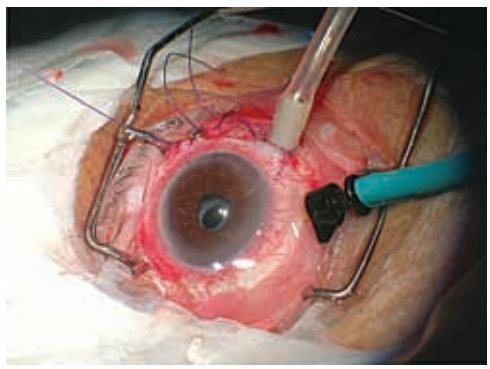


Figure 5: *Chandelier 25 G illuminating fibre*

and rhegmatogenous retinal detachment cases[13]. The rhegmatogenous component is a conse-quence of progressive fibrovascular contraction leading to a break. Usually, more sudden and profound visual loss ensues once the rheg-matogenous component occurs. The retinal break usually is found poste-rior to the equator but frequently is not appreciated preoperatively com-mon sites of the break include areas adjacent to previous chorioretinal scars or at the base of vitreoretinal adhesions. The hallmark or such cases is the appearance of hydration lines, with a more mobile, elevated retina. Though some cases with a rhegmatogenous component may be only slowly progressive and could be monitored carefully without surgery, usu-ally prompt surgery is indicated.

The results of vitrectomy for combined retinal detachment are poorer than those for cases with purely tractional detachment. Visual improve-ment is reported in 32 to 53% and final vision equal to or greater than 20/200 in only 25 to 36% (see Table 2).

A rare, more subtle form of traction-induced complications involves laser-resistant macular edema induced by the traction mediated by a taut, typically thickened, persistently attached posterior hyaloid[14,15]. The vast majority of cases of diabetic macular edema do not appear to be induced by traction and should be considered for photocoagulation/ anti- VEGF agents. Selected cases with chronic diffuse diabetic macular edema however respond to surgical release of the traction, and ILM peel (Figure 3a,3b&3c).

Other Indications

Other indications for vitrectomy usually consist of attempts to complication of previous vitrectomy. A severe vitreous hemorrhage (before or after vitrectomy) may induce a secondary glaucoma through a ghost cell mechanism. Most cases of vitreous hemorrhage and increased intraocular pressure respond to medical therapy and do not further surgery. However, selected cases may have uncontrollable intraocular pressure despite maximal medical treatment, and they constitute indication for vitrectomy on that basis. In some cases, office-based fluid gas exchange may provide sufficient elimination of blood such that re -vitrectomy in the operating room may be avoided.

A more difficult condition is progressive anterior hyaloid fibrovascular proliferation, but this entity usually is confined to an eye in the operative period after vitrectomy. Usually, the only hopes for stabilization are lensectomy and extensive anterior vitreous dissection similar to techniques used for proliferative vitreoretiilopathy.

Surgical Objectives and Advances

The surgical objectives of vitrectomy for severe complications of dia-betic retinopathy are numerous but interrelated (Table 3). Basically, the objectives are to neutralize and, when possible, eliminate the components that have led to the visual loss. Specifically, this modality involves the removal of axial media opacities and preretinal traction. *New multifunction instruments and bimanual techniques, use of wide angle lens systems for use in diabetic vitrectomy have emerged in response to the need to achieve these objectives more safely and reproducibly* (Figure 4&5).

Newer minimal gauge 23G and 25G transconjunctival instruments offer lessor post-op astigmatism, lesser scarring, and a shorter operating time usually in simple vitreous hemorrhage eyes, as they are sutureless vitrectomies.

Table 3: Objectives of Vitrectomy for Severe Diabetic Retinopathy

- Removal of axial opacities
- Relief of anteroposterior and tangential traction
- Segmenting or peeling of epiretinal membranes
- Endolaser treatment
- Effecting hemostasis
- Closure of all retinal breaks
- Treatment and prophylaxis of complications

The removal of traction involves removal of anteroposterior and tan-gential vitreoretinal traction and removal of membrane-induced surface traction. Different surgical techniques have been developed and promulgated to do this[16]. In the segmentation

technique, the traction is dissected sequentially by removing anteroposterior traction, bridging traction, and surface traction (epiretinal membranes). In the en-bloc technique, the surface traction is removed primarily and, by doing so, the preretinal tissue is removed as a large, confluent piece, and the anteroposterior traction is removed simultaneously. The advantage of this technique is that the anteroposterior traction serves a "third-hand" function by holding released tissue away from the retinal surface so that subsequent surface dissection is facilitated. In the delamination technique, the anteroposterior traction commonly is removed first and, with horizontal scissors and multifunction instruments (such as lighted picks or lighted forceps), the preretinal tissue is shaved at the retinal plane and is removed completely in large pieces. In this regard, the procedure is like the en bloc technique.

An important surgical objective is the delivery of laser photocoagula-tion to prevent and to induce involution of neovascular tissue. With the advent of endolaser and indirect laser ophthalmoscopic delivery systems, this objective has been achieved intraoperatvely.

Intraoperative hemostasis facilitates completion of the other surgical objectives and optimizes the chance for surgical success by minimizing postoperative fibrin and blood. Strategies include intravitreal diathermy, increase of the infusion pressure, or use of intraocular thrombin. Delamination techniques are reported to induce less bleeding.

A vital surgical objective is closure of retinal breaks by performing fluid-gas exchange and applying endolaser photocoagulation. Retinal breaks occur in up to 20% of cases and would lead to retinal detachment if untreated. The primary role for silicone oil is affecting long-term internal tamponade of multiple or occult retinal breaks [17]. Usually, this oil is applied in the setting of a reoperation necessitated by reproliferation of fibrovascular tissues and features of proliferative vitreoretinopathy. Severe, progressive anterior-segment neovascularization seems to regress after infusion of silicone oil, possibly via blocking diffusion of a vasoproliferative substance, and constitutes an indication for silicone oil in selected cases.

The final surgical objective is to treat and avoid future complications so as to maximize the chances for ultimate success. Even if previous treat-ment has been applied, generous laser photocoagulation usually is deliv-ered also to lessen further proliferation. Scleral buckling is advisable to relieve peripheral retinal traction from unreachable or undissectable membranes.

The principal complications of diabetic vitrectomy include vitreous hemorrhage, retinal detachment, and rubeosis[18,19]. The management of many of these complications has been discussed. Vitreous hemorrhage occurs in virtually all cases but is significant in some 30% of cases. Office based fluid-gas exchange or vitreous lavage are options to consider. Usually, at least a 8 week postoperative waiting period is recommended before reoperation, to allow for spontaneous clearing. The rates of postoperative retinal detachment and rubeosis iridis vary with the preoperative diagnoses and occur in up to 20% of cases. In severe cases with uncontrollable glaucoma, such procedures as Molteno or Baerveldt tube placements are necessary. Though many other potential complications, exist, they are rare or are not unique to diabetic vitrectomy cases.

A host of multifunction instrumentation also has been developed. However, in the last 5 to 10 years, the light probe has been modified to allow additional functions, including use of the pick or forceps. A fourth sclerotomy involving a multi port illumination system also has been developed, freeing up the second hand to use a pick or forceps. Wide angle viewing systems have been developed to facilitate the global view of the posterior pole, thereby lessening the risk of inducing unintended traction and retinal breaks in distant areas. A very useful innovation has been the application of a variety of different iris retractors. Though usually reserved for nondiabetics, these tools facilitate the achievement surgical objectives by allowing visibility in patients with fixed, small pupils.

Conclusions

The indications for diabetic vitrectomy have increased in recent years. Not only has the threshold for performing surgery in established indica-tions increased but other indications have been established. This expan-sion can be attributed to improvements in the instrumentation and the development of techniques, use of Anti-VEGFs that facilitate the necessary intra-operative manoevers[20]. Accordingly, increasingly difficult cases are being considered and vision is being salvaged by such techniques[21,22].

The surgical prognosis is respectable in comparison to the natural his-tory but is poor considering the efficacy of such preventive measures as timely diagnosis and treatment with laser.

References

1. Aaberg TM. Pars plana vitrectomy for diabetic traction retinal detachment. Ophthalmol-ogy. 1981; 88:639-642.
2. Blankenship GW. Preoperative prognostic factors in diabetic pars plana vitrectomy. Ophthalmology. 1982; 89: 1246-1249.
3. The Diabetic Retinopathy Study Research Group. Early vitrectomy for severe vitreous hemorrhage in diabetic retinopathy: two-year results of randomized trial [DRVS rep. no. 2]. Arch Ophthalmology. I985; 103:1644 -1652.
4. The Diabetic Retinopathy Study Research Group. Early vitrectomy for severe prolifera-tive diabetic retinopathy in eyes with useful vision: results of a randomized trial [DRVS rep. no. 3]. Ophthalmology 1988; 95:1307-1320.
5. The Diabetic Retinopathy Study Research Croup. Early vitrectomy for severe proliferative diabetic retinopathy in eyes with useful vision. Clinical application of results of a randomized trial [DRVS rep. no. 4]. Ophtthalmolagy" 1988;95:1321-1334.
6. The Diabetic Retinopathy Study Research Croup. Early vitrectomy for hemorrhage in diabetic retinopathy. Four-year results of a randomized trial [The Dia-betic Retinopathy Study rep. no. 5]. Arch OphthalmoI1990;108:958-964
7. Michels RG. Vitrectomy for complications of diabetic retinpathy. Arch Ophthalmology. 1978; 96:237- 246.
8. Rice TA, Michels RG, Rice EF. Vitrectomy for diabetic traction retinal detachment involving the macula. Am] DphthalmolI983; 95:22-33.
9. The Diabetic Retinopathy Study Research Group. Four risk factors for severe visual loss in diabetic retinopathy. Arch Ophthalmol 1979:97:654-655.
10. Machemer R, Blankenship G. Vitrectomy for proliferative diabetic retinopathy associ-ated with vitreous hemorrhage. Ophthalmology 1980;88(7):643-646.

11. Patz A, Smith RE. The ETDRS and Diabetes 2000. Ophthalmology 1991;98:739-740.
12. Aaberg TM, Abrams GW. Changing indications and techniques for vitrectomy in man--agement of complications of diabetic retinopathy. Ophthalmology 1987;9·1:77:.-779
13. Rice TA, Michels RG, Rice EF. Vitrectomy for diabetic rhegmatogenous retinal detach-ment. II m] DphthalnwlI983; 95:34-44.
14. O'Hanley CP, Canny CLB. Diabetic dense pre-macular hemorrhage: a possible indication for prompt vitrectomy. Ophthalmology. 1985;92:507-511.
15. Kumar A, Sinha S, Sharma YR, Azad RV, Vohra R: Comparative evaluation of vitrectomy and dye-enhanced ILM peel with grid laser in diffuse diabetic macular edema. Graefes Arch Clin. Exp. Ophthalmol. March 2007; 245(3): 360-8.
16. Abrams GW, Williams GA. "En bloc" excision of diabetic membranes. Am J Ophthalmol. 1987; 103:302-308
17. McCuen BW II, rinkoff JS. Silicone oil for progressive anterior ocular neovascularization after failed diabetic vitrectomy. Arch Ophthalmol. 1989; 107: 677-682.
18. Lloyd MA, Heuer DK, Baerveldt G, et al. Combined Molteno implnator and pars plana vitrectomy for neovascular glaucomas. Ophthalmology. 19991; 98: 1401-1415
19. Aiello RC. Wand M. Liang C. Neovascular glaucoma and vitreous hemorrhage follow-ing cataract surgery in patients with diabetes mellitus.
20. Kumar Atul, Sinha S: Intravitreal bevacizumab (Avastin) treatment of diffuse diabetic macular edema in an Indian population. Indian J Ophthalmol. 2007; 55:451-455.ophthdlmology 1983;90:8l4-820.
21. Thompson JT, Auer CL, de Bustros S, et al. Prognostic indicators of success and failure in vitrectomy for diabetic retinopathy. Ophthalmology 1986;93:290-295.
22. Eliot D, Lee MS, Abrams GW. Proliferative Diabetic Retinopathy: principles and techniques of surgical treatment. In : RyanSJ, ed Retina. Vol3. 4th ed.2006:2413-2449

First Author
Atul Kumar MD, FAMS

Monthly Clinical Meetings Calendar 2008-2009

Dr. R.P. Centre for Ophthalmic Sciences 3rd August, 2008 (Sunday)	**Centre for Sight** 7th December, 2008 (Sunday)
Venu Eye Institute & Research Centre 7th September, 2008 (Sunday)	**DOS Picnic** Thursday, 25th December, 2008
Army Hospital (R&R) 28th September, 2008 (Sunday)	**Mohan Eye Institute** 28th December, 2008 (Sunday)
World Sight Day 8th October, 2008 (Wednesday)	**New Hospital/Institute** 25th January, 2009 (Sunday)
Sir Ganga Ram Hospital 2nd November, 2008 (Sunday)	**Guru Nanak Eye Centre** 22nd February, 2009 (Sunday)
Midterm Conference of DOS 22nd & 23rd November, 2008 (Saturday - Sunday)	**New Hospital/Institute** 15th March, 2009 (Sunday)

Annual Conference of DOS 20th-22nd March, 2009 (Friday, Saturday & Sunday)

Phacoemulsification in Subluxated Cataract

Abhay R. Vasavada *MS, FRCS,* ***M.R. Praveen*** *DOMS*

The management of ectopia lentis of different origins poses a challenge to the ophthalmologist.

It poses two major problems

- Removal of cataract itself
- Fixation of IOL

Strategies

- Pre operative evaluation
- Counseling
- Anesthesia
- Surgical principles
  - Closed chamber technique
  - Bag & IOL fixation

Counseling: The patient and the family are made aware of:-

- Possibility of uncertain surgical outcome,
- Challenges and consequences of scleral fixation of IOL,
- Postoperative suboptimal visual recovery and
- Need for secondary intervention.

Preoperative evaluation: is carried out under maximum mydriasis for detecting:-

- Extent of zonular weakness,
- Grade of cataract,
- Presence of vitreous strands in anterior chamber and
- Peripheral retinal lesions.

Anaesthesia*:* Peribulbar without massage or pressure.

- Additional facial nerve block.
- *Optional:* Topical Anaesthesia

Surgical strategy*:*

- Closed chamber technique.
- Minimum turbulence.

Closed Chamber Technique Includes

Incision:

An initial 2 paracentesis incisions of 1 mm in the clear cornea are initiated.

Using the *soft shell technique* first Viscoat is injected into the anterior chamber to coat the corneal endothelium. This is followed by injection of Provisc this ensures that the Viscoat is pushed towards the cornea.

Iladevi Cataract & IOL Research Centre
Raghudeep Eye Clinic, Gurukul Road,
Memnagar, Ahmedabad

A temporal single plane clear corneal incision is preferred irrespective of site of subluxation for the surgeon's comfort and convenience.

Rhexis: Initial Small Rhexis

In unusual conditions where initiating the rhexis with 26 gauge needle is difficult, a 15° slit knife is used to make a slit opening on the anterior capsule and completed with Uttrata forceps.

An initial small rhexis is attempted and then definite large rhexis is performed if necessary *[I & D rhexis]*. Small rhexis restricts turbulence within the bag.

If rhexis is achieved Stabilize the bag. *This is achieved by Iris retractors* which - temporarily support the cataract and *prevents additional loss of zonules.*

Hydrodissection

Gentle but thorough multiquadrant hydrodissection helps to reduce the stress on zonules during phacoemulsification.

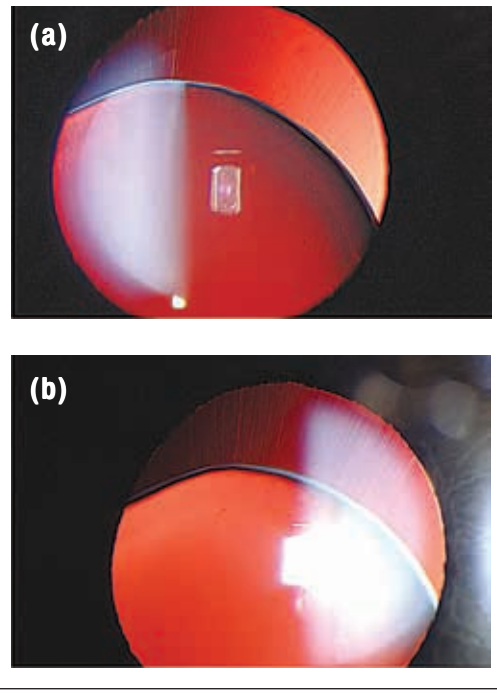


Figure (1a &1b) : *Preoperative congenital inferior subluxation*

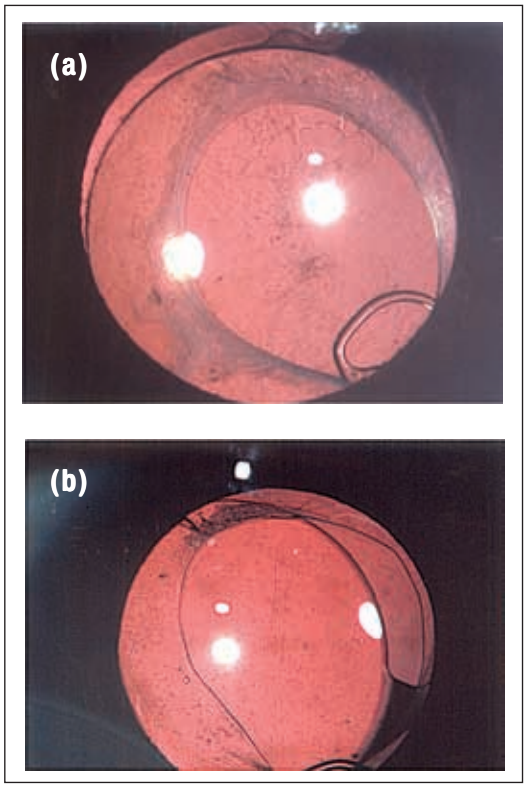


Figure (2a & 2b): *Implantation of Cionni ring with Acrysof SA60AT within the capsular bag*

Sculpting

Power	Supraoptimal
AFR	12-16 cc/min
Vacuum	60 mm/Hg
Bottle Height	60 cms

Aim

- Prevent flutter of the lens.
- Avoid turbulence within the chamber.

Vitrectomy

2 port vitrectomy was given priority. "May the vitreous strands be dealt with immediately, at their first appearance"

Division of nucleus

"*Step by step chop-in-situ and lateral separation* "transferred minimum stress to the bag and zonules and produced multiple small fragments.

Removal of fragments

Multiple small fragments were consumed using "*Step Down Technique*"

This technique involves reduction in aspiration parameters as proportionate to posterior capsule exposure.

Power	Supraoptimal
AFR	12-16 cc/minute
Vacuum	Subminimal
Bottle Height	70-90 cms

Implantation of CIONNI's Ring

- A corneal stab incision is made opposite to scleral flap (a scleral flap is made at the overlying maximal dialysis).
- The Cionni ring is threaded with 10/0 polypropylene monofilament nonabsorbable suture, double armed with 2 straight needles (Ethicon - W 1713) outside the eye.
- It is passed through the corneal stab incision into the capsular bag.
- Ring is dialed until the cionni's element is subjacent to scleral flap.
- Bent 26 G needle is passed through scleral pocket to fetch the straight needle which is introduced through the same corneal stab incision.
- Similarly the second needle is passed in the same track.
- Temporary knot is tied outside the eye after the capsule bag is centered.

Bimanual irrigation & aspiration

Bimanual I/A is performed for cortex removal.

Single piece AcrySof SN60WF is implanted using Monarch II injector.

Maintenance of Closed Chamber: is mandatory throughout the surgery

Achieved by injecting viscoelastic substance in the anterior chamber before removing any instrument from the eye.

The Crux:

- Adhere to the **closed chamber technique**
- Prevent turbulence.

Conclusion

In conclusion, using appropriate phaco power depending on grade of cataract is essential. This must be accompanied by low aspiration flow rate, low vacuum and low bottle height which together cause minimal turbulence in the anterior chamber similar to Slow motion technique. It has been well delineated by Dr. Robert Osher. This provides a safe and predictable outcome in subluxated cataract surgery.

First Author
Abhay R. Vasavada MS, FRCS

Phacoemulsification in Posterior Polar Cataracts

Jeewan S. Titiyal MD, *Noopur Gupta* MS, DNB, *Namrata Sharma* MD, DNB, MNAMS

A posterior polar cataract is a round, discoid, opaque mass that consists of malformed and distorted lens fibers located in the central posterior lenticular region. The location of the opacity is the most significant feature, in addition to its proximity and possible adherence with the posterior capsule. Moreover, it may be associated with friable posterior capsule. Hence, cataract surgery in these cases presents a challenge to the surgeon.

Posterior polar cataracts are sometimes associated with remanants of the hyaloid system or the tunica vasculosa lentis.[1] These cataracts may also occur without any relation to hyaloid remnants and appear as circular or rosette shaped opacities (Figure 1). They are reported to be hereditary in nature and transmitted as a dominant trait. They are usually associated with mutation of PITX3 gene[2, 3] in chromosome 16. [4]

Morphologically, they are divided into 4 types. [5] (Table 1)

Table 1: Classification of posterior polar cataracts

Type 1	Opacity associated with posterior subcapsular cataract.
Type 2	Opacity with ringed appearance like an onion.
Type 3	Opacity with dense white spots at the edge often associated with thin or absent Posterior capsule.
Type 4	Combination of the above 3 types with nuclear sclerosis.

Posterior polar cataract surgery is associated with an increased incidence of posterior capsular rupture. Undue stress on the capsule must be minimized. The main difficulty is the adherence of the abnormally formed lens fibers to the posterior capsule and its associated weakness. Once the surgeon is aware of these dangers, the technique can be altered to meet these challenges.

Osher and co-authors[6] report a 26% incidence of capsule rupture in a series of 31 eyes and Vasavada et al[7] reported 36% incidence in a series of 22 eyes. Recently, Hayashi et al[8] have reported 7.1% incidence of posterior capsule tear in a series of 28 eyes. The incidence of posterior capsule tear has decreased in recent times due to modern instrumentation, refined surgical techniques and increasing surgical expertise.

Counselling of the patient

The patient should be informed of the possibility of intraoperative posterior capsule rupture and increased chances of vitreous loss. During the preoperative examination, the physician should inform the patient of the possibility of intraoperative nucleus drop due to a posterior capsular rupture, a longer surgical time, secondary posterior segment intervention and a delayed visual recovery.

Phacoemulsification is preferable to conventional extra capsular cataract extraction because the former gives a better control with closed chamber techniques. [9] Preoperatively, in cases of total cataract, fellow eye should always be examined for presence of polar cataract or evidence of complicated surgery to avoid nucleus drop after accidental and aggressive hydroprocedures. Relevant strategy for every step of surgery should be planned.

Anesthesia

Peribulbar anesthesia is recommended especially for novice surgeons. However, an experienced surgeon may undertake this procedure under topical anesthesia.

Incision

A temporal clear corneal incision is preferable especially for topical anaesthesia surgery.

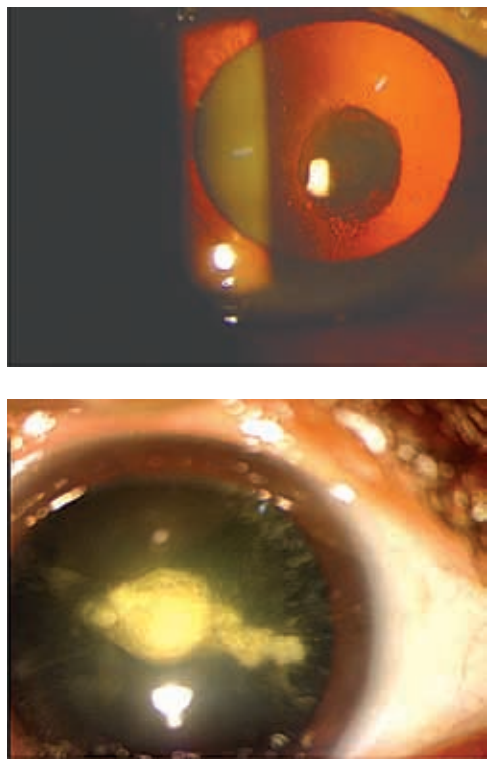


Figure 1: *Posterior Polar Cataract with associated posterior capsular tear*

Department of Ophthalmology
Dr. Rajendra Prasad Centre for Ophthalmic Sciences,
All India Institute of Medical Sciences, New Delhi

Capsulorhexis

Adequate size CCC is performed of about 4.5 to 5.0 mm size. A smaller capsulorhexis may increase the hydrostatic pressure during hydrodelineation and subsequent nuclear emulsification and may jeopardize the nuclear, epinuclear or cortical matter removal. A larger capsulorhexis, if done may not allow the implantation of the intraocular lens in the sulcus.

Hydroprocedures

Hydrodissection is contraindicated in cases of posterior polar cataracts, especially in cases where preoperative assessment is suggestive of a defect in the posterior capsule. Hydrodelineation should be achieved in these cases. Cortico-cleaving hydrodissection should not be done as this may cause a posterior capsule tear.

Nuclear Emulsification

A central trench is then sculpted. We prefer low vacuum, low aspiration and low inflow parameters to ensure a more stable anterior chamber.U/S energy 40-70%, vacuum 100 mmHg, aspiration flow rate (AFR) 20 cc/ min and bottle height of 60-70 cm is recommended. The parameters are adjusted appropriately according to the density of the cataract.

Following a continuous curvilinear capsulorhexis, multiple injections of fluid are undertaken in a controlled manner to hydrodelineate the nucleus from the epinucleus. A slow motion phacoemulsification with low irrigation (bottle height 60 cm), low flow rate (15 to 20 cc/ min) and low vacuum 60 to 80 mm Hg) are kept. The central nucleus is emulsified first and then each layer of epinucleus and cortex is sequentially aspirated layer-by-layer using partial segmentation technique. The wedge shaped cortical material is gradually aspirated till the central area of the posterior polar cataract (which may or may not have a preexisting defect) is reached. The cortical material is broken off, from approximately 3-4 mm outside the central area with the aid of a second instrument such as a chopper or a Sinskey hook. This maneuver of mechanical separation from the central plaque avoids traction or pull, which may otherwise be generated from attempting to directly aspirating the cortical matter. The penultimate layer is carefully aspirated leaving the posterior plaque along with a thin layer of the cortex. This reduces undue stress on the posterior capsule during aspiration. The posterior plaque is then viscodissected and either aspirated with the automated irrigation aspiration probe or peeled off with the help of a capsulorhexis forceps. Peeling is usually required in cases where the opacity appears to be adherent or incorporated with the posterior capsule.

The advantage of layer-by-layer phacoemulsification[10] is the availability of an adequate cushion throughout the procedure, which is available during debulking of the nucleus. Further, the visibility of the plaque is enhanced as the subsequent layers are gradually peeled off by aspiration.

If the posterior capsule is ruptured, the chamber should be filled with a dispersive viscoelastic like Viscoat before the phaco /I/A probe is withdrawn from the eye and two-port automated anterior vitrectomy should be performed. This is done with a bimanual approach. The vitrector and irrigation cannula are exchanged through the ports for adequate vitrectomy. With a high cut rate and low vacuum and flow rate, one can safely perform vitrectomy close to the torn capsule. Typical parameters are cut rate 400 cuts/ min; vacuum 200 mm Hg and AFR 20 cc/min. After vitrectomy is adequately accomplished, the cortex is aspirated the two-port irrigation aspiration approach. A posterior capsulorhexis (PCCC) may be performed if the tear is confined to the central area.

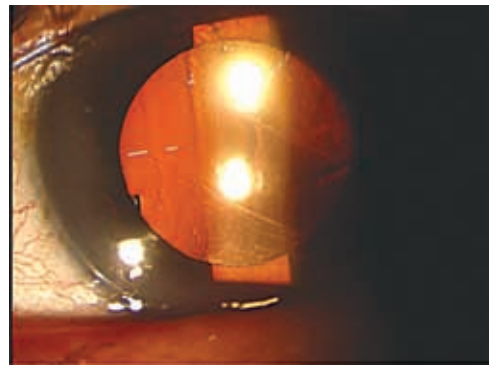


Figure 2: *Successful PCIOL Implantation in A case of Posterior polar cataract with PCR*

In eyes where the posterior capsule is compromised, the remaining capsular support is evaluated to choose the site for intraocular lens fixation. Accordingly, the IOL is implanted in the sulcus or in the bag. In-the-bag implantation of the IOL can be achieved if PCCC can be performed (Figure 2). In case of sulcus placement, it may be possible to capture the optic if anterior capsulorhexis is smaller than the optic size. We prefer a symmetrical placement of the IOL over anterior capsule.

After intraocular lens implantation, viscoelastic is removed by bimanual methods. This technique involves removal of viscoelastic in a piecemeal and gradual manner and reduces the chances of aspiration of vitreous.

Anticipating salient difficulties and adhering to surgical paradigms as described above should help the surgeon to obtain satisfactory technical outcome in a majority of these challenging cases.

Phacoemulsification is an effective and safe method to manage posterior polar cataract assisted with gentle hydrodelination and hydrodissection free phacoemulsification technique.[11] Various approaches have been suggested to minimize complications, including a bimanual microincisional approach,[12] the use of viscodissection,[13] pars plana approach,[14,15] and posterior capsulorrhexis. These approaches all address the weakness of the posterior capsule with its tendency to rupture. Since this challenge will continue to persist, different surgical approaches will continue to be offered.

Summary

- All cases of posterior polar cataract need thorough examination and counselling.
- Adequate and complete CCC should achieved.
- Hydro-procedures should be performed with caution.

Hydrodissection is avoided, delineation is a must.

- Nucleus rotation should be avoided.
- Sudden anterior chamber collapse should be avoided at all times during procedures.
- Always be prepared for vitrectomy equipment and vitro-retinal help.

References

1. Luntz MH. Clinical types of cataracts. Duane's Ophthalmology 1996;CD ROM
2. Finzi S, Li Y, Mitchell TN, Farr A, Maumenee IH, Sallum JM, Sundin O. Posterior polar cataract: genetic analysis of a large family. Ophthalmic Genet. 2005 Sep;26(3):125-30.
3. Addison PK, Berry V, Ionides AC, Francis PJ, Bhattacharya SS, Moore AT. Posterior polar cataract is the predominant consequence of a recurrent mutation in the PITX3 gene. B. Ophthalmol. 2005 Feb;89(2):138-41.
4. Maumenee IH. Classification of hereditary cataracts in children by linkage analysis. Ophthalmology 1979;86:1554-58.
5. Anon. Consultation section: Cataract surgical problem. J Cataract Refract Surg 1997;23:819–24
6. Osher RH, Yu Be, Koch DO. Posterior polar cataracts: A predisposition to intraoperative posterior capsular rupture. Journal of Cataract and Refractive Surgery 1990;16:157-62.
7. Vasavada AR, Singh R. Phacoemulsification with posterior polar cataract. Journal of Cataract and Refractive Surgery 1999;25:238-45.
8. Hayashi K, Hayashi H, Nakao F et al. Outcomes of surgery for posterior polar cataract. Journal of Cataract and Refractive Surgery 2003;29:45-49.
9. Das S, Khanna R, Mohiuddin SM, Ramamurthy B. Surgical and visual outcomes for posterior polar cataract. Br J Ophthalmol. 2008 Nov;92(11):1476-8.
10 Vajpayee RB, Sinha R, Singhvi A, Sharma N, Titiyal JS, Tandon R. 'Layer by layer' phacoemulsification in posterior polar cataract with pre-existing posterior capsular rent. Eye. 2008 Aug;22(8):1008-10.
11. Siatiri H, Moghimi S. Posterior polar cataract: minimizing risk of posterior capsule rupture. Eye. 2006 Jul;20(7):814-6.
12 J Haripriya A, Aravind S, Vadi K, Natchiar G. Bimanual microphaco for posterior polar cataracts. J Cataract Refract Surg. 2006 Jun;32(6):914-7.
13 Taskapili M, Gulkilik G, Kocabora MS, Ozsutcu M. Phacoemulsification with viscodissection in posterior polar cataract: minimizing risk of posterior capsule tear. Ann Ophthalmol (Skokie). 2007 Jun;39(2):145-9.
14 Kumar V, Ghosh B, Kaul U, Thakar M, Goel N. Posterior polar cataract surgery: a posterior segment approach. Eye. 2008 Nov 7. E-pub ahead of print
15 Ghosh YK, Kirkby GR. Posterior polar cataract surgery - a posterior segment approach. Eye. 2008 Jun;22(6):844-8.

First Author
Jeewan S. Titiyal MD

Phacoemulsification in White Cataract

Mathew Kurian *MS, DNB*

Phacoemulsification is challenging in white cataracts due to a variety of reasons. However, pre and intra-operative attention to certain specific aspects can enhance a positive visual outcome in these cases.

As with all cataract surgeries the routine pre-operative evaluation needs to be done. Numerous tests in the presence of opaque media are mentioned in all standard textbooks such as B-scan ultrasonography to reveal posterior segment pathology. Central fixation and tracking of the indirect ophthalmoscope light also is a gross indicator of a healthy macula.

Assessment of the endothelium preoperatively with a specular study or at least on the slit-lamp is mandatory. In patients with mature cataracts the endothelium may be more susceptible to surgical trauma, due to lower preoperative counts as well as greater dissipated phaco energy on account of the harder nature of these cataracts. A good quality dispersive viscoelastic should be chosen to ensure adequate endothelial protection. Intumescent cataracts requires the use of a cohesive viscoelastic to create and preserve the space, prevent anterior chamber shallowing and allow the completion of an ideal sized rhexis. Thus, the soft shell technique may be ideal for these surgeries[1].

In addition, an irrigating fluid that maintains the physiologic integrity of intraocular tissues should be used. There is evidence to suggest that irrigating solutions that contain glutathione (an effective free-radical scavenger) along with a natural buffer and an energy source like glucose are associated with less chance of corneal swelling, alteration of endothelial cell density, polymegathism and pleomorphism[2].

Wound construction comprises of two 1.5mm paracentesis for bimanual irrigation and aspiration and a 3.2 mm triplane, blue line sclero-limbal-corneal (SLIC) incision for the standard 1.1 mm phacotip, with a miniperitomy to avoid subtenons fluid collection. In the event of any intraoperative complications one can easily convert this 3.2 mm incision to a manual small incision scleral tunnel by adding back cuts from either edge of the phaco tunnel, creating scleral pouches and then extending the internal wound. The Infinity microcoaxial phacoemulsification allows surgery with a single paracentesis and a 2.2 mm main tunnel for the miniflare tip.

Adequate visualization of the surgical field is mandatory. Attempting a technically difficult surgery in a small pupil would be tempting fate. Multiple iris hooks or the Malyugin ring would give adequate view of the surgical field[3]. These devices are also useful in the cases of intraoperative floppy iris syndrome. Iris hooks can also be used to support the capsular bag in cases of pre-operative zonular weakness or intraoperative zonular dialysis.

Cataract & Refractive Lens Surgery Services
Narayana Nethralaya,
Post Graduate Institute of Ophthalmology, Bangalore

Dye assisted capsulorhexis is preferable in these cases (Figure 1). Raised intralenticular pressure tends to cause rhexis extension and is seen in white cortical cataracts with intumescent lens fibres and water clefts on slit lamp examination. On ultrasound biomicroscopy the antero-posterior lens diameter in these cases is greater than 5mm. One can minimize the chance of extension by completely filling the anterior chamber with high molecular weight viscoelastics prior to staring the rhexis. A large bore needle can be used to puncture the centre of the anterior capsule and some of the cortical matter may be aspirated to decompress the capsular bag. Microcapsulorhexis forceps also can help to complete an intact rhexis. Aiming for a small rhexis also reduces the risk of peripheral extension. A double rhexis can be performed prior to IOL implantation in such cases. In some cases with a wrinkled, calcified anterior capsule, it may not be possible to complete the rhexis and phacoemulsification may not be the surgery of choice.

With longitudinal phacoemulsification, chatter reduced holdability and followability. The Ozil Torsional handpiece with the intrepid system provides a stable anterior chamber, excellent followability and holdability and a surge free operating environment.

Morphologically white cataracts are not a single entity. They can be chalky brittle or fluffy cortical cataracts or there may be a layer of intumescent lens fibres or liquid cortex overlying a leathery brown to black nucleus. In all cases, nucleus disassembly starts with superficial epinucleus aspiration and nucleus rotation to break residual capsular adhesions.

For White chalky brittle or fluffy cortical cataracts the direct chop is preferred (Figure 2). A combination of vertical and horizontal chopping techniques may be used. Due to the absence of epinuclear support, the posterior capsule is more mobile and may

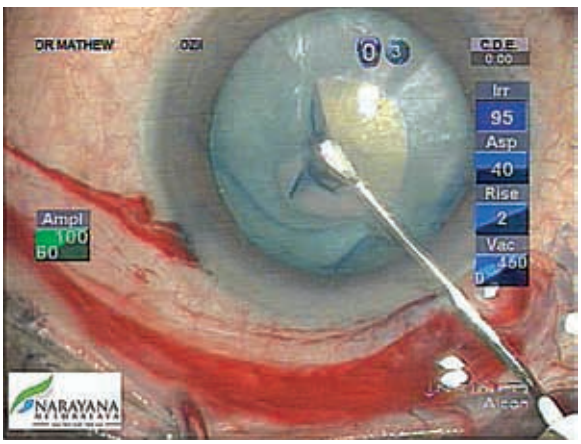


Figure 1: *Dye assisted capsulorhexis is preferable in white cataracts*

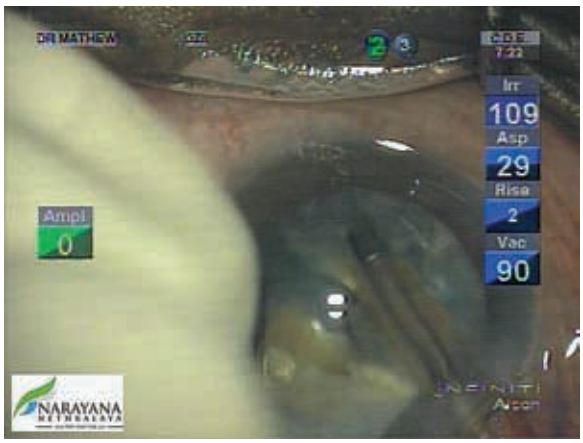


Figure 2: *For White chalky brittle or fluffy cortical cataracts the direct chop is preferred*

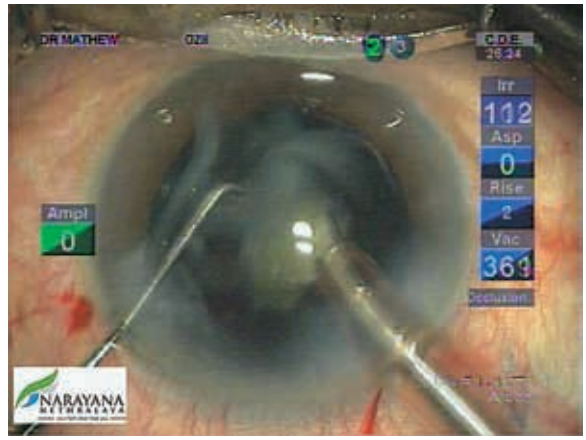


Figure 3: *Alteration of phaco parameters is not required during the emulsification of the last segment because of the superior fluidics of the Infiniti phaco machine*

be damaged especially during the removal of the last segment. In these instances, segment removal may be performed at the pupillary plane. My preferred settings for the Infiniti Phaco machine with the Intrepid system are: Torsional amplitude with a threshold of 60% and linear control to a maximum of 100%. No longitudinal phacoemulsification is used. Alteration of the parameters is not required during the emulsification of the last segment because of the superior fluidics (Figure 3).

In hard leathery cataracts the divide and conquer technique is preferred as much of the phaco energy is delivered well away from the endothelium (Figure 4). Also in these cases almost the entire lens material is nucleus and the divide and conquer technique creates space for segment separation. Proximal downslope sculpting minimises the risk of posterior capsular damage. The depth of each trench is judged by using the red glow, the orientation of fibres in the base of the trench and the depth of the adjacent trench as a guide. Trenching may be continued till the leathery posterior plated is shaved and made quite thin. Classical divide and conquer or a modified stop & chop technique may be used to separate the quadrants. Sub-chopping of the quadrants makes nucleus removal easier. Complete segment separation needs to be ensured as the posterior plate does not crack but tends to tear. Clogging of the tip is prevented by not allowing the tip to be completely impaled in the leathery material and by making the segment to carousel at the phaco tip.

For morgagnian cataracts, the direct vertical chop is preferred as the nucleus is mobile. Good holdability is mandatory as the nucleus lacks the support of the epinuclear shell. A good chopper and proper technique are also essential as the nucleus tends to rotate around the phaco tip.

The fluidic parameters on the Infiniti with the intrepid system for most cases would be as follows. The bottle height for would be between 75 to 90cm, the vacuum would have a threshold of 200 to 250 mmHg and be under linear control to a maximum of 400 mmHg, the dynamic rise would be 0 or plus 1 and the aspiration flow rate would be 35 to 40 cc per min fixed flow. I would use the

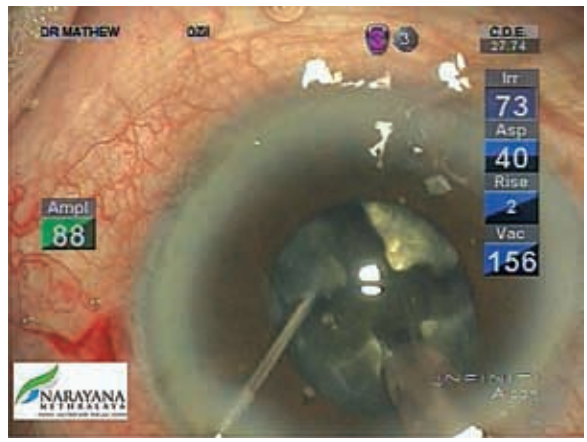


Figure 4: *In hard leathery cataracts the divide and conquer technique is preferred as much of the phaco energy is delivered well away from the endothelium*

lower parameters for surgery under topical anaesthesia and in cases of doubtful zonular integrity while in cataracts with a central leathery brown to black nucleus; I would opt for the higher parameters to prevent clogging of the phacotip.

Integrity of the bag and zonular support should be assessed prior to IOL implantation. In cases with pseudoexfoliation, associated pre or intra-operative zonular deficits a capsular tension ring would ensure long term IOL centration. In all uncomplicated, cases a wound assisted implantation technique is used for the single piece foldable IOL. A multipiece IOL is preferred in the event of intraoperative complications.

Thus phacoemulsification of white cataracts can give excellent results with adequate planning, good surgical technique and appropriate instrumentation and surgical adjuncts.

References

1. Arshinoff SA. Dispersive-cohesive viscoelastic soft shell technique. *J Cataract Refract Surg*. 1999 Feb;25(2):167-73.
2. Glasser DB, Matsuda M, Ellis JG, Edelhauser HF. Effects of Intraocular Irrigating Solutions on the Corneal Endothelium After *in vivo* Anterior Chamber Irrigation. *Am J Ophthalmol* 1985; 99:321-328.
3. Malyugin B. Small pupil phaco surgery: a new technique. *Ann Ophthalmol*. 2007 Sep;39(3):185-93

Author
Mathew Kurian MS, DNB

Congratulations

Heartfelt Congratulations to Dr. Namrata Sharma, Associate Professor, Cornea & Refractive Services, Dr. R.P. Centre for Ophthalmic Sciences, AIIMS, New Delhi & Secretary, Delhi Ophthalmological Society for receiving "***The Best of Show Award 2008"*** *from* ***American Academy of Ophthalmology*** *for 'DALK* in Hurler Schie's Syndrome.'

Dr. Jacqueline Beltz, Dr. Vishal Jhanji, Dr. Namrata Sharma, and Dr. Rasik Vajpayee for winning a trophy in 2008 **"Australasian Society of Cataract and Refractive Surgeons"**, Annual Film Festival for the DSAEK Triple – the RVEEH technique.

"**Rhett Buckler**" Award for ***Best Videos Screened*** at the 10th Annual Film Festival for the ASRS (American Society of Retinal Surgeons) held at Maui Hawaii from 11th – 15th October, 2008 for "Surgical Management of Submacular Cysticercus Cyst" Awarded to: *Dr. Cyrus M. Shroff, Dr. Ajay K. Singh, Dr. Charu Gupta*, Edited by: Dr. Neelam Atri, Shroff Eye Centre, New Delhi

Phacoemulsification in Brown Cataract

Haripriya Aravind *MS*

Phacoemulsification has become the surgery of choice for cataract extraction.[1] Nowadays, apart from immature cataracts, it is widely practiced for extraction of almost all kinds of cataractous lenses[2] including, white cataracts,[3] complicated cataracts, subluxated lenses,[4] and pediatric cataracts.[5] However, performing safe and successful phacoemulsification remains a challenge in brunescent cataracts.

The lens consists of a central hard nucleus surrounded by the epinucleus cushion. With advancing age, endonucleus volume increases with a corresponding decrease in epinucleus cushion. Using the Lens Opacities Classification System III (LOCS III) cataract classification system[6] is recommended.[7] Nuclear color (NC), or level of brown color, is the key feature relevant to phacoemulsification energy in this cataract grading system of 0.1 to 6.9 in increments of 0.1 unit.[7] The amount of energy required to emulsify increasingly hard lenses as graded on this linear scale is in fact exponential.

Performing phacoemulsification on brown cataracts (Figure 1) tests the skills and expertise of the surgeon, with high chances of complications even in experienced hands. Many would turn to ECCE or manual small incision cataract surgery,[8,9] to handle them.

Challenges in handling brown cataracts

1. None to poor red reflex makes capsulorhexis challenging.
2. Despite a complete capsulorhexis, the margins are difficult to visualise during nuclear emulsification, which increases the risk of damaging the rhexis margin.
3. Incisional burns, particularly with a clear corneal incision.
4. Post operative stromal edema. As hard nuclear fragments do not mould as well to the phaco tip, poor followability and greater chatter occur at the phaco tip excessive particulate turbulence within the anterior chamber leading to increased endothelial damage.
5. The disassembly of a hard nucleus is very difficult because the nuclear fibers are strong and densely packed. Higher U/S energy, higher vacuum, and stronger forces for nuclear separation may be needed.
6. Brown cataracts often have weak zonules, especially when the nucleus is very dense.
7. Higher chances of posterior capsule rupture- more endonucleus and less epinucleus cushion exist with brunescent cataracts. The phaco tip has to work closer to the posterior capsule, as a deep central trough is required to split the leathery posterior plate. Also with the thinner posterior capsule seen in these brown cataracts, without the epinucleus the exposed posterior capsule tends to dome towards the phaco tip further increasing the risk of capsular rupture.

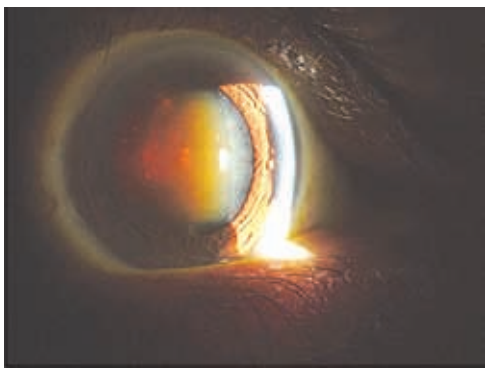


Figure 1: *Dense brown cataract with faint red reflex*

Aravind Eye Hospital
Madurai, Tamil Nadu

Anaesthesia

Local anesthesia should be considered in eyes with brown cataracts as such patients will often be uncooperative which may complicate an already difficult surgery. Moreover the surgery time may be prolonged in which case the effect of topical anaesthesia may wear out.

Local anesthesia will allow both the patient and the surgeon to enjoy a more comfortable and relaxed procedure, especially if a posterior capsule rupture or zonular dehiscence develops, necessitating a vitrectomy or posterior-assisted levitation of nuclear fragments, or if there is a need to suture a posterior chamber IOL to the sclera.

Prophylaxis/ Strategies

One should not rush as hard cataracts require time and care. Make a large capsulorhexis, which is easier to achieve in such cataracts due to the thin capsule well stretched around a large nucleus. Also, this makes hydrodissection easier and prevents capsular-lenticular block, and if one has to convert mid-way to SICS, such nuclei are easier to prolapse out through a large rhexis. If the red reflex is poor, Trypan blue dye (0.06%) is used to provide better contrast during capsulorhexis and phacoemulsification. When considering a viscoelastic, the ideal choice will be a moderate molecular weight, dispersive viscoelastic which will coat and protect the endothelium.

Ensure adequate hydrodissection and nucleus mobility before commencing phaco so as to minimize zonular stress. To avoid capsular-lenticular block, hydrodissection should be terminated as soon as the solid nucleus elevates against the capsulorhexis. The temptation to continue injecting until the migrating fluid wave completely crosses behind the nucleus should be avoided. Instead, the center of the elevated nucleus is tapped to dislodge it posteriorly before resuming hydrodissection from the opposite quadrant. A right-angled hydrodissection canulla facilitates the latter step.

During phacoemulsification always attempt to have infusion on, except for brief seconds needed to inject OVD so as to avoid

fluctuation in IOP. If the surgery time is prolonged viscoelastic is reintroduced periodically to ensure endothelial protection. When divide and conquer technique is the preferred technique, adequate power has to be used with low vacuum and flow rate so as to achieve a deep trench. Initial phaco sculpting should be very slow, and very shallow to ascertain the stability of the bag and zonules. In many instances the surgery becomes difficult because of the insufficient depth rather than going too deep so it is imperative to groove deep enough. While removing the quadrants the vacuum and the flow rates are increased and when this is combined with paused ultrasound like the pulse mode, chatter is reduced and the followability improved. The pulse mode also helps conserve the amount of phaco energy used thus reducing the incidence of wound burn.

While considering a phaco chop technique, the first challenge is to achieve a complete chop cracking the central leathery posterior plate and the second challenge is to release the first nuclear piece. A vertical chop technique is preferred over the horizontal chop in hard cataracts. A long chopper (1.75- 2mm) with a sharp tip helps attain a complete chop. In order to get a deep hold on the nucleus, a short burrow is created on the center of the nucleus and then the nucleus is impaled with the tip completely occluded. The burst mode is useful to get a good hold on the nucleus during the chop. The chopper is introduced vertically into the nucleus, while the nucleus is stabilized with phaco tip and then the tip and chopper are moved laterally so as to achieve a complete crack. If the crack is incomplete the same maneuver is repeated until a complete crack is achieved. The nucleus is then rotated through 180° and the chop is completed. Each half is then split into 3-4 fragments before they are emulsified. It might be necessary to sub chop the fragments into smaller pieces so as to reduce chatter and aid emulsification. Once the first piece is removed and emulsified, the rest of the nucleus is sub chopped into smaller pieces before emulsifying the fragments it as it gives good counter pressure for chopping.

My personal preference while handling these dense cataracts is the use of isolated continuous torsional ultrasound (Alcon Infiniti machine with OZil) for the phaco chop technique. Parameters for a 3mm incision, high infusion sleeve, Kelman tip include

- Torsional ultrasound- 100% continuous
- Flow rate- 40 ml/min
- Vacuum- 450 mmlHg
- Bottle height- 110 cms

While chopping I prefer to use the torsional ultrasound on panel mode as this ensures a good hold on the nucleus. In order to achieve a complete crack the tip has to be impaled on the lower third of the central nucleus ensuring complete occlusion. While dealing with hard cataracts, its better to have more of the phaco tip exposed, about 1.5mm as this helps to achieve a hold on the lower aspect of the nucleus. It will also make a difference to use sharp phaco tips in these cases so a few tips can be set aside to handle these cataracts. The most important aspect to achieve a complete chop is to have a good hold on the nucleus and in order to achieve that all of the above factors such as sharp tip, retracted sleeve and deep complete occlusion play a major role. If using traditional ultrasound the burst mode helps to get a firm hold on the nucleus.

Once the pieces are separated, I switch to linear mode so that there is more control during fragment emulsification. The pieces have to be as small as possible as this minimizes chatter and thus endothelial damage. During fragment emulsification the bevel of phaco tip should be at the pupillary plane and face sideways so that there is less chance of endothelial damage and at the same time there is good visibility. While removing the last piece the chance of posterior capsular rupture is higher as the epinuclear cushion is either very thin or absent. Hence the flow and the vacuum parameters have to be lowered so that there is better chamber stability and less chance for the posterior capsule to trampoline towards the phaco tip.

Another option in these cataracts is the stop and chop technique where the initial trench creates enough space within the capsular bag for manipulation and then the rest of the nucleus is chopped and emulsified thus reducing phaco energy compared to the divide and conquer technique. In hard cataracts cortex is minimal compared to the softer lenses so cortex aspiration is quicker but all the same the posterior capsule is thin so care should be taken.

Postoperative examination gives us an indication whether our plane of emulsification was too close to the endothelium and whether there was turbulence in the anterior chamber. Based on the intra-operative comfort and post op picture, we can modify the parameters so as to target clear cornea on post op day 1.

In conclusion, by observing a few precautions as mentioned above, the management of a dense nucleus can almost be routine and very satisfying.

References

1. Emery JM. Phacoemulsification-cataract surgery of the future: Int Ophthalmol Clin 1978; 18(2):155-170 1.
2. Vasavada A, Singh R. Surgical techniques for difficult cataracts. Curr Opin Ophthalmol1999; 10(.1):46-52
3. Hiles DA. Phacoemulsification of infantile cataracts. Int Ophthalmol Clin 1977; 17(4):83-102 1
4. Vajpayee RE, Bansal A, Sharma N, et al. Phacoemulsification of white hypermature cataract. J Cataract Refract Surg 1999; 25:1157-1160
5. Morley MG. Pars plana lensectomy for primary extraction and removal of lens fragments. In: Steinert RF, Cataract Surgery: Technique, Complications, & Management. Philadelphia, PA, WE Saunders, 1995; 192- 198
6. Chylack LT Jr, Wolfe JK, Singer DM. The Lens Opacities Classification System III. Arch Ophthalmol 1993; 111:831-836.
7. Davison JA. Phacoemulsification of hard cataract. In: Buratto L et al, Phacoemulsification Principles and techniques 2nd edition, 2003; 551-553.
8. Ogino K et al. Effect of Phacoemulsification using the Divide and conquer technique on corneal endothelium. J Jpn Soc Ophthalmic surgeons 1991; 4:665-668.
9. Gonglore B, Smith R. Extracapsular cataract extraction to phacoemulsification: why and how? Eye 1998; 12:976-982.

Author
Haripriya Aravind MS

Phacoemulsification in Phacomorphic Glaucoma

R. Ramakrishnan MS, DO, Devendra Maheshwari MS

Phacomorphic glaucoma a common entity in developing countries like India owing to decreased awareness of the cataract, delaying its removal. Cataract extraction is the only definitive treatment for an intumescent cataract[1].

Cataracts in eyes with a very shallow anterior chamber and high intraocular pressure (IOP) present difficult situations during phacoemulsification. In eyes with phacomorphic glaucoma, swelling of the lens leads to a progressive reduction in the iridocorneal angle. Angle closure may be secondary to a pupillary block mechanism or it may be due to forward displacement of the lens–iris diaphragm. Pupillary block glaucoma is caused by changes in the size of the crystalline lens and its relatively anterior position.

Symptoms

- Patients with phacomorphic glaucoma complain of acute pain, blurred vision, rainbow-colored haloes around lights, nausea, and vomiting.
- Patients generally have decreased vision before the acute episode because of a history of a cataract.

Signs

- High intraocular pressure (IOP) - Greater than 35 mm Hg
- Mid-dilated, sluggish, irregular pupil
- Corneal edema
- Injection of conjunctival and episcleral vessels
- Shallow central anterior chamber (AC)
- Lens enlargement and forward displacement
- Unequal cataract formation between the 2 eyes

Causes: Certain factors predispose a patient to phacomorphic glaucoma, as follows:

- Intumescent cataract
- Traumatic cataract
- Rapidly developing senile cataract
- Phacomorphic glaucoma is more common in smaller hyperopic eyes with a larger lens and a shallower AC.
- An angle-closure attack can be precipitated by pupillary dilation in dim light. The dilation to midposition relaxes the peripheral iris so that it may bow forward, coming into contact with the trabecular meshwork, setting the stage for pupillary block. Angle closure is also facilitated by the pressure originating posterior to the lens and the enlargement of the lens itself.
- Zonular weakness secondary to exfoliation, trauma, or age can play a part in causing phacomorphic glaucoma.

There is an increased risk intraoperatively for peripheral capsulorhexis tears, corneal decompensation, iris prolapse, and intraoperative suprachoroidal hemorrhage, posterior capsule tear due to positive vitreous pressure Postoperatively there may be elevated IOP,fibrinous reaction,poor visual outcomes related to irreversible optic nerve head damage.

Preoperative Evaluation

Successful postoperative outcome is more likely when surgery is performed in quiet eye. Bscan ultrasonography is essential to rule out any posterior segment pathology . Assessment of corneal endothelial count to determine risk of corneal decompnsation is optional .

Preoperative IOP reduction should be performed by using systemic osmotic agent (Glycerol , intravenous mannitol , oral acetazolamide and a combination topical beta blocker and alfa agonist .Topical steroid must be priscribed to decrease anterior chamber inflammation.[2]

If the intra ocular pressure has been elevated for long time with complete synechial closure of the angle and IOP not controlled by medical treatment a combined procedure – phacotrabeculectomy or extra capsular cataract extraction in conjuction with trabeculectmy may be indicated to control IOP. Adjunctive use of subconjuctival MMC (0.2-0.4mg\ml for 2 minute) must be used if a combined surgery is planed . Patient should be explained about risk of surgery and prognosis for visual outcome.

Surgical technique: A shallow anterior chamber with elevated IOP, complicated multiples surgical steps . Choice of surgical technique depends on various considerations. ECCE requires a large incision in a globe with very high IOP, which increases the risk of sight threatening complications such as expulsive hemorrhage[3,4] the surgical steps are technically more challenging and may be complicated by iris tissue prolapse through the large limbal wound.

It has been shown that MSICS gives better uncorrected vision compared to ECCE due to higher postoperative astigmatism in ECCE.[8] Ruit et al found both phacoemulsification and SICS achieved excellent visual outcomes with low complication rates. SICS is significantly faster, less expensive, and less technology dependent than phacoemulsification.

Cataracts in the developing world.[6,] SICS may be the more appropriate surgical procedure for the treatment of advanced cataract. Venkatesh et al reported MSICS to be safe and effective for management of phacolytic glaucoma.[7]

- Advantages of SICS
- Safe techniques
- Economic

Aravind Eye Hospital
Tirunelveli, Tamil Nadu

- Less intraoperative complications
- Less astigmatism,
- Cases with high IOP can be taken up for surgery

Phacoemulsification is difficult in phacomorphic glaucoma because, there is an increased risk for peripheral capsulorhexis tears, iris prolapse. Phacoemulsification is preferred being a small incision surgery with relatively closed chamber system thereby controlling the anterior chamber depth and safe. Phacoemulsification in phacomorphic glaucoma is more challenging .CCC is technically more difficult owing to increased convexity of anterior capsule leading to extension of tear .The risk of endothelial cell loss is also greater because of close proximity of the phacotip during the nucleus emulsification as well as by the reduced endothelial reserve count .The chances of suprachoroidal hemorrhage are high due to rapid fluctuation of IOP during the procedure .Overinfusion of any OVDs increase the risk of iris prolapse and IOP elevation hence should be avoided.20% mannitol (1- 1.5 gm\kg\body weight) should be given 30 to 60 minute before surgery to lower the IOP and increasing anterior chamber depth .

The use of a sutureless, small-gauge, pars plana partial-core vitrectomy as an effective technique to overcome these problems. The controlled debulking of anterior vitreous with decrease in vitreous pressure leads to posterior displacement of lens resulting in deepening of anterior chamber and facilitating the surgical manipulation with in the anterior chamber .but the limitations of this technique are that direct visual control is often not possible because of the dense cataracts and there is a small risk for retinal detachment, as reported after small-gauge vitrectomy for various posterior segment disorders.[9] Chang et al reported technique to deepen the anterior segment prior to phacoemulsification in these eyes are by the use of parsplana vitreous tap.[10, 11] Once the IOP is controlled and anterior chamber stabilizes then routine temporal clear corneal phacoemulsification can be performed leaving superior site for trabeculectomy in future. High Molecular weight viscoelastics can also be used to deepen shallow anterior chamber, but is effective only after positive pressure has been relieved through vitrectomy.Viscoat (combination of sodium hyaluonate and chondritin sulphate) and chilled BSS Plus can be used to protect corneal endothelium during phacoemulsification. A small pupil encountered during surgery could be managed by various techniques to manipulate pupil size by the use of iris hooks, stretch pupilloplasty or mini sphincterotomies.

In absence of red fundus glow in such intumesecnt cataract a trypan blue dye enhanced continuos curvilinear capsulorhexis is helpful.[11]Alternatively the intumesecnt cataract can be decompressed by filling anterior chamber with viscoelastics and a 30 Gauge needle is used to aspirate liquid cortex which reduces intralenticular pressure facilitating capsulorhexis. In presence of any subluxation or intraoperative zonular dialysis Endocapsular capsular ring should be implanted after assessing amount of zonular dialysis.

During phacoemulsification stress on corneal endothelium and touching the iris should be avoided . Lower ultrasound power ,aspiration flow rate and increased bottle height are must and phaco chop with burst mode is preferred as it transmits minimum force to the zonules and reduces requirement of ultrasound energy. Irrigation aspiration must be done gently and is best done using bimanual technique.[12] The foldable lens either acrylic or silicone are preferred. Heparin coated lens reduces post operative inflammatory response especially in early post operative period.The viscoelastics should be completely removed to prevent any postoperative IOP spikes particulary after use of high viscosity viscoelastics.

Post Operative Management

In postoperative period meticulous follow up is warranted to look for postoperative anterior chamber inflammation and any IOP spike. Frequency of topical steroid should be increased to ½ hourly and additional antiglaucoma medication should be added on first postoperative day. If a sutureless vitrectomy or vitreous tap has been performed as mentioned ,an indirect ophthamoscopy must be perfomed to check the site of entry to rule out any retinal tear or dialysis On subsequent follow up IOP estimation, optic nerve head evaluation and visual fields should be performed.Fellow eye should be evaluated to rule out glaucoma. Patient belonging to remote areas who may not come back for follow up should undergo other eye surgery to prevent occurrence the of phacomorphic glaucoma.

Conclusion

In conclusion, phacoemulsification in phacomorphic glaucoma is challenging and requires special intra and postoperative considerations. A small gauge vitrectomy or vitreous tap performed prior to phacoemulsification, significantly enhance the ease of surgery. The visual out comes depends upon the duration of phacomorphic glaucoma , shorter the duration,better the visual out come ,the health of optic nerve head, corneal clearity,and inflammatory deposits on intra ocular lens . Long term followup is required to keep check on the IOP of the patient as some of cases may need antiglaucoma medications and filtering surgery to achieve target pressure.

References

1. Jain IS, Gupta A, Dogra MR, etal. Phacomorphic glaucoma – management and visual prognosis. Indian J Ophthalmol 1983; 31(5):648-53.
2. O'Keeffe M, Nabil M. the use of mannitol in intraocular surgery. Ophthalmic Surg 1983;14(1):55-6.
3. Mckibbin M,Gupta A, Atkins AD. Cataract extraction and intraocular lens implantation in eyes with phacomorphic or phacolytic glaucoma. J Cataract Refract Surg 1996; 22(5):633-6.
4. Prajna N V, Ramakrishnan R, Krishnadas R, etal. Lens induced glaucomas-visual results and risk factors for final visual acuity. Indian J Ophthalmology 1996;44(3): 149-55.
5. Pradhan D,Henning A,KumarJ,etal. A prospective study of 413 cases of lens-induced glaucoma in Nepal. Indian J Ophthalmology 2001; 49(2):103-7.
6. Ruit S, Tabin G, Chang D, Bajracharya L, Kline DC, Richheimer W, Shrestha M, Paudyal G A prospective randomized clinical trial of phacoemulsification vs manual sutureless small-incision extracapsular cataract surgery in Nepal.Am J Ophthalmol. 2007 Jan;143(1):32-38. Epub 2006 Sep 5.
7. Venkatesh R, Tan CS, Kumar TT, Ravindran RD. Safety and efficacy

of manual small incision cataract surgery for phacolytic glaucoma.Br J Ophthalmol. 2007 Mar;91(3):279-81.

8. Venkatesh R, Das MR, Prashanth S, *et al*. Manual small incision cataract surgery in White Cataracts. *Indian J Ophthalmol* 2005;53:181–4.

9. Data T, Gadia R, Aggarwal A, Kumar S, etal. Suture less, single port transconjunctival pars plana limited vitrectomy combined with phacoemulsification for management of phacomorphic glaucoma.J Cataract Refract Surgery 2007.

10. Chang DF. Pars plana vitreous tap for phacoemulsification in the crowded eye. J Cataract Refract Surg 2001;27(12):1911-4.

11. Jacob S, Agarwal A, Agarwal A, Agarwal S etal. Trypan blue as an adjunct for safe phacoemulsification in eyes with white cataract. J Cataract Refract Surg 2002;28(10):1819-25.

12. Masket S(Ed). Consultation section; cataract surgical problem. J Cataract Refract Surg 2000;26:12-20

First Author
R. Ramakrishnan MS, DO

DOS Election

Applications are invited from Delhi Members of **Delhi Ophthalmological Society** for the posts of : ***Vice President*** *(1 Post)*, ***Secretary*** *(1 Post)*, ***Joint Secretary*** *(1 Post)*, ***Treasurer*** *(1 Post)*, ***Editor*** *(1 Post)*, ***Library Officer*** *(1 Post)*, ***& Executive Member*** *(8 Posts)*.

The eligibility criteria for different Posts prescribed in DOS Constitution (1998) will be followed. Application should be submitted on a plain paper duly proposed and seconded by a member of DOS (not in arrears). Application should reach Secretary Office latest by 21st January, 2009 (2 p.m.). Last date of withdrawal is 21st February, 2009 (5 p.m.) Election will be held during the Annual DOS Conference on 22nd March, 2009.

Secretary, DOS

DOS Election

If you want to VOTE in the forthcoming DOS Election, Please ensure that your correct address (office and residential) is available at the DOS secretariat by 25th January, 2009. Outstation members are not permited to vote in DOS Election.

Secretary, DOS

Resolutions / Suggestions for General Body Meeting

DOS members are requested to send us their **suggestions or resolutions** to be discussed in the general body meeting to be held on 22nd March, 2009. These will be discussed first in the executive meeting and then forwarded to **General Body Meeting.** Last date of receipt 21st January 2009.

– Secretary DOS

Answer Quiz No. 5

1. ARGON 2. DIODE 3. KRYPTON
4. EXCIMER 5. MONOCHROMATIC 6. PHOTOCOAGULATION

Extra Word: LASERS

Phacoemulsification in Small Pupil

Arup Bhaumik *MS*

Phacoemulsification in small pupil is considered a challenge to all cataract surgeons. Often complications like iris damage, PC rent and vitreous prolapse jeopardize the final outcome of the surgery.

Small pupil is used to describe a pupil diameter equal to or less than 4 mm. Small pupil is mainly of two types:

- Hyporeactive (functional)
- Fixed (anatomical)

Preoperative examination: It is very important to examine the eye carefully by a good slit lamp biomicroscope for areas of iris atrophy. Post synechia, pupillary membrane and condition of iris parenchyma. It is also important to measure exact dilatation of the pupil after instillation of mydriatic eye drop. Assessment of hardness of cataract is also noted. It is very important to note central AC depth & also corneal endothelial status.

Operating strategies

Small pupil can be mechanically dilated by various ways. Surgeon should decide the strategies of operative procedure. Following techniques can be applied either individually or combined.

- Viscomydriasis
- Synechiolysis
- Pupillary stretch
- Pupil dilators

Viscomydriasis

Pupil is temporarily dilated when anterior chamber tamponade is done with viscoelastic (VES)

It is believed that high molecular viscoelastic such as Healon GV or Healon are best for this purpose

When the surgeon exerts pressure on the posterior lip of surgical wound, the cohesive VES may escape from the anterior chamber and must be replaced.

Convary to conventional beliefe, I prefer dispersive viscoelastic (VISCOAT) for viscomydriasis because it never escapes from anterior chamber in minor to moderate manipulation.

Synechiolysis: When the pupil is fixed by posterior synechia, synechiolysis is almost always required to create greater or more uniform mydiasis. Synechiolysis should be done by blunt instruments or viscoelastic substances.

Pupillary stretch

The pupil can be stretched by two hook like instruments, introduced into viscoelastic filled anterior chamber through sideports.

There are a number of hooks (osher work, iris retractors, Graethers button-tipped hook) which have been developed from the surgical need to stretch the pupil outward without damaging or tearing it.

This method will almost certainly achieve satisfactory mydriasis. However, stretching often damage sphincter, tears sphincter which eventually lead to post operative persistent mydriasis or irregular pupil.

Pupil dialators

Hook: Even after stretching it may so happen that pupil does not reach sufficient mydriasis because of the lack of iris tone and can

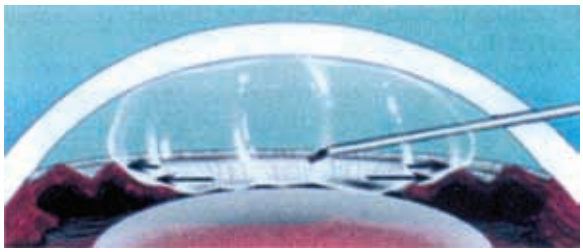


Figure 1: *Viscomydriasis*

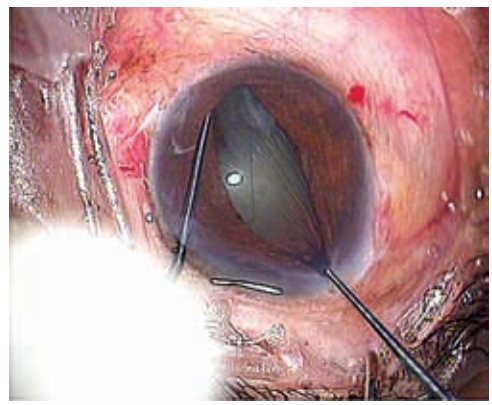


Figure 2: *Pupillary Stretch*

Disha Eye Hospitals
Kolkata, West Bengal

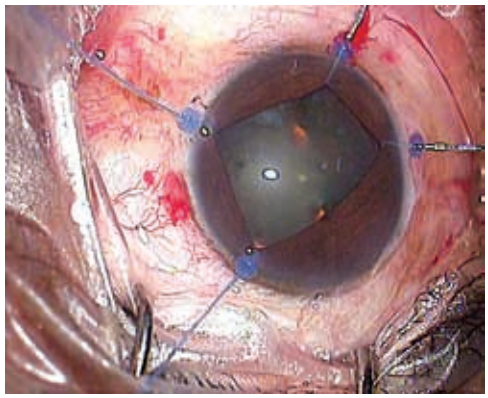


Figure 3: *Square pupil-Iris hook*

create the risk of the iris being snagged by the phaco tip. In these cases the surgeon should use dilating hooks or iris ring.

The most famous hooks are those designed by De Juan and by Mackool.

The De Juan hook consists of segment of monofilament nylon thread, that is curved at one end. A small silicon device is fixed on the segment to block it at desired length. These hooks are inserted through limbal paracentesis wounds, hooked to the pupil edge, following centrifugal retraction, the silicon device is blocked on the limbus at the required distance. Normally four hooks are positioned producing a square-shaped pupil.

Ring

Siepser's hydrogel ring can be used for pupillary dilatation. This ring when dehydrated, has an irregular oval shape and is easily introduced into anterior chamber through 3 mm incision. When hydrated it expands and is positioned over the pupil using a manipulator hook. It can be easily removed by same tunnel by simple pulling.

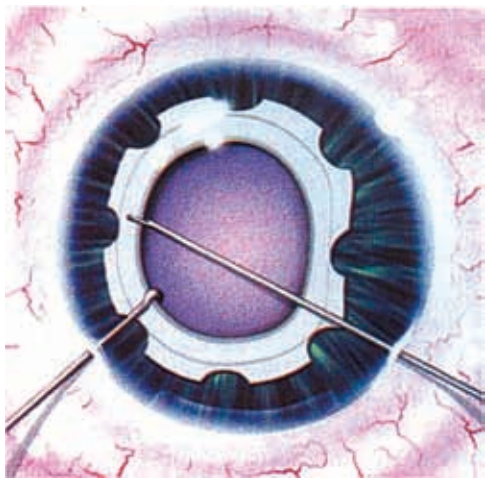


Figure 4: *Siepser's hydrogel ring*

So, there are several ways to mechanically dilate the pupil. Once pupil is dilated phacoemulsification is almost like normal surgery. Only we should keep in mind about IRIS. Because iris may loose its tone during mechanical dilatation procedure. Mechanical dilatation may damage sphincter muscle which eventually leads to post operative persistent mydriasis.

The advent of very efficient and high end phaco -machine like infinity® with ozil hand piece and excellent viscoelastic like viscoat, phacoemulsification in small pupil has became a comfortable reality even without mechanical dilatation of the pupil. Advantages of this technique are that the function and the anatomy of the pupil is fully preserved.

Most important step is to do *capsulorhexis* because it has to be complete even done somewhat blindly under the iris. Viscomydriasis is done before starting of capsulorhexis. Sometimes it may be easy to do a rhexis of 2 mm greater than the pupil diameter by using pupillary edge as a fulcrum. The surgeon use forceps to pull tangentially and upwards. The two forces will create a more peripheral rhexis with respect to the pupil, but pulled centripetally by the clearly visible folded capsular flap above the pupil itself. So friction of capsular flap and the pupil margin prevent run away of rhexis. Under these apparently critical conditions, good rhexis will actually be an easy procedure. In order to prevent escape, the anterior chamber depth must also be kept constant. With a miotic pupil, as the rhexis proceed it will also be possible to move the iris edge to the desired position using a push pull forceps or hook like instrument introduced through sideport incision. This will permit a wide rhexis, directly displaying the anterior capsule to release fluid.

In small pupil *hydro dissection* is also relatively blind procedure because wave produced by fluid are not clearly visible. The introduction of the canula and its progress along the anterior face of the lens, under the capsule depend largely on the surgeons experience. As rhexis is small there is increased chance of capsular block, care must be taken to prevent capsular block by frequent pressing of nucleus in central part.

Go slow is the added skill the surgeon should master for phacoemulsification in small pupil.

I prefer direct chop technique after making a small crater at the centre of the nucleus.

Import steps during phaco emulsification

- All parameters should be lower than usual settings.
- Vertical chopping is preferred over horizontal chopping because here horizontal chopping is a blind procedure.
- Bevel of phaco tip is turned down ward, (which eventually increases efficiency and reduce iris catch during surgery).
- Emulsification of quadrants of nucleus should be done at centre of pupil, keeping phoco tip downward.
- Liberal use of viscoelastic substance.

- Retraction of pupil margins has to be done for proper visualization of rhexis magin.
- Last quadrant of nucleus is emulsified in anterior chamber after proper protection of corneal endothelium with viscoelastic.

Cortical aspiration is not difficult if performed with patience. Capsular ruptures are not uncommon during this phase particularly when the pupil is small. My preference is bimanual irrigation-aspiration than coaxial probe as pupil margin can be retracted by irrigation probe. It is almost always easy to remove the cortical material, starting to exfoliate it from the edge of the bag, continuing towards the centre and looking for occlusion of the cortex towards the anterior capsule. In this stage also parameter should be kept lower than usual values.

Choice of IOL is important in these types of surgeries because the main problem lies with the visualization of the capsulorhexis which will not permit observation of the IOL position.

It is very import to prepare the eye with VES apporopriate to the specific type of lens. Most of the eyes subjected to an operation with narrow pupil are either hyperopic eyes or having anti glaucoma medication or post uveitic cataract.

Considering all factors, ease of implantation and gentle unfolding, my preference is Acrysof single piece/Natural IQ 'IOL'. Chance of capsular contracture and capsular phimosis are also minimized with these particular lenses.

At last *viscoelastic must be removed* as completely as possible. The removal of VES from the capsular bag may prove difficult in the eye having small pupil and limited capsularrhexis but it is possible if done patiently.

Pearls for phacoemulsification with Narrow pupil

- Proper preoperative examination.
- Preoperative evaluation of maximum possible mydriasis.
- Use medication that will produce maximum mydriasis.
- Consider the use of adrenaline in the anterior chamber and bottle.
- Use appropriate VES abundantly.
- Combine a number of technique to achieve optimal mydriasis, with the objective of proceeding surgery under condition of safety without permanently compromising the pupil and its function.
- Keep all parameters slightly on lower side.
- Go slow and wins the race is the moral of the story.

Author
Arup Bhaumik MS

Erratum

Please read "Differential diagnosis of posterior uveitis" instead of "Common bacterial ophthalmic infections". Vol. 14, No. 4, October, 2008, DOS Times in the tear sheet.

Phacoemulsification in Soft Cataract

V.C. Mehta MS, DOMS

The cataract surgical techniques and the IOL technology have advanced significantly in the recent times. The cataract patient now enjoys a painless surgical experience and recovers good quality vision in a very short time. The newer IOLs like Toric, Multifocal, and Aspheric IOLs combined with excellent Phaco machines like Alcon Infinity; AMO Signature etc. have prompted many surgeons to consider cataract surgery as refractive surgery. Prelex and Refractive cataract surgery is on the rise. This means we will now deal with 'soft cataracts' more often than in the past.

In this context, the topic becomes very important. In the refractive cataract surgery, the procedure should be safe, with minimum complication rates.

The word "soft cataract" puts a smile on the phaco surgeon's face. Rightfully so, as most of these cataracts are easy to manage, very often without even spending any ultrasonic energy in the eye. However simple these cases may appear, it is important to understand the tactics involved in dealing with soft cataracts. Rarely these cases may pose a real challenge to the phaco surgeons, especially in small pupil and/or small CCC.

The challenges posed by the soft cataracts are:

- Difficult to crack or divide.
- Difficult to hold with phaco tip.
- Difficult to rotate the nucleus.
- Paracenter settings required are different.

The good news is that the soft cataract can be easily aspirated and doesn't acquire the complex techniques of chopping and cracking.

Following are the steps of the surgery with few tips and pearls to achieve the best possible results:-

Anesthesia & Draping

Topical anesthesia should be the choice since this avoids an injection with its potential though rare complications.

Draping under topical anesthesia poses a challenge. Since the lids are not flaccid, draping is difficult under topical anesthesia.

The purpose of draping is to isolate the eye from lid margin, eyelashes, and the surrounding skin. For draping under topical, a pre-sterile adhesive drape, cut into a strip of 2" breadth is used to tape the eyelashes of upper and lower lid.

Having done this, second adhesive drape is then used to cover these. The eye should be open while doing this .When the drape is cut in the centre and the speculum is inserted the eyelashes, eyelids, and skin are covered by the sterile drape as shown in (Figure 1).

Incision

Clear corneal temporal incision is of choice as it offers enough room to operate even in small palpebral fissure and prominent eyebrow.

2.2 mm keratone is of choice. The knife should dissect at least 1.5 mm into clear cornea. This creates square wound architecture, and makes the wound water light (Figure 2 & 3). Following are the peals for incision making.

- Sharp knives should be used.
- Incision to be created on firm eyes.
- 2 side ports on either side of main incision.

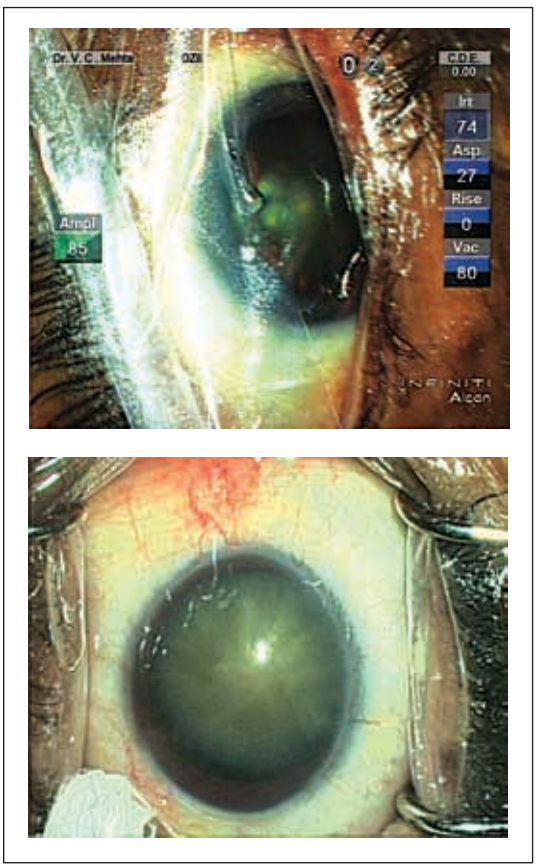


Figure 1: *Draping: note the covering of Eye Lashes*

Mehta Eye Clinic
Jayant Arcade, 3rd Floor,
Rajawadi Junction, M.G. Road,
Ghatkopar-(E), Mumbai

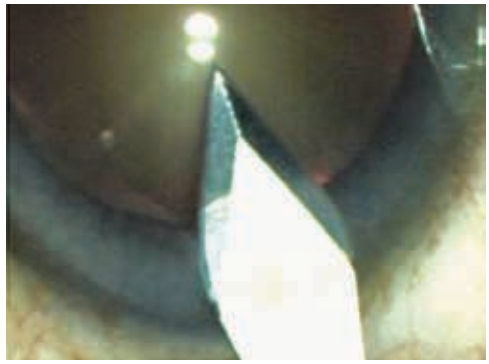


Figure 2: *Sharp Keratome*

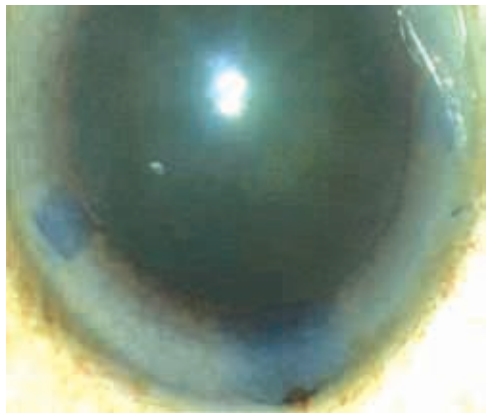


Figure 3: *Square Incision*

Figure 4: *CCC with Needle*

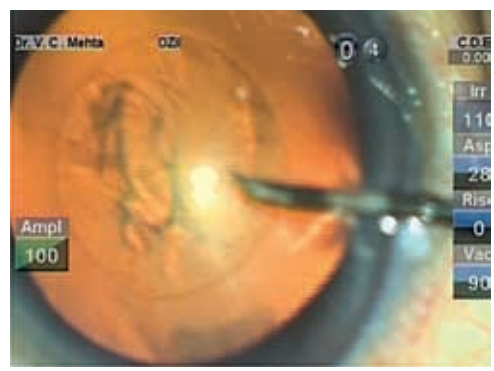


Figure 5: *CCC Completed*

Capsulorrehxis

To get a CCC the AC must be filled with visco elastic and CCC can be achieved either with needle from side port or forceps through the main incision. If at any stage the AC becomes shallow, one should refill the chamber and then proceed with CCC. Remember the continuity is important, shape is not. Adequate size of CCC would be 5-6 mm. (Figure 4&5).

Following are the peals for creating a good CCC.

- Anterior capsule should be made flat with adequate OVD in the eye.
- Size of CCC should be smaller than 6 mm so that anterior capsule overlaps the optics of the IOL all around.
- CCC should be central in position.

Hydroprocedure

The sole deciding factors which will determine the ease with which these cataracts will proceed is Hydro-Procedure.

Hydro-procedure is the single most important step in dealing with soft cataract. This step therefore deserves utmost attention and should be dealt with properly. The hydro-procedure will separate the epinucleus and nucleus complex thoroughly from the capsule. This complex can thus be easily rotated and aspirated. Inadequate hydro-procedure will result in leaving behind the subincisional epinucleus and nucleus which is difficult to rotate and make it accessible to phaco-tip. If the pupil constricts, the subincisional part of cataract will demand significant skill and patience.

Before proceeding with hydro-procedure it is advisable to remove the visco from the chamber (Figure 6 & 7). Which was abundantly used during the previous step of CCC. Hydro procedure is easier if the eye is somewhat soft & anterior chamber partially emptied.

For hydroprocedure to be effective, sufficient hydrostatic force must be generated.As the amount of fluid that can be injected in the AC is limited the fluid jet should be brief,sufficiently forceful &

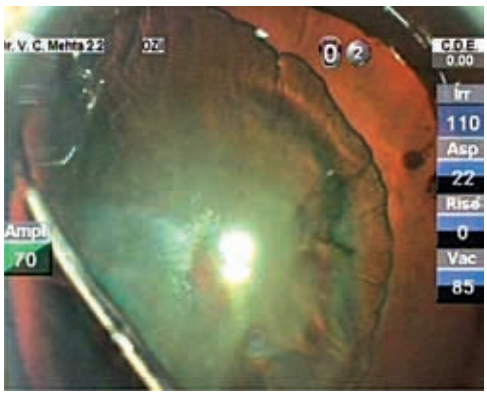


Figure 6: *Hydrodissection*

Figure 7: *Burping of Visco*

Figure 8: *Stop and Chop Tech*

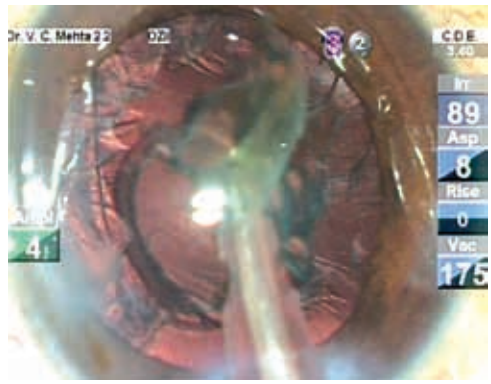


Figure 9: *Epinucleus removal*

radially directed. This can be achieved with 27 or 30 G cannula attached to 3 cc syringe.

Hydrodissection can be achieved by tenting the anterior capsule slightly upwards with cannula tip & the fluid is directed along the inside contour of the capsular bag. This produces a slow wave as the fluid shears through the cortico-capsular adhesions. As opposed to this, a rapid wave without any resistance signifies hydro-delineation, ie separation of endo nucleus from epi nucleus. Ideally in Soft Cataract, both should be achieved creating two golden rings.

Pearls of Hydroprocedure

- Burp out the visco before initiating hydro.
- Sufficient force and quantity, is the right plane to separate epinucleus from capsule.
- Tap the nucleus to release the trapped fluid behind the nucleus.
- Try to get two golden rings, one for epinucleus and other for nucleus.

Nucleus Management

This is the easiest step of Phaco in soft cataract. Very often, this can be achieved with using any u/s power. If necessary stop and chop technique is best suited for soft cataracts (Figure 8).

As soon as trenching is initiated, the surgeon must judge the softness of the nucleus and set the parameter settings of the machine accordingly.

The usual settings for trenching are as follows,

- Bottle height —110 cm
- Vacuum — 85 mm Hg
- Flow rate — 22 cc
- Power — 70 OZIL

If the surgeon finds that the nucleus is very soft, it is advisable to step down on all parameters. Usually the parameters set for epinucleus will be sufficient to handle the nucleus in such soft cataracts.

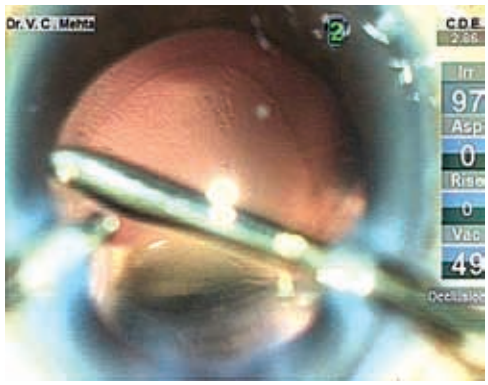


Figure 10: *Polishing of ant. Cap*

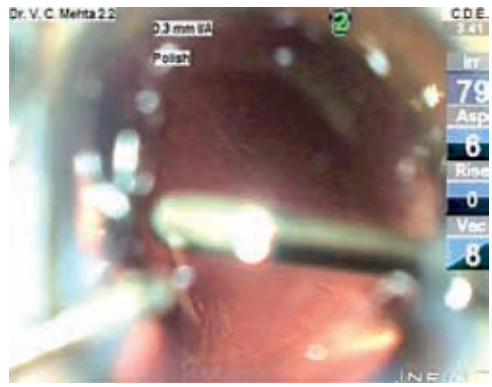


Figure 11: *Polishing of PC*

Pearls for Nucleus Management

- Adjust the machine parameters, depending on the softness of nucleus. For very soft nucleus, shift to the epinucleus parameters.
- Employ stop and chop technique.
- Ensure complete separation of pieces.
- While removing the last piece, step down (shift to epinucleus) the parameters.

Epinucleus Management

Hydro procedure determines the case of epinucleus removal. A well-done hydro dissection will make the epinucleus fold on itself and will be aspirated easily. (Figure 9) An incomplete hydro dissection causes the epinucleus to break and leaves behind the proximal part.

Cortex Removal and Capsule Polishing

One of the aims for refractive cataract surgery is to prevent capsular opacification, both anterior and posterior. (Figure 10 & 11) Bi-manual system helps in achieving this objective. In a Bi-manual system, there are no subincisional cortex problems since the hands can be changed.

Thorough cortical cleaning is necessary. Polishing of posterior capsule and the under surface of anterior capsule is of paramount importance in preventing PCO and anterior capsule phimosis.

Since we aim at smaller CCC (4.5 – 5 mm) for the anterior capsule overlap on the optics, polishing the undersurface of the anterior capsule becomes mandatory.

Vacuum Polishing can achieve this at low vacuum (30-50 mm Hg) in Bi-manual system.

IOL Insertion

I use Alcon IOLs like IQ, Toric, and Restor, which go through 2.2 mm incision, with the injector system. Prior to IOL insertion, the anterior chamber and the capsular bag should be inflated with OVD.

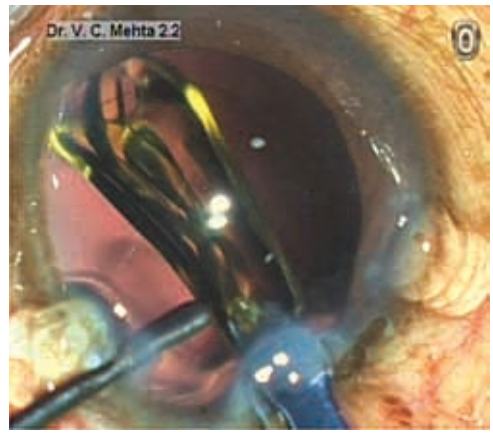


Figure 12: *IOL insertion thro 2.2mm Incision*

While injecting the IOL through 2.2 mm, the cartridge sits at the wound and doesn't go through it. Some amount of chamber loss can occur before the IOL enters the eye. It is therefore important to fill not only the anterior chamber but also the capsular bag with OVD. This prevents the IOL rubbings against the posterior capsule during its insertion and prevents a possible PC tear.

VISCO Removal

Once the IOL is in place, removal of VISCO from the anterior chamber and from behind the IOL is important, especially for Toric IOLs. (Figure 13)

For removing the OVD from behind the IOL, the aspiration tip centre is put behind the IOL. The irrigation tip remains in front of IOL, preventing the undue tilting of the IOL. The VISCO can be aspirated with low vacuum of 50-120 mm Hg.

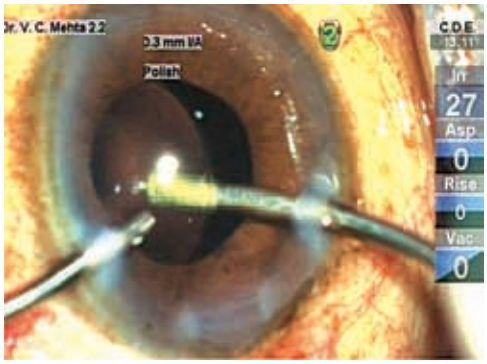


Figure 13: *Visco Removal from behind the IOL*

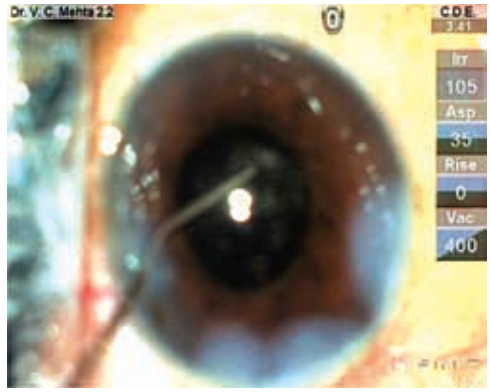


Figure 15: *AB Injection in cap bag*

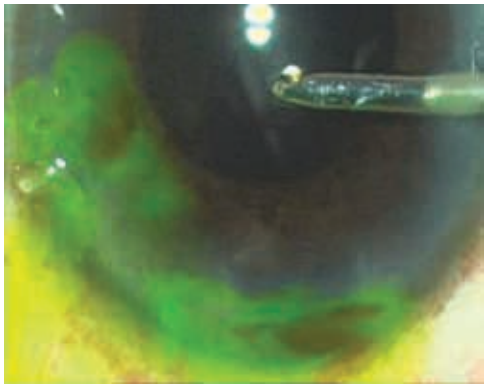


Figure 14: *Siedel Test for Incision Leakage*

Incision Closure

It is important to construct a valvular incision. However, it is more important to make sure that the valvularity has been maintained after the Phaco procedure has been completed. Usually during the cortical clean up the valvularity of the incision can be checked. Before starting ¼, the main incision needs to be irrigated to remove any remnant of lens matter or OVD. The irrigation hand piece is then put through side port and the main incision is watched for any leakage. If required, Siedel test can be done. (Figure 14)

Any leakage in the main incision needs to be closed with a suture. In absence of any leakage, hydration of main incision and side ports will prevent any leakage and subsequent hypotory and ingress of fluid during early post-op period.

Infection Prevention

Preventing endophthalmitis is every surgeons endeavor. In Refractive cataract surgery, it becomes a priority. The following steps need to be taken to prevent infection:

- Preparation of the skin around the eye with Betadine solution.
- Sterile adhesive drapes to prevent the skin, eyelid border, eyelashes coming in the operative field.
- Sterilize the conjunctiva with Betadine solution.
- Pre-op antibiotic drops and injecting antibiotic in the capsular bag at the end of the surgery. (Figure 15)

Constructing and leaving the incision valvular at the end of the surgery.

Reference

1. Koch PS . Structural analysis of cataract incision construction. J.cataract Refractive Surg 1991;17:661-667
2. Fine IH. Architecture and construction of a self-sealing incision for cataract surgery J Cataract Refractive Surgery; 1991; 17:672-676
3. Ravalico G, Tognetto D, Palomba M, et al. Capsulorrhexis size and posterior capsule opacification. J cataract Refract surg. 1996; 22:98-103
4. Vasavada AR, singh R, Apple DJ, et al Effect of hydrodissection on intraoperative performance: randomized study. J cataract Refract surg.2002; 28:1623-1628.
5. Gimbel HV. Hydrodissection and hydrolineation. Int opthalmol Clin. 1994; 34:73-90
6. Davison JA. Capsule contraction syndrome.j cataract Refractive Surg. 1993;19:582-589.

Author
V.C. Mehta MS, DOMS

Phacoemulsification in Eyes with Corneal Opacity

Aditi Johri MS, Prema Padmanabhan MS

With advances in technique and instrumentation, phacoemulsification (PE) has been established as the preferred modality for cataract extraction over the last decade. Much of the success of cataract surgery rests on the clarity of the intervening media i.e. the cornea and optimum visualization of intraocular structures, permitting delicate intraoperative maneuvers to be performed. It follows therefore, that eyes with corneal opacity pose a challenge for accurate assessment of surgical variables involved in phacoemulsification.

Ideally when cataract is complicated by corneal opacities; the best method of visual rehabilitation is a 'triple 'procedure – that is corneal transplantation combined with cataract extraction and Intraocular lens implantation. Although PK enjoys a high success rate, even the best of corneal grafts is fraught with the inherent risks of rejection, suture related complications, infections and delayed visual rehabilitation. Coupled with this, when one considers the enormous gap between demand and supply of donor corneal tissues in India-the requirement of donor corneas per year in India is estimated to be 20 times the current procurement [1]; it seems prudent to reduce this burden by devising alternative surgical modality (Phacoemulsification alone) for visual rehabilitation in such cases.

Patients with nebulomacular corneal opacities with visually debilitating cataract may regain ambulatory vision with cataract surgery alone.[2] Postoperatively, such scars are managed successfully with rigid gas permeable contact lenses providing good visual outcome[3].

Another subset of patients who can be benefited without the use of allograft corneal tissue include those in whom PK can be delayed or not performed or those in whom PK carries high risk of rejection.

Indications for phacoemulsification alone in corneal opacity

- One eyed patients
- Elderly patients
- High risk graft (Extensive corneal vascularization)
- Poor ocular surface
- Patients at risk for expulsive hemorrhage (elderly/ hypertensives/ History of glaucoma/ Expulsive hemorrhage in fellow eye)
- Low socioeconomic status (Poor compliance with post PK follow-up)

Sankara Nethralaya
Medical Research Foundation
College Road, Chennai

Preoperative evaluation of a patient with corneal opacity

Slit lamp biomicroscopy to assess the depth of corneal opacity

The extent of impact of the corneal opacity on visual acuity depends not only on the dimensions of the opacity but also its location in relation to the visual axis, its density and the presence of associated iris adhesion, thinning, vascularisation and ectasia if any.

Keratometry

Distorted mires on keratometry is a practical difficulty seen in these patients. This problem is circumvented by obtaining simulated keratometry readings on corneal topography. Pentacam equivalent keratometry readings can also provide additional information about IOL power calculation in addition to better delineation of depth of corneal opacity.

Specular microscopy and pachymetry

These are invaluable tools for prognostication of corneal decompensation if corneal guttata are detected on slitlamp biomicroscopy. They provide useful information regarding surgical strategy (One step triple procedure PK + Phacoemulsification+ IOL implantation) vs (Phacoemulsification alone.)

Potential acuity meter (PAM)

In the presence of both corneal and lenticular opacities, an accurate PAM reading is less likely. However, when a favorable PAM reading is obtained, good prognosis can be expected in such patients.

Anterior segment optical coherence tomography (OCT)

Anterior segment OCT is a valuable adjunct for assessing the extent of corneal stromal involvement especially when phacoemulsification is planned to be combined with lamellar corneal transplantation.

Dry eye evaluation

Dry eye evaluation is necessary in selected cases where ocular surface is compromised such as when corneal opacities occur in Ocular Cicatricial Pemphigoid and Stevens-Johnsons syndrome.

Surgical Technique

Suboptimal visualization is the sole factor responsible for problems encountered during phacoemulsification in patients with corneal opacities.

Challenges due to corneal opacity in phacoemulsification

- Scattering and reflection of light off the cornea
- Poor visualization of anterior capsule for successful capsulorhexis

- Difficulty in nuclear management
- Damage to endothelium due to prolonged surgical time
- Adherent leucoma with cataract

Scattering and reflection of light off the cornea

Taking inspiration from intravitreal illumination techniques,Farjo et al, have described transcorneal illumination with fiber optic light pipe and noted that it can minimize aberrant reflection and scatter, resulting in improved visualization of anterior segment structures.[4] The disadvantage reported is that it is technically challenging as it requires regular repositioning for optimal viewing.

Poor visualization of anterior capsule for successful capsulorhexis

Nishimura et al described use of an endoilluminator as a light source *outside the cornea* for capsulorhexis and as a light source *inside the anterior chamber* for phacoemulsification to execute cataract surgery in patients with corneal opacities.[5]

The role of capsular staining by trypan blue 0.1% has been described to facilitate the delineation of lenticular morphology in the presence of corneal opacity.[6] Trypan blue has not been found to be harmful to corneal endothelium in a clinical study in which endothelial counts and morphology were evaluated both pre and postoperatively.[7]

Chang et al described Indocyanine green (0.5%) assisted phacoemulsification in eyes with advanced cataracts with corneal opacities.[8] They noted good contrast during capsulorhexis between the greenish stained anterior capsular rim and the unstained whitish cortex of the lens thereby facilitating phacoemulsification.

Difficulty in nuclear management

Since corneal haze can impede visibility even in the presence of adequate fundal glow, this makes vital steps such as nucleus emulsification especially difficult leading to complications such as PC rupture/vitreous loss/ IOL displacement.

One should attempt visualization of the capsular bag at all times with the help of staining techniques, and ensure proper positioning of the depth of phaco tip during nuclear management. Maintaining low aspiration rates and using low phaco power, nucleus management can be achieved safely by avoiding working too close to the posterior capsule and facilitating gradual occlusion break. At all times it is important to maintain a stable anterior chamber.

Transcorneal and intracameral light pipe illumination is useful in cases with mild or moderate corneal haze. In contrast, chandelier illumimnation from the posterior side as described by Inoue et al for cataract surgery combined with Descmet stripping automated endothelial keratoplasty (DSAEK) is sufficiently bright to perform cataract surgeries in very hazy corneas.[9]

Damage to endothelium due to prolonged surgical time

As longer surgical time is expected due to working through a hazy media,maximum endothelial protection should be provided by using appropriate viscosurgical devices.In a recent study it was observed that employing the soft-shell technique using Viscoat and Hyal-2000 protected corneal endothelial cells during cataract surgery in patients with a nuclear opacity grade of 4.[10]

Corneal opacities in specific situations

Adherent leucoma with cataract

In this special situation, automated vitrector assisted optical iridectomy has been described by Agarwal et al to release the adherent leucoma prior to phacoemulsification. They concluded that creating an optical window at the beginning of surgery greatly facilitates intraoperative visualization and provides a feasible alternative to a conventional triple procedure in patients with partial central/paracentral corneal opacification and coexisting senile cataract.[11]

Cataract surgery with coexistent corneal opacity combined with pupillary sphincterotomy at conclusion has been described as another modification to provide a bypass to dense corneal opacities. The added advantage of this technique in addition to increasing the size of the pupil in the direction of clear cornea is that it prevents any chance of edge effect of the IOL or both phakic and aphakic refraction.[12]

Corneal stromal disease and cataract

Performing 'open sky' triple procedure poses several significant risks due to the loss of anterior chamber pressure counterbalacing the positive vitreal pressure.These include difficulty in accomplishing successful rhexis,cortical cleanup,IOL placement and the higher risk of suprachoroidal hemorrhage. Therefore most authors recommend performing phacoemulsification before trephination whenever corneal transparency permits [13]or using a temporary keratoprosthesis[14]or temporary corneal graft [15]if corneal opacity is too pronounced.However if the corneal involvement is not full thickness and is limited to the stromal layers,then one can take advantage of lamellar corneal transplantation techniques and combine *Deep Anterior Lamellar Keratoplasty combined with phacoemulsification*. As described by Muraine et al, [16] Deep lamellar dissection of the cornea to bare the descemet's membrane (DM) allows one to perform phaco under visibility conditions identical to those of a clear cornea. At the end of the surgery, a donor button denuded of DM is sutured onto the recipient bed. This procedure allows patients to benefit from optimal operative conditions of closed globe cataract surgery as well as enjoy the benefits of lamellar corneal transplantation.

Endothelial dystrophy and cataract

Until recently, patients with cataract and corneal edema/ opacity due to Fuch's endothelial dystrophy underwent visual rehabilitation by means of the triple procedure. However, now with *Descemet's Stripping and Automated Endothelial Keratoplasty(DSAEK)* becoming the established procedure of choice for surgical replacement of diseased host endothelium and DM , the benefit of this procedure has been extended to include patients with clinically significant cataracts in what is termed as the *New Triple Procedure:DSAEK combined with PE +IOL implantation* .Covert et al[17] in their case series of 21 patients who underwent phaco and posterior chamber IOL implantation through temporal clear corneal incision, followed by DSAEK have reported rapid visual rehabilitation and predictable refractive outcomes. Terry and Ousley have demonstrated similar refractive results in patients undergoing simultaneous PE+IOL+deep lamellar endothelial keratoplasty through separate superior and limbal incisions.[18]

Dry eye and cataract

Corneal opacities are often part of a larger spectra of dry eye disorders,ranging from innocuous, peripheral lesions of healed keratitis to severe keratinized plaques.Cataract surgery if undertaken without proper precautions can not only worsen the primary disease but have sight threatening consequences like infection,corneal melts and perforations. Vasavada has described phacoemulsification in Stevens-Johnson Syndrome with appropriate precautionary measures including refraining from steroid usage postoperatively due to fear of superadded infection.[19]Geerling recommends systemic perioperative immunosuppression in patients with Ocular Cicatricial Pemphigoid undergoing cataract surgery.[20]Punctal cautery, amniotic membrane transplantation and frequent administration of preservative free lubricants are adjunctive measures to promote a healthy ocular surface in dry eye states.

Conclusion

Cataract surgery in eyes with corneal opacities requires a key understanding of the trade off between less than ideal vision on one hand and longevity of the regained vision on the other. It is important that the patient fully understands the surgical options of cataract surgery alone versus a triple procedure, in order to take a realistic decision affecting the long term quality of vision and life. The best candidates for cataract extraction without PK are those with documented worsening of visual acuity and cataract with unchanging corneal opacity. Once the risks of more extensive surgery are understood, patients may themselves choose limited improvement in visual acuity if the prolonged rehabilitation and high refractive error often associated with PK are eliminated [4].Appropriate case based decision-making and innovations in operative and visualization techniques can make these challenging procedures rewarding for patient and surgeon alike.

References

1. P Garg, PV Krishna, AK Stratis and Gopinathan.The value of corneal Transplantation in reducing blindness Eye 2005.19;1106–1114.
2. Pandey SK, Werner L, Escobar-Gomez M, Roig-Melo EA,Apple DJ. Dye-enhanced cataract surgery. Part 1: anterior capsule staining for capsulorrhexis in advanced/white cataract. J Cataract Refract Surg 2000; 26: 1052–1059.
3. Kanpolat A, Ciftci OU: The use of rigid gas permeable contact lenses in scarred corneas. *CLAO J* 1995, 21:64-66
4. Ayad A. Farjo,Roger F. Meyer, , Qais A. Farjo.Phacoemulsification in eyes with cornealopacification, *J Cataract Refract Surg 2003; 29:242–245*
5. Akira Nishimura, Akira Kobayashi, Yasunori Segawa, Kazuhisa Sugiyama Endoillumination-assisted cataract surgeryin a patient with corneal opacity J Cataract Refract Surg 2003; 29:2277–2280
6. Bhartiya P, Sharma N, Ray M, Sinha R, Vajpayee RB.Trypan blue assisted phacoemulsification in corneal opacities. Br J Ophthalmol 2002; 86: 857–859.
7. Kothari K, Jain SS, Shah NJ. Anterior capsular staining with trypan blue in mature and hypermature cataract: a preliminary study. Indian J Ophthalmol 2001;49:177–80
8. Yi-Sheng Chang,Jing-Hsing Hsiao, Sung-Huei Tseng, Po-Hsiu Kuo,Fred Kuanfu Chen. Indocyanine Green-assisted Phacoemulsification in Cases of Complicated or Simple Advanced Cataracts. J Formos Med Assoc | 2008 • Vol 107 • No 9
9. Tomoyuki Inoue, Yusuke Oshima, Chiharu Shima, Yuichi Hori, Naoyuki Maeda, Yasuo Tano, Chandelier illumination to complete Descemet stripping through severe hazy cornea during Descemet-stripping automatedendothelial keratoplasty J Cataract Refract Surg 2008; 34:892–896.
10. Hyojin Kim, Choun-Ki Joo.Efficacy of the soft-shell technique using Viscoat and Hyal-2000. *J Cataract Refract Surg 2004; 30:2366–2370.*
11. T Agarwal, V Jhanji, P Dutta and JS Titiyal Automated vitrector-assisted iridectomy and phacoemulsification in eyes with coexisting cataract and adherent leucomas Eye (2008), 1–4.
12. Sinha R, Sharma N, Vajpayee RB. Visual outcome of cataract surgery with pupillary sphincterotomy in eyes with coexisting corneal opacity. BMC Med 2004; 2: 10.
13. Malbran ES, Malbran E, Buonsanti J, Adrogue E.Closed-system phacoemulsification and posteriorchamber implant combined with penetrating keratoplasty.*Ophthalmic Surg.* 1993;24:403-406.
14. Menapace R, Skorpik C, Grasl M. Modified triple procedure using a temporary keratoprosthesis for closed-system, small-incision cataract surgery.*J Cataract Refract Surg.* 1990;16:230-234.
15. Nardi M, Giudice V, Marabotti A, Alfieri E, RizzoS. Temporary graft for closed-system cataract surgery during corneal triple procedures. *J CataractRefract Surg.* 2001;27:1172-1175.
16. Marc C. Muraine, Ame´lie Collet, Ge´rard Brasseur .Deep Lamellar Keratoplasty Combined With Cataract Surgery Arch Ophthalmol. 2002; 120:812-815.
17. D. Covert, S. Koenig.New Triple Procedure: Descemet's Stripping and Automated Endothelial Keratoplasty Combined with Phacoemulsification and Intraocular Lens Implantation. Ophthalmology, Volume 114 , Issue 7 , Pages 1272 - 1277.
18. Terry MA, Ousley PJ. Replacing the endothelium without corneal surface incisions or sutures: the firstUnited States clinical series using the deep lamellar endothelial keratoplasty procedure. Ophthalmology. 2003 Apr;110(4):755-64; discussion 764.
19. Vasavada Abhay R, Dholakia Sheena A. Phacoemulsification in total white cataract with *Stevens-Johnson syndrome* Indian Journal of Ophthalmology, Year 2007, Volume 55, Issue 2.
20. Gerd Geerling,John K.G. Dart Management and outcome of cataract surgery in ocular cicatricial pemphigoid Graefe's Arch Clin Exp Ophthalmol (2000) 238:112–118.

Author
Aditi Johri MS

Phacoemulsification in Pseudoexfoliation Syndrome

Suresh K. Pandey *MS,* ***Vidushi Sharma*** *MD, FRCS*

Pseudoexfoliation (PXF) syndrome is the most common identifiable cause of open-angle glaucoma worldwide. PXF is a systemic and ocular condition in which hyaline material of unknown etiology is deposited onto structures in the anterior segment. Many studies have shown that pseudoexfoliation syndrome patients have higher rates of intraoperative complications during and after cataract surgery compared to patients without the condition. This article reviews the clinical signs of pseudoexfoliation syndrome and methods of managing complications during cataract surgery. The ophthalmologist must be aware of the subtle signs of pseudoexfoliation syndrome prior to undertaking cataract surgery. Techniques for enlarging small pupils, overcoming zonular instability, modification of phacoemulsification technique, and appropriate choice of intraocular lens implant, could minimize the likelihood of intraoperative and postoperative complications.

Clinical Signs

The patient presents with a fine, flaky material on the anterior lens capsule at the pupillary margin (Figure 1 and 2). Over time, this coalesces into a characteristic "bulls-eye" pattern seen in pseudoexfoliation (Figure 3). There is often increased transillumination of the iris at the pupillary margin and there may be pigment granules on the endothelium and iris surface. Within the angle, there may be observable pigment or clear flaky material. Initially, intraocular pressure is unaffected; however, elevated IOP develops in up to 80 percent of patients. In these cases, glaucomatous cupping and visual field loss may ensue.

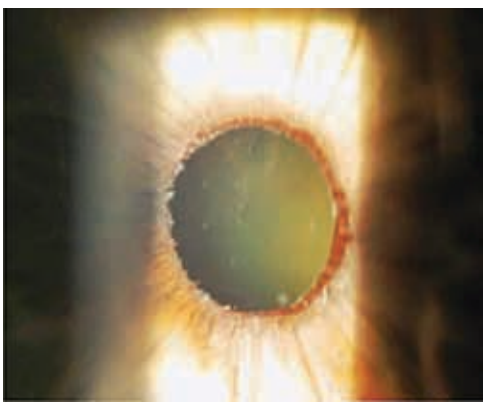


Figure 1: *Undilated pupil exam in a case of PXF syndrome. Note the presence of white, fluffy material around pupil margin*

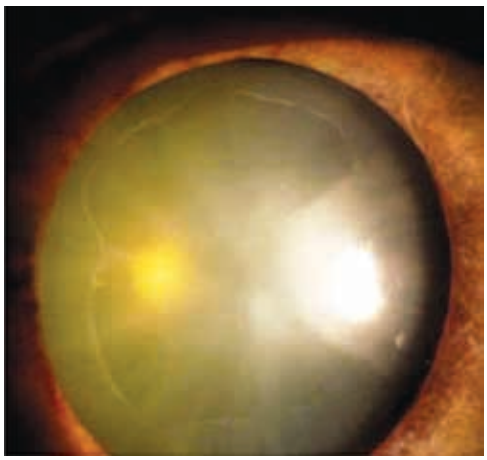


Figure 2: *Dilated examination in a case of PXF syndrome. Notice the presence of ground glass appearance of anterior lens capsule*

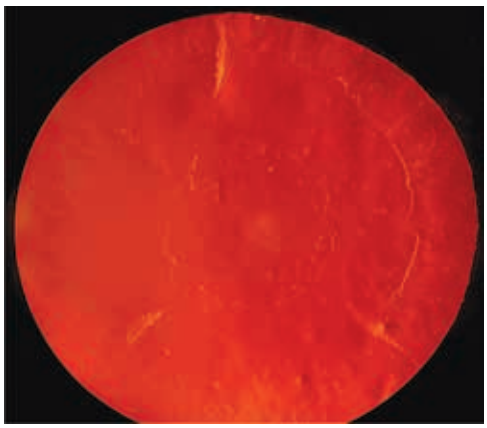


Figure 3: *Retro-illumination of lens in a case of PXF syndrome. Note the 'bullseye lesion' on the anterior lens capsule*

Suvi Eye Hospital & Research Centre
A 475 Indra Vihar, Near Shiv Jyoti School,
Kota, Rajasthan

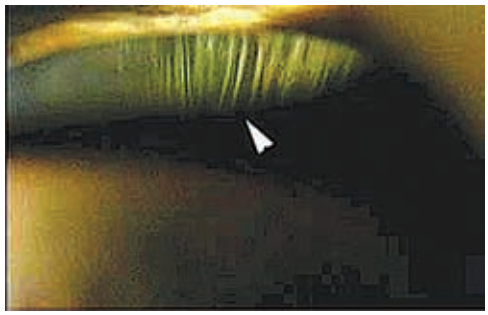


Figure 4: *Gonioscopic examination in a case of PXF syndrome. Note deposition of fluffy, white material on lens zonules*

Table 1: Signs suggestive of a diagnosis of Pseudoexfoliation (PXF) syndrome

- Pseudoexfoliation deposits on lens anterior capsule in pupillary area (classic pseudoexfoliation (PXF) syndrome)
- Phacodonesis/lens subluxation
- Intrastromal hemorrhage post mydriasis without rubeosis (indicative of iris vascular damage)
- Pigment dispersion post mydriasis without obvious cause
- Poor mydriasis and posterior synchiae without obvious cause
- Small anterior chamber depth without other reasons for a narrow drainage angle
- Pseudoexfoliation deposits on iris margin

Telltale signs of PXF syndrome include a classic deposition pattern on the lens, zonules (Figure 4) and pigment in the angle on gonioscopy. The most common challenges surgeons face when performing phacoemulsification on affected patients are managing small pupils and maintaining zonular stability.

Patients should undergo a slit-lamp evaluation to rule out zonular instability, phacodonesis, or subtle asymmetry in the depth of his anterior chambers. Any of these abnormalities could portend zonular problems and complicate cataract surgery. Patients with PXF syndrome can experience sudden IOP spikes after pupillary dilation, so surgeons should take steps to avoid this complication.

Challenges during Phacoemulsification

Inadequate Pupillary Dilatation

Patients' pupils must be large enough to permit the safe creation of the capsulorhexis. Surgeons may use topical mydriatics or mechanical means such as iris hooks (Katena Products, Inc., Denville, NJ), the Beehler pupil dilator (Moria, Antony, France), the Morcher Pupil Dilator (Morcher GmbH, Stuttgart, Germany; distributed in the US by FCI Ophthalmics, Inc., Marshfield Hills, MA), and the Perfect Pupil Injectable (PPI; Milvella Ltd, Sydney, Australia).

Table: 2: Surgical tips for management of PXF

- Enlarge small pupils
- Stabilize the capsule
- Adequate size capsulorhexis
- Gentle hydrosection
- Avoid downsculpting and favor chopping the nucleus
- Clean up cortical material
- Choice of intraocular lens (foldable hydrophobic acrylic biomaterial)
- Placement of intaocular lens into the capsular bag

It is advisable to create 5.5 to 6.0 mm central capsulorhexis in eyes with PXF through a combination of iris hooks. Viscoadaptive ophthalmic viscosurgical device, such as Healon 5 (Advanced Medical Optics, Inc., Santa Ana, CA) may also help to create viscomydriasis.

Zonule-Friendly Phaco Techniques

The phaco techniques on patients with PXF syndrome are designed to place minimal stress on weak zonules. It is advisable to attempt multiqudrant hydrodissection to create a gentle wave setting to dissect the nucleus away from the capsular bag with cortical cleaving hydrodissection. After completion of hydrodisscetion, gently rotate the nucleus to ensure it is completely free. Divide the nucleus using stop and chop or by using a zonule-friendly vertical chopping technique.

In cases where debulking or divide-and-conquer is appropriate, it is advisable to use enough energy to prevent the nucleus from moving during the phaco passes. Choosing the proper duty cycle reduces the amount of energy delivered to the eye and can prevent corneal damage. The surgeon must use enough power to prevent nuclear movement but employ a pulse or burst mode to prevent corneal burns.

Cortical Removal

The cortical clean-up procedure using irrigation and aspiration can be tedious in eyes with PXF and, if not performed carefully, can strip away weak zonules. A bimanual irrigation and aspiration technique may be useful, especially if the patient's pupil is relatively small, because it is easier to get to the subincisional cortex through two sites.

Role of capsular tension ring (CTR)

There is some debate as to whether the device is necessary in all cases of PXF. CTRs can decrease capsulophimosis and distribute forces to the zonules more equally. Although the devices do not protect against the late dislocation of an IOL, their presence may

make it easier to suture the IOL to the sclera if necessary. The placement of these devices can exert stress on the zonules, however, and CTRs can complicate I/A if they are inserted too early. It is not advisable to use CTRs in all eyes with PXF syndrome, only in those with clear evidence of zonular weakness.

Postoperative Management

To prevent postoperative IOP spikes, it is advisable to carefully remove all lenticular fragments and viscoelastic from the eye at the end of surgery. The patient can be prescribed topical pressure lowering medication and/or oral acetazolamide for first few days and, when necessary, release pressure from their eyes through the sideport incision on the day of surgery.

A long-term complication associated with PXF is the spontaneous subluxation of implanted IOLs. This problem can arise any time between 2 months and 16 years postoperatively, with most cases occurring an average of 8.5 years after the IOL's implantation.

Several strategies can be used to correct IOL subluxation in patients with PXF. If the patient has plate IOLs, it is advisable to remove the lenses and replace them with a haptic design. For example, three-piece lenses may be sutured to the sclera or the iris. If the patient does not have glaucoma, and I have to make a large incision to remove his original lens.

Management of Late Complications

Posterior Capsular Changes

Secondary cataract (PCO) has been shown to be more frequent following cataract surgery in patients with PEX. Clinically significant PCO is treated with Nd:YAG capsulotomy.

Anterior Capsular Changes Capsule Contraction Syndrome With or Without IOL Decentration

Capsule contraction syndrome has been reported in PXF cases in which there was an exaggerated reduction in anterior capsulectomy and capsular bag diameter after extracapsular cataract surgery involving the use of a continuous curvilinear capsulorhexis. An imbalance of forces caused by zonular weakness results in an inability to resist the relatively increased strength of the centrally directed contractile forces generated by capsular fibrosis. An autopsy study and clinical study showed a significant increase in decentration of the entire capsular bag in PXF eyes. We recommend the following preventative measures: create an optimal round anterior rhexis (just within the optic of the IOL) or a secondary capsulorhexis to enlarge the initial rhexis after completion of phacoemulsification. Performing intraoperative vacuuming of the undersurface of the anterior capsule prior to lens implantation has been shown to reduce the amount of residual lens epithelial cells and reduce capsular fibrosis. Recent publications have shown that the choice of haptic and optic material influences the likelihood of anterior capsular contraction (the rigid PMMA haptics are more resistant to contractile forces than soft polypropylene haptics). It has been suggested that patients with PXF and a small anterior capsulotomy opening should be scheduled for postoperative Nd:YAG laser capsulorhexis augmentation in the first few months following cataract surgery.

Conclusion

When operating on patients with PXF, surgeons should be aware of strategies they can use to prevent IOP spikes after phacoemulsification. Gentle nuclear disassembly, careful cortical cleanup, and the use of devices such as CTRs can reduce the risk of immediate postoperative complications. Fixating nonplate IOLs to the sclera or the iris may help prevent subluxation.

References

1. Naumann GO, Schlotzer-Schrehardt U, Kuchle M: Pseudoexfoliation syndrome for the comprehensive ophthalmologist. Intraocular and systemic manifestations. Ophthalmology 105:951-68, 1998
2. Fine IH, Hoffman RS: Phacoemulsification in the presence of pseudoexfoliation: challenges and options. J Cataract Refract Surg 23: 160-5, 1997
3. Cionni RJ, Osher RH: Endocapsular ring approach to the subluxed cataractous lens. J Cataract Refract Surg 21:245-9, 1995
4. Werner L, Pandey SK, Escobar-Gomez M, et al: Anterior capsule opacification: a histopathological study comparing different IOL styles. Ophthalmology 107: 463-71, 2000
5. Waheed K, Eleftheriadis H, Liu C: Anterior capsular phimosis in eyes with a capsular tension ring. J Cataract Refract Surg 27: 1688-90, 2001

First Author
Suresh K. Pandey MS

Obituary

With profound grief we inform the sad demise of **Dr. Anil Johri** on 25.11.2008. We pray to the almighty to give courage to his family to face this loss and we stand by them in this difficult time.

Answer to Quiz

Seema Kashyap MD

Answers (Vol. 14, No. 4, October 2008, Pg. 35)

Figure 1:	Basal cell carcinoma (Palisading arrangement of tumour cells)
Figure 2:	Well differentiated retinoblastoma (Deletion of chromosome 13q14)
Figure 3:	Well differentiated sebaceous cell carcinoma (Oil Red O stain)
Figure 4:	Non Hodgkin's lymphoma LCA (leucocyte common antigen) stain
Figure 5:	Rhinosporidiosis (Aquatic protistan parasite-Rhinosporidium seeberi)
Figure 6:	Schwannoma (Antoni A area in which Verrocay bodies are seen)
Figure 7:	Leukemic blast seen on peripheral smear (Myeloperioxidase stain to confirm AML)
Figure 8:	Parent tissue – cornea: Macular dystrophy (Special stain: colloidal iron)
Figure 9:	Choroidal malignant melanoma (HMB 45 stain)

Department of Ocular Pathology
Dr. Rajendra Prasad Centre for Ophthalmic Sciences,
All India Institute of Medical Sciences, New Delhi

Ciliary Body Mass in a Child

Nayanshi Sood *MBBS,* ***Shaloo Bageja*** *DNB,* ***Ashok K. Grover*** *MD, MNAMS, FRCS*

A 3 year old boy presented to us in July 2008 with 10 to 15 days history of white reflex in his right eye, it was associated with outward deviation and pain in the same eye. There was no history of redness, watering, protrusion of eye or trauma. Also there was no history of any systemic complaint like seizures, deafness or cutaneous lesions.

General physical examination were within limits. On ophthalmic examination there was no perception of light in right eye vision in left eye vision was 6/9. Anterior segment examination of right eye lids and conjunctiva where normal, cornea was clear whereas pupil was vertically oval distorted and not reacting to light. There was a white membrane with vascularization from 10 to 12 clock hours in the pupillary area. The pattern of iris was lost and there were pigmented nodular excrescences present from 5 to 7 clock hours. There was iridocorneal contact present at the same site due to which anterior chamber was shallow inferotemporally (Figure 1,2).

Fundal glow was absent and intraocular pressure was normal digitally.

Provisional diagnosis of Right eye was Leukocoria with fibrovascular membrane with pigmented iris nodules so the differential diagnosis were:

Diktyoma/Medulloepithelioma, Retinoblastoma, Iridociliary cyst, Juvenile Xanthogranuloma and Ciliary body melanoma.

Investigations

B scan

Ultrasound of the orbit (Figure 3) showed a dome shaped hyperechoic mass with high internal reflectivity in the ciliary body region temporally of right eye. (Figure 4) showed a hyperechoic mass with cystic cavity in the temporal region of ciliary body.

Color Doppler USG

There was minimal uptake of dye (Figure5, 6) which proved it to be vascular in nature.

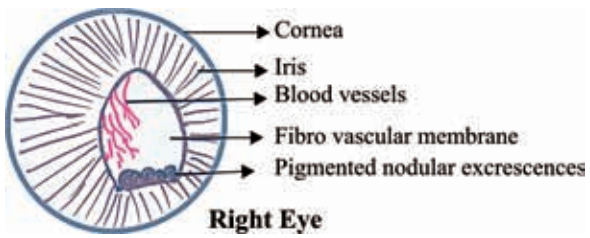


Figure 1: *Anterior segment diagrammatic figure*

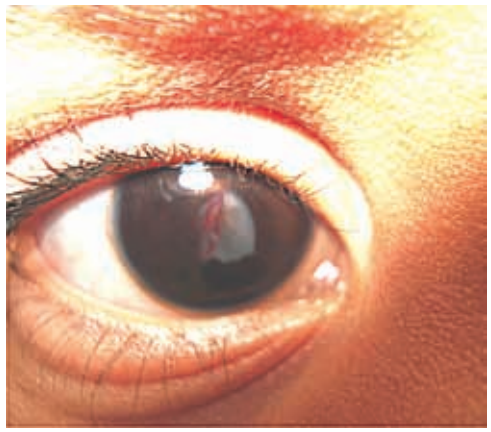


Figure 2: *Photograph of right eye*

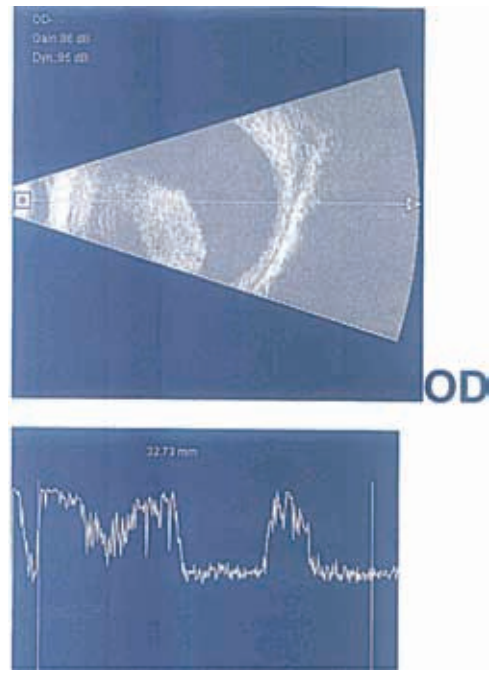


Figure 3: *Bscan*

Department of Ophthalmology
Sir Ganga Ram Hospital,
Rajinder Nagar, New Delhi

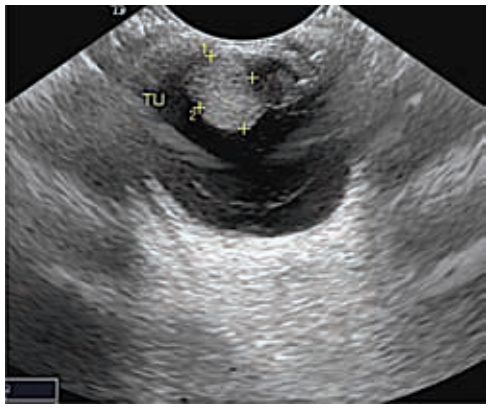


Figure 4: *Ultra Sound of Orbit*

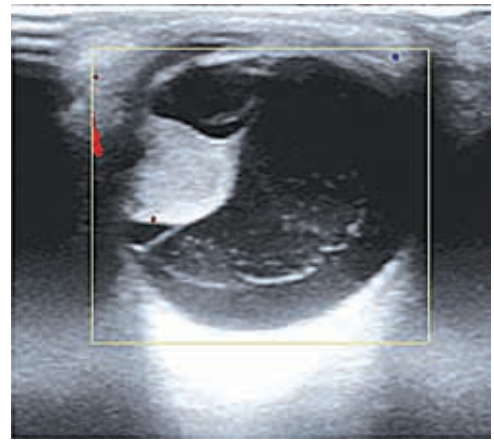


Figure 5: *Color Doppler USG*

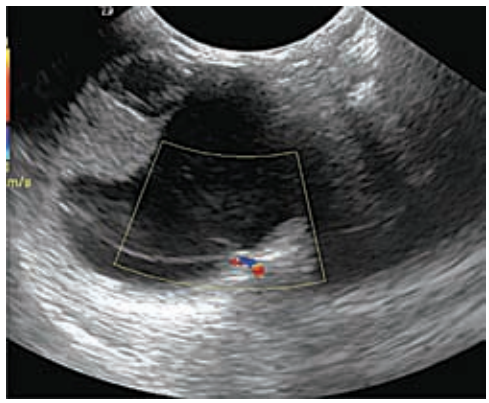


Figure 6: *Color Doppler USG*

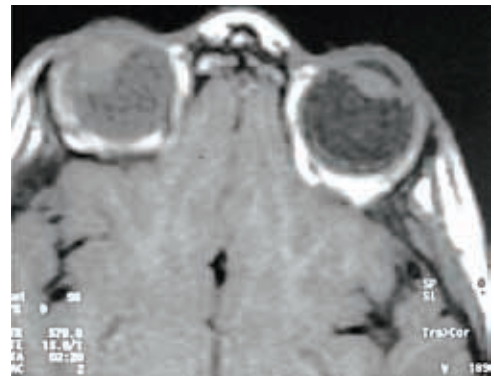


Figure 7: *Coronal Cuts T 1W*

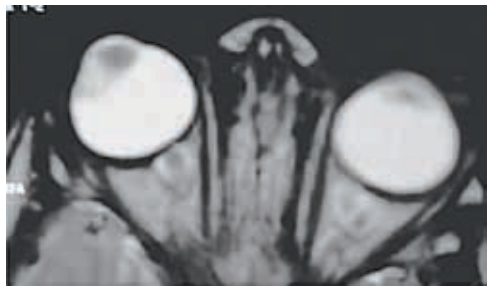


Figure 8: *T2 W Coronal Cut*

MRI (Figure 7,8,9) howed a hyperdense soft tissue lesion superiorly and anterolaterally region of right eye in the T1W , measuring 8mm x 8mm x1.5mm anterioposteriorlly,horizontally and craniocaudally. Globe and extraocular muscles were normal.

MRI contrast showed enhancement of the lesion suggestive of its vascular nature (Figure 10).

Hence our diagnosis was Medulloepithelioma of ciliary body which was supported by the age of patient, its unilateralality, presence of fibrovascular cyclitic membrane with iris nodules and the investigations like :

USG/B scan which showed a hyperechoic cystic mass with high internal reflectivity and MRI which showed a soft tissue enhancing lesion in the ciliary body region.

Routine Investigations like Complete blood count and Urine examination and Complete metastatic workup was done. Right eye enucleation with orbital implant (hydroxyapatite) was done under general anesthesia. The specimen was sent for biopsy.

Histopathology

Section showed a tumor (Figure 11) consisting mostly of round to oval cells arranged in cords and groups with papillary and gland formation at places. A few rosette formations are also seen. In the

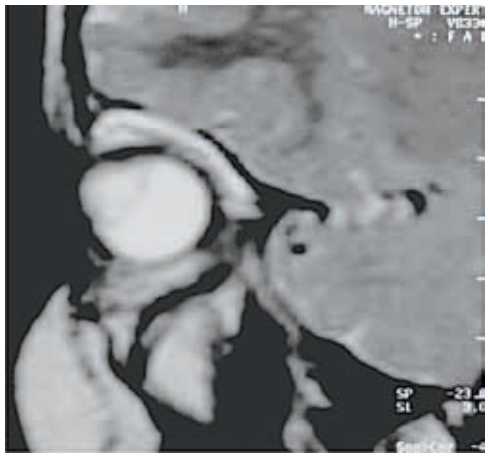


Figure 9: *Saggital CT*

Figure 10: *MRI Contrast*

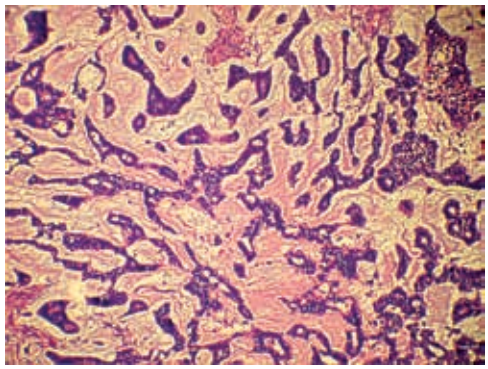


Figure 11: *High Power Showing Magnification Malignant Cells*

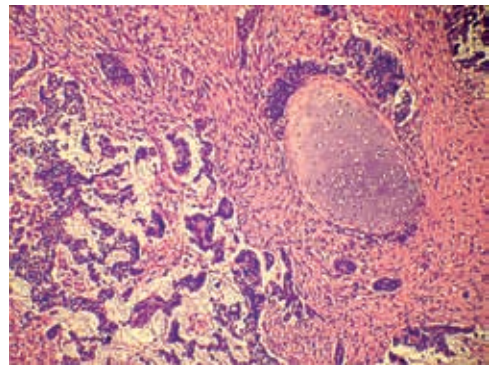


Figure12: *Island of Cartilage seen in High Power Magnification*

intervening area prominent loose myxoid change is noticed. An occasional island of cartilage is present (Figure 12). Cystic change is also seen. Optic nerve appears unremarkable. Hence the diagnosis was malignant medulloepithelioma, teratoid form.

Discussion

Ciliary body medulloepithelioma is a rare embryonic tumour arising from the primitive medullary epithelium. It clinically manifests during first decade of life at mean age of 4 years. It is classified as Teratoid and Nonteratoid.

Nonteratoid medulloepithelioma is a pure neoplastic proliferation of cells that resembles the medullary epithelium without heteroplastic elements whereas Teratoid variety contains heteroplastic elements like hyaline cartilage, rhabdomyoblasts, striated muscle, and neural tissue resembling brain.

Futher they are subclassified into benign (60%) and malignant (60%, 40%) . The histological criteria for malignancy are areas of poorly differentiated neuroblastic cells, increased mitotic activity or nuclear pleomorphism,sarcomatous areas and invasion of other ocular tissue with or without extraocular extension.

Symptoms include loss of vision, pain, leukocoria, abnormal bulging of the eye, epiphora and deviation of eye. Signs include visible iris or ciliary body cystic mass, iris neovasculrization resulting in NVG (60%), iritis, hyphaema, proptosis, cataract, strabismus, vitreous haemorrhage, retinal mass, retinal detachment.Diagnosis of medulloepithelioma made on the basis of age of the patient, clinical findings are ultrasonography. Radiological investigations (CT/MRI Scan) are done to visualise extent of the tumour and to monitor the tumour recurrence.

But definitive diagnosis is often established on histological examination.

Treatment

Local surgical removal (Iridocyclectomy) is indicated only for relatively small tumors that are not associated with an extensive neoplastic cyclitic membrane. But because of the disadvantages of extensive bleeding from the fibrovascular neoplastic cyclitic membrane, recurrence because the tumor often grows as a thin sheet on the surface of ocular structures and neoplastic cells being left behind in the cyclitic membrane, enucleation often becomes necessary.

Treatment with iodine-125 brachytherapy has been employed to debulk the mass before resection. It showed a favorable response through 18 months of follow-up after treatment. This was a single case report, and longer follow-up is necessary before treatment efficacy can be fully evaluated.

References

1. Broughton WL, Zimmerman LE. A clinicopathologic study of 56 cases of intraocular medulloepithelioma. Am J Ophthalmol. 1978;85:407-418.
2. Shields JA, Eagle RC Jr, Shields CL, De Potter P. Congenital neoplasms of the nonpigmented ciliary epithelium (medulloepithelioma). Ophthalmology. 1996;103:1998-2006.
3. W Broughton Am J Ophthalmology 85:407, 1978.
4. Shields JA, Congenital neoplasms of the non-pigmented ciliary epithelium (medulloepithelioma). Ophthalmology. 1996;103:1998–2006.
5. Frederick Clin Experiment Ophthalmol. 2006 Sep ;34 (7):695-8.
6. Garcia-Feijoo J Medulloepithelioma of the ciliary body: ultrasonographic biomicroscopic findings. J Ultrasound Med. 2005;24.

First Author
Nayanshi Sood MBBS

Delhi Ophthalmological Society
Monthly Clinical Meeting, December 2008

Venue: Mohan Eye Institute, 11B, Ganga Ram Hospital Marg, New Delhi - 110 060

Date and Time: ***28th December,*** 2008 (Sunday) 10:30 a.m. - 12.30 p.m.

Clinical Cases

1.	Bilateral Disc Edema	:	Shalini Kumari	10 Mins
	Discussant	:	Rajiv Mohan, P. Tanwar	
2.	Subretinal Mass	:	Parul Lokwani	10 Mins
	Discussant	:	Rajiv Mohan, P. Tanwar	

Clinical Talk:

Aesthetic Surgery in Eye	:	Lalit Choudhary	20 Mins

Mini Symposium: ***Trauma***

Chairman: L.D. Sota, **Co-Chairman:** B. Ghosh

1.	Posterior Segment Pathology and its management	:	S. Natarajan	15 Mins
2.	Management of Lid and Lacrimal Injury	:	A.K. Grover	10 Mins
3.	Cricket Ball Injury	:	Sanjiv Mohan	10 Mins

Meeting will be followed by Lunch

Sponsored: **M/s. Syntho Pharmaceuticals**

Exudative Retinal Detachment-Vogt Koyanagi Harada Syndrome

Nidhi Tanwar MD, Tinku Bali MS, FRCS, S.N. Jha MD, H.K. Tewari MD, Amit Khosla MD, Neeraj Manchanda DOMS, DNB

A 50 year old female presented to the eye OPD with history of diminution of vision L > R eye for the past 2 weeks. The diminution of vision was acute in onset, painless, progressive, and associated with photophobia, redness and watering and floaters. There was also an associated h/o frontal headache, which was of throbbing type.

There was no h/o eye discharge, ocular trauma, neck pain or rigidity, frequent change of glasses, prior surgery, fever, cough, weight loss. No h/o oro genital ulcers, skin rashes or prior similar illness.

She was a diagnosed case of hypothyroidism, and was controlled on treatment. Her personal and family history were normal.

Right Eye

Left Eye

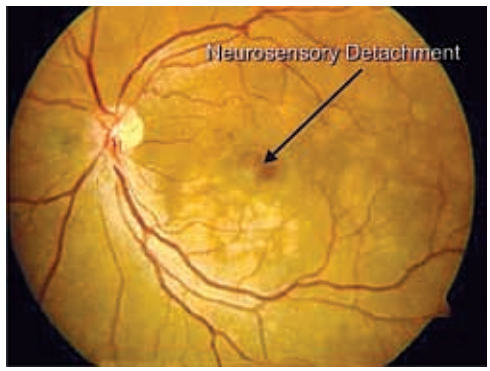


Figure 1: *Fundus*

Department of Ophthalmology
Sir Ganga Ram Hospital,
Rajinder Nagar, New Delhi

Her general physical examination and systemic examination was normal. There was no joint abnormality, no lump, no joint tenderness or crepitus.

Ocular examination revealed vision 6/24 (OD), and no improvement with refraction; 6/36 (OS) , again no improvement with refraction.

Conjunctiva showed mild ciliary congestion and cornea showed few Keratic precipitates bilaterally.

Anterior chamber had 2+ Cells with moderate flare (OU). Intra Ocular Pressure was 16 mm Hg (OU), and there were retrolental cells present in both the eyes.

Fundus picture showed multiple, hypopigmented, subretinal lesions in both the eyes with multiple neurosensory detachments especially at the posterior pole. (Figure 1)

FFA done at this point showed multiple pinpoint leaks at the level of RPE along with dye accumulation at the areas of neurosensory detachments at the posterior pole. (Figure 2 and 3)

OCT was also done which again documented the neurosensory detachments. (Figure 4)

USG B Scan showed mild choroidal thickening. (Figure 5)

Audiometry done for this patient did not show any sensorineural hearing loss. (Figure 6)

A differential diagnosis was made for *Bilateral panuveitis* (Vogt koyanagi harada syndrome, Sarcoidosis, Sympathetic ophthalmitis, Endopthalmitis Behcet 's disease). On the basis of *fundus picture* a differential diagnosis of VKH /Sympathetic ophthalmitis or AMPPE was made.

Investigations revealed normal blood counts, normal biochemistry, normal Chest X-ray, ACE negative and negative mantoux test.

On the basis of above a diagnosis of bilateral granulomatous panuveitis was made and the patient was started on topical corticosteroids, cycloplegics, oral corticosteroids (1 mg/kg/day) along with oral methotrexate (20 mg/wk), oral folinic acid (5 mg/wk) and calcium supplements.

The patient responded with the above therapy, and her oral corticosteroids and methotrexate were gradually being tapered, when patient was lost to follow up and stopped all medications on her own.

After follow up loss of 3 months, the patient presented with decrease in vision in left eye. (Figure 7)

Again a stepped up treatment with Oral Methotrexate 20 mg/wk, and oral corticosteroids 1.5mg/kg/day) were started.

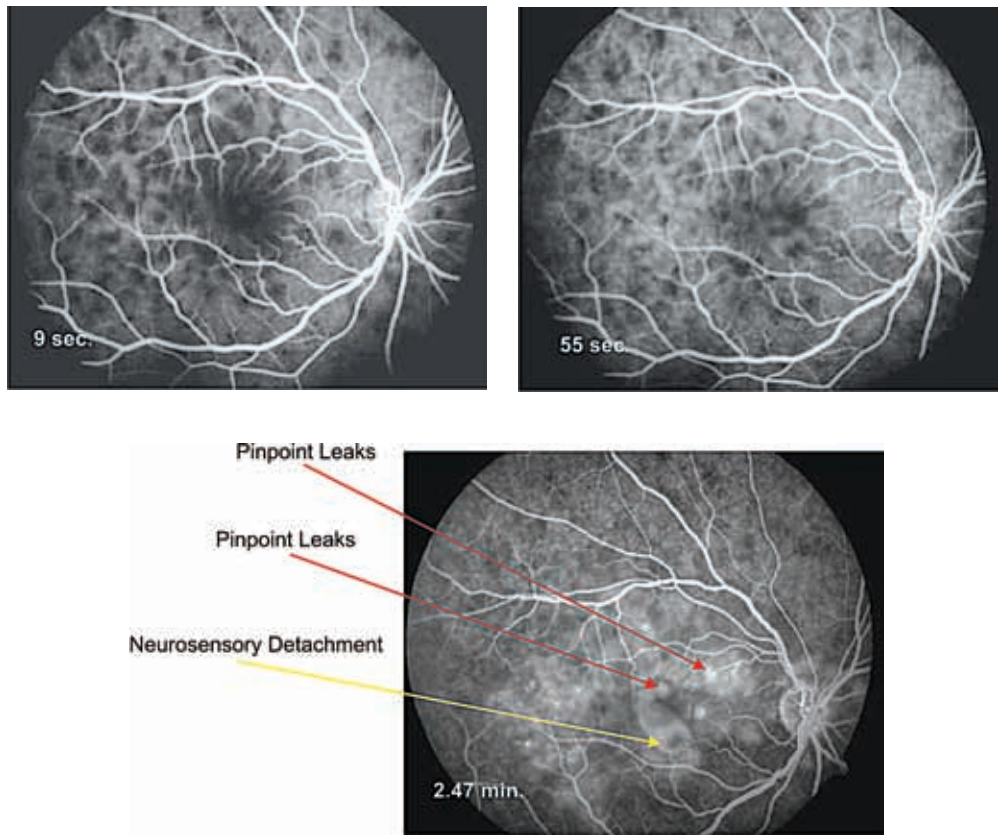


Figure 2: *FFA of right eye*

The patient went in remission with this therapy and her treatment has now been tapered to oral steroids 10 mg/day and oral methotrexate 7.5 mg/wk.

Discussion

Vogt Koyanagi Harada Syndrome is a bilateral, non-necrotizing, diffuse granulomatous inflammation of uvea with exudative retinal detachment with extraocular manifestations. The incidence of the disease is 6.8 – 9.2% (Woods et al). A female-to-male ratio is 2:1 with an age range of 20-50 years, most frequently during the third decade and is most often found in pigmented individuals.

The clinical features can be categorized into prodromal, uveitic, convalescent, and recurrent phases.

Table 1: Difference Between Vogt- Kayanagi syndrome and Harada disease

	Vogt-Koyanagi	Harada's Disease
Ocular Symptoms	Severe granulomatous anterior uveitis	Vitritis, choroiditis, exudative retinal detachment common
CNS Symptoms	Mild or lacking	Often severe, including headache, encephalitis, cranial nerve palsies and psyhosis
Ocular sequelae	Cataracts, posterior synechiae, glaucoma	Hypopigmentation of the fundus after reattachment of retina producing a "sunset glow"
Poliosis or Alopecia	90%	<10%
Vitiligo	>50%	<10%
Auditory disturbances	Common (>50%)	Less common
Visual Prognosis	Poor	Fair to good

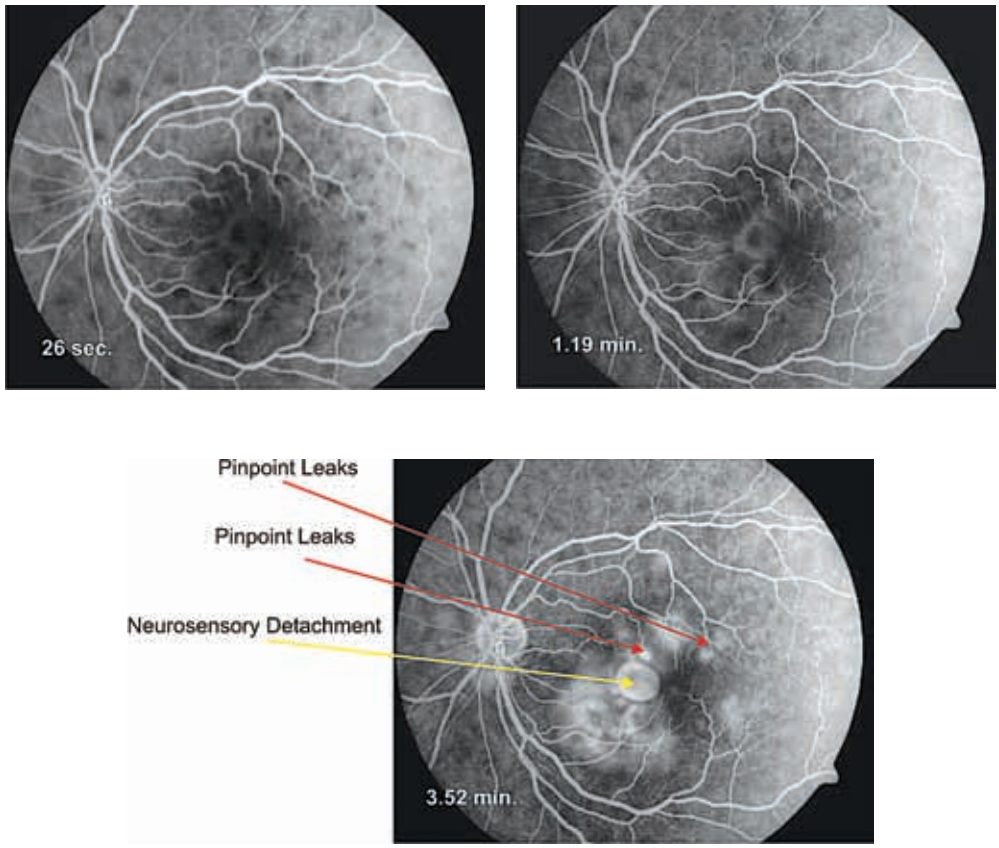


Figure 3: *FFA of left eye*

Prodromal phase

Meningeal phase- patients have headache, fever, and meningismus. Other complaints include confusion and photophobia. Auditory symptoms, such as tinnitus and dysacusis are seen in the majority of patients, at any stage CSF reveals lymphocytic pleocytosis.

Uveitic phase

It is characterised by acute diminution of vision, with associated redness and photophobia. There may be choroidal thickening, disk hyperemia and exudative retinal detachments. Detachments and their multifocal, multi-leak origins are best seen with fluorescein angiography.

Convalescent phase

This phase includes dermatologic changes in the form of patchy alopecia, patchy poliosis and symmetrical vitiligo over the head and trunk. There may be uveal depigmentation, perilimbal vitiligo (*Sugiura's sign*) and pigment epithelial depigmentation (*sunset glow fundus*).

Chronic phase

It is characterized by smoldering panuveitis with acute episodes of anterior uveitis.

Atypical presentations

VKH presenting as optic neuritis- Three cases were reported of VKH , who presented as optic neuritis and FFA could pick up the pin point leaks at the RPE level, suggestive of VKH. [1]

Single case has been reported by Kim et al, of a patient with bilateral optic neuritis and uveitis. [2]

The studies in Indian scenario include the following features –

Female more commonly involved (84%), with median age of most patients being 37 years. 75% had bilateral anterior uveitis. Posterior segment findings included disc edema (31/45), bilateral serous RD (26/45), Vitritis (17/45) and sunset glow (8/45). Extraocular manifestations were found only in 4/45 patients.[3]

VKH can be divided as per the revised diagnostic criteria[4] Complete VKH

- Incomplete VKH
- Probable VKH

Complete VKH

(All 5 should be present)

No h/o penetrating ocular trauma or surgery preceding the illness

No clinical evidence of other ocular disease

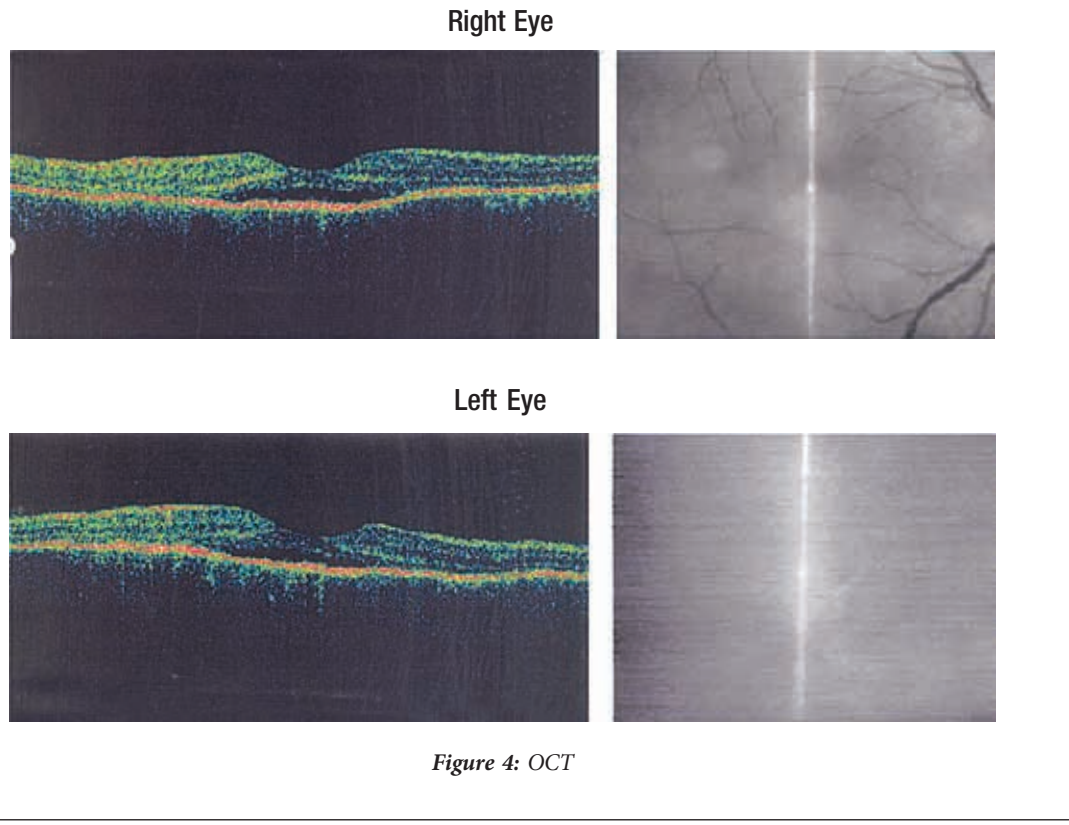


Figure 4: *OCT*

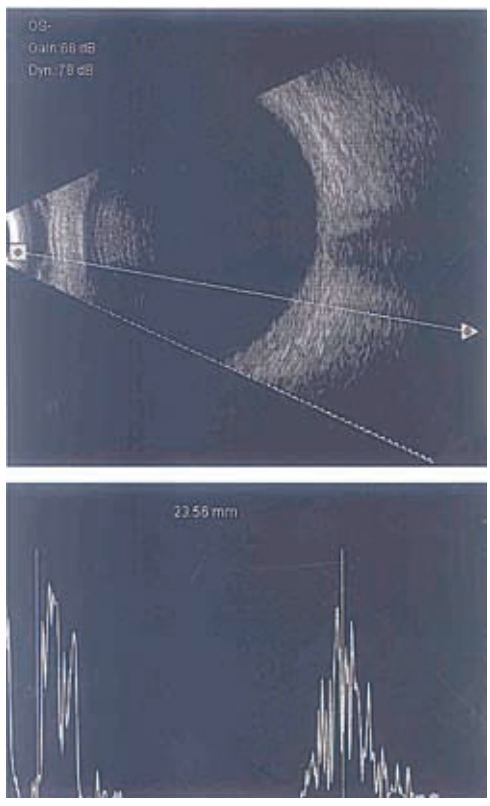


Figure 5: *USG*

Bilateral ocular involvement (a or b must be met)

Early manifestations

- Diffuse choroiditis
- Multiple pin point leakage/ diffuse choroidal thickening

Late manifestations

- Ocular depigmentation
- h/s/o prior ocular findings
- Multiple nummular depigmented scars / RPE clumping/ recurrent or chronic anterior uveitis

Neurological or auditory findings

- Meningismus or
- Tinnitus or
- CSF pleocytosis

Integumentary findings

- Alopecia or
- Poliosis or
- Vitiligo

Incomplete VKH

(Criteria 1-3 and either 4 or 5 must be present)

- No h/o penetrating ocular trauma or surgery preceding the illness

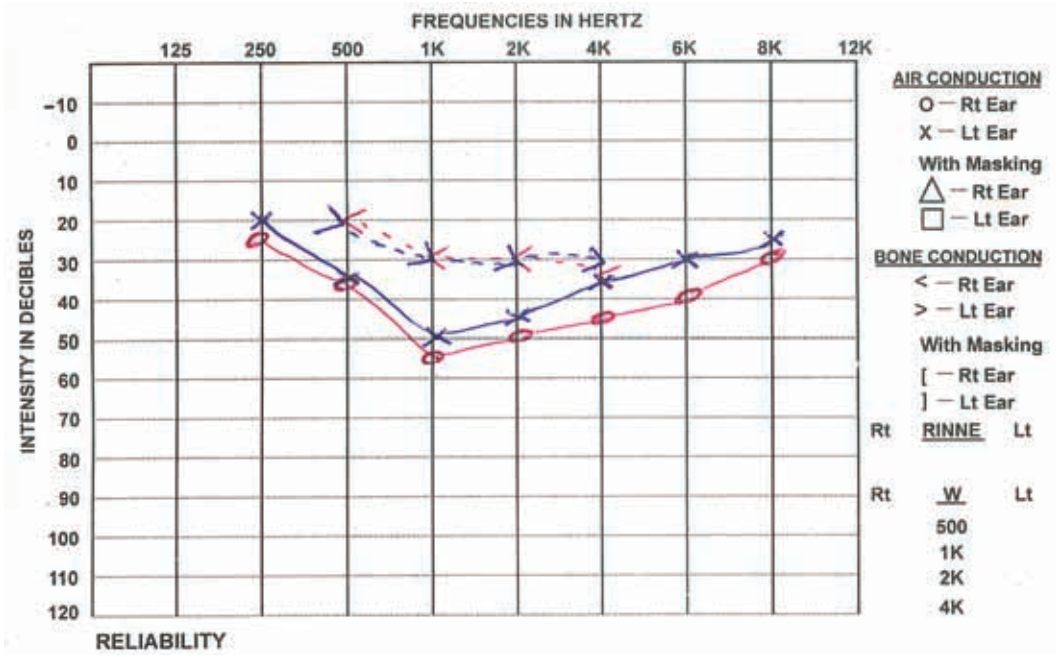


Figure 6: *Audiometry*

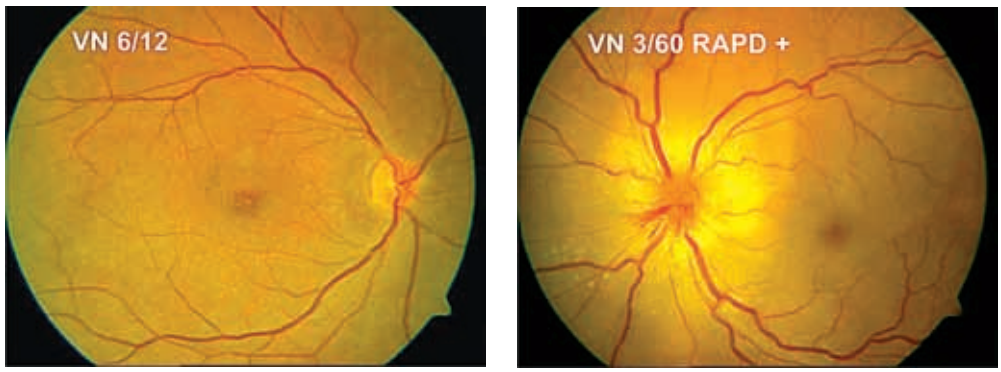


Figure 7: *After follow up loss of 3 months, the patient presented with decrease vision in left eye*

- No clinical or lab e/o other ocular disease
- Bilateral ocular involvement
- Neurological or auditory findings
- Integumentary findings

Probable VKH

(Criteria 1-3 must be present)

- No h/o penetrating ocular trauma or surgery preceding the illness
- No clinical or lab e/o other ocular disease
- Bilateral ocular involvement

Treatment

Classically, early and aggressive use of systemic corticosteroids should be implemented. The steroids should be used for a long time and very gradually tapered.

Now, immunomodulatory therapy has been recommended as the first line therapy for the treatment of VKH.[5]

Table 2: Certain diseases categorically require the employment, from the very first moment, of immunomodulatory agents, given the poor outcomes that eventually attend such disorders when steroids represent the only mode of treatment; they are-

- Sympathetic ophthalmia,
- Vogt-Koyanagi-Harada's disease,
- Multifocal choroiditis with pan uveitis,
- Birdshot retinochoroidopathy,
- Behçet's disease with retinal vasculitis, rheumatoid sclerouveitis,
- Polyarteritis nodosa,
- Wegener's granulomatosis, and
- Juvenile idiopathic arthritis-associated uveitis, which is chronic or recurrent

International Uveitis Study Group and the American Uveitis Society recommendations.

Immunotherapy for VKH includes the usage of drugs like Cyclosporine, Azathioprine, Methotrexate , Mycophenolate mofetil and Cyclophosphamide.

Cyclosporin acts by inhibiting cell mediated immunity. It is given in an initial dose of 2-5 mg/Kg/day. Renal and liver functions to be monitored. And there is always and increased risk of infection and lymphoma.

Azathioprine (IMMURAN)

Azathioprine therapy has been found to be effective in VKH disease to control active inflammation and for maintaining remission. It acts by inhibiting purine metabolism, given in a dose of 1-3mg/kg/day Per Orally. Liver Function Tests and Renal Function Tests should be monitored. Hematologic toxicity and risk of neoplasia may be present. [6]

Methotrexate

It modulates immune function and ameliorates symptoms of inflammation. It is given 5-15 g/m2/wk PO/IM as single dose. Blood counts, LFT and RFT monitoring to be done Folic acid supplements need to be given along with it.

Mycophenolate mofetil

MMF (2 g/day) appears to be a safe and effective second- or third-line adjunct/alternative immunosuppressant in the refractory and difficult cases. [7]

Suppresses purine synthesis by lymphocytes, inhibits their proliferation; inhibits antibody production. But there is always an increased risk of infection, risk of malignancies, impaired renal functions. There can be GI upset, nasopharyngitis, peptic ulcer disaease.

Triple agent immunosuppresive therapy in VKH

With the use of Oral prednisolone, azathioprine, and cyclosporine in combination, a rapid remission has been observed in patients with VKH.[8]

Infliximab

Infliximab intravenous infusions, 5 mg/kg, has been associated with rapid improvement in VKH disease, and the patients were able to taper and discontinue prednisone without disease recurrence for the several-month follow-up period.[9]

Long term complications Asociated with VKH include Cataract in 25%, Glaucoma in 33% and SRNVM in <10%

So, as per our experience Immunomodulatory therapy needs to be considered as the first line therapy for VKH in conjunction with corticosteroids. Also, slow tapering and long term treatment is important for maintaining remission and decreasing recurrences.

References

1. Vogt-Koyanagi-Harada disease presenting as optic neuritis. Rajendram R, Evans M, Khurana RN, Tsai JH, Rao NA. Int Ophthalmol. 2007 Apr-Jun;27(2-3):217-20. Epub 2007 Apr
2. Kim et al; Journal of Neuro-Ophthalmology:Volume 21(3)September 2001,p 205-206.
3. The spectrum of Vogt-Koyanagi-Harada disease in South India Murthy SI, Moreker MR, Sangwan VS, Khanna RC, Tejwani S. Int Ophthalmol. 2007 Apr-Jun;27(2-3):131-
4. Revised diagnostic criteria for Vogt-Koyanagi-Harada disease: report of an international committee on nomenclature Am Jour Ophthalmol Vol 131, issue 5, May 2001, Pages 647-652
5. Immunomodulatory therapy for Vogt-Koyanagi-Harada patients as first-line therapy. Paredes et al Ophthalmology 2004 Annual Meeting; April 25-29, 2004; Fort Lauderdale, Florida.
6. The use of low dose azathiprine in patients with Vogt koyanagi harada syndrome Kim SJ, Yu HG. Ocul Immunol Inflamm. 2007 Sep-Oct;15(5):381-7.
7. Mycophenolate mofetil as an immunosuppressive agent in refractory inflammatory eye disease Choudhary et al ; J Ocul Pharmacol Ther 2006;22(3) 168-75
8. Triple agent immunosuppressive therapy in Vogt-Koyanagi-Harada syndrome. Agarwal M, Ganesh SK, Biswas J. Ocul Immunol Inflamm. 2006 Dec;14(6):333-9
9. Infliximab therapy for 2 patients with Vogt-Koyanagi-Harada syndrome. Wang Y, Gaudio PA Ocul Immunol Inflamm. 2008 Jul-Aug;16(4):167-71

First Author
Nidhi Tanwar MD

Optical Coherence Tomography
New Horizons in Vitreo-Retinal Diseases

S.N. Jha MD

Progress of applied physics and ophthalmic imaging have gone hand in hand. Right from the day where first fundus viewing was carried out till this date the field has been covered by exciting inventions. After a long gap fundus fluorescien angiography made a phenomenal entry and it defined new ways of managing retinal diseases. It still remains one of the most used tool. The scene started becoming quite monotonous. The limitation of FFA was that it didn't give prevailing tissue structure. It only showed dynamics of blood circulation and provided end on view. With advances in management of different diseases something more was desired.

Enter optical coherence tomography (OCT) and it changed the rule of the game as never before. It was unbelievable, histopathology without biopsy of a structure which was literally untouchable, RETINA.

As we know OCT works on the principle of low coherence interferometry. A good analogy can be made with ultrasonography with substitution of light wave for sound waves. Not only noninvasive it is basically no touch technique. The basic physics is too complicated. Only thing to be noted is that it is limited by media clarity and computer analysis and modification is profound. A brief review of utility of this tool in different disease conditions is as follows.

Central Serous Retinopathy (CSR)

One of the commonest medical retina problem encountered by ophthalmologists has been thoroughly investigated. OCT provided insight into the pathophysiology of disease which was unparalled. Being noninvasive it is also easier to follow up the cases. As we know CSR is basically serous detachment of retina essentially in central area with or without pigment epithelial detachment. It quantified the serous detachment and counted the RPE detachments. It also could explain poor recovery inspite of cessation of leak on FFA by demonstrating residual serous detachment. It is also very informative in ruling out the diagnosis of CSR as pitfalls in diagnosis is well known. Many retinologists have stopped carrying out FFA in CSR except in exceptional situations.

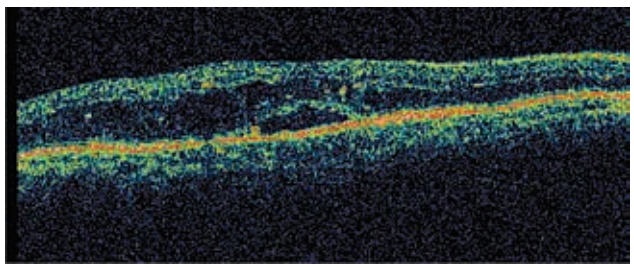


Figure 1: *Central Serous reinochoroidopathy*

Diabetic Maculopathy

One of the most challenging condition of modern times causing central visual loss got a total new approach in management with arrival of OCT. So far management was based on leakage on FFA and clinical appreciation of thickening in macular area. It not only quantified the thickening but also cleared doubts in some cases of maculopathy where treatment failed to make any headway. It showed for the first time role of vitreomacular traction in diabetic maculopathy. Presence of serous detachment was also demonstrated. It explained why it is futile to carry out laser photocoagulation in a spongy retina. Trying to light up a wet

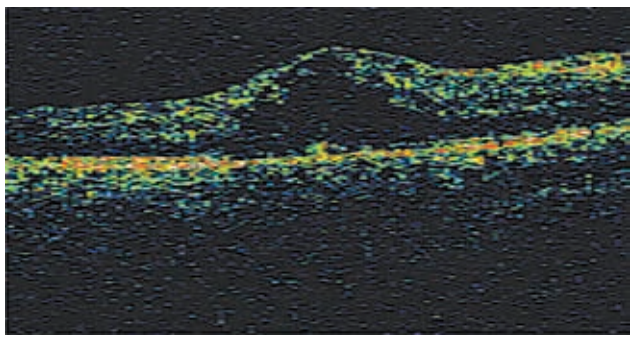


Figure 2: *Diabetic Macular Edema with Neurosensory detachment*

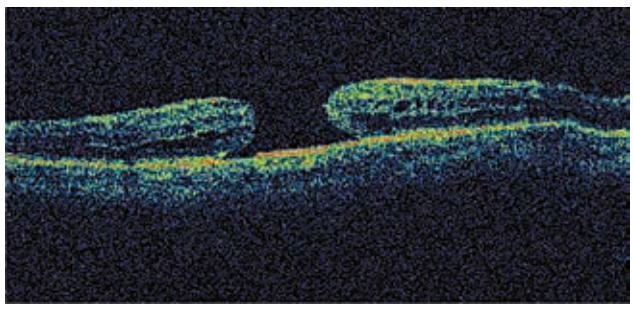


Figure 3: *Macular Edema*

Department of Ophthalmology
Sir Ganga Ram Hospital,
Rajinder Nagar, New Delhi

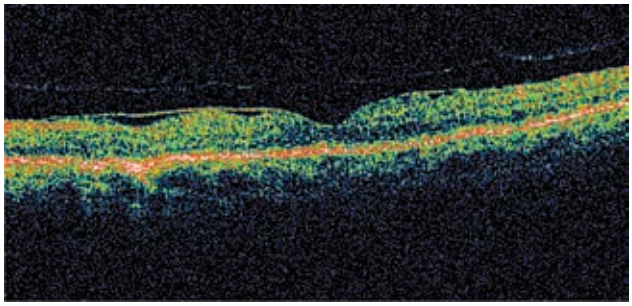


Figure 4: *Macular Hole*

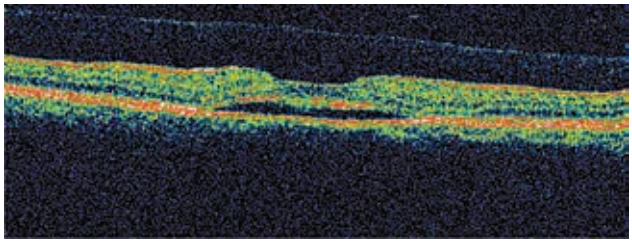


Figure 5: *Epiretinal membrane*

Matchstick! It introduced a whole new system of medical management of diabetic maculopathy from steroids to anti VEGF. Objectivity in follow up was fine tuned.

Choroidal Neovascular Membrane

In past few years retinologists got hold of modality of treatment of this condition which so far has been frustrating to say the least. Photodynamic therapy made the breakthrough. At this stage, treatment was defined by findings of FFA which partly was confusing. Anti VEGF along with OCT changed the rule of the game for sometimes to come if not forever. It simplified the indications making it possible to be treated by general ophthalmologists with certain undesirable implications. It introduced the criteria of thickening, presence of fluid along with drop in vision which are totally objective as compared to era of FFA. So OCT is new guru, follow it. The best thing OCT did to the management of CNVM was easy communicability of the disease situation to the patient. It also helped to define RPE detachment which in certain situations was contraindication to treatment. If there is large RPE detachment any modality of treatment is likely to lead to rip a condition no doctor will like to be associated.

Retinal Venous Blocks

OCT fine tuned management of macular pathology in these conditions particularly presence of serous detachment below fovea. It guides use of anti VEGF and steroids. As stressed, in cases of CNVM, OCT helps the doctor in convincing the patient about the type of treatment and underlying reasons to do so.

Macular Hole

OCT helps in reaching definitive diagnosis as well in distinguishing it from lamellar macular hole which does not require intervention. It also helps in predicting surgical success depending upon the geometric dimension of hole.

Unexplained Visual Loss

In many situations surgeons were foxed as to the cause of poor vision. OCT clarifies these doubts by detecting serous detachment, vitreomacular traction, epiretinal membrane and loss of visual elements in macular area.

In brief, OCT has helped to understand retinal diseases better, defining a scientific line of management and objective follow up by a non invasive method.

Author
S.N. Jha MD

Missed DOS Times Copy

If you have missed your copy of DOS Times.
Please Contact:
Secretary DOS : *Dr. Namrata Sharma*
Room No. 474, 4th Floor,
Dr. Rajendra Prasad Centre for Ophthalmic Sciences
All India Institute of Medical Sciences,
Ansari Nagar, New Delhi – 110029
Ph.: 91-11-65705229, ***Fax:*** 91-11-26588919,
E-mail: dosonlin@vsnl.net,
Website: www.dosonline.org

Corneal biomechanical properties and intraocular pressure changes after phacoemulsification and intraocular lens implantation

Kucumen RB, Yenerel NM, Gorgun E, Kulacoglu DN, Oncel B, Kohen MC, Alimgil ML.

J Cataract Refract Surg. 2008 Dec;34(12):2096-8.

Yeditepe University Department of Ophthalmology, Istanbul, Turkey.

PURPOSE

To evaluate corneal viscoelastic and intraocular pressure (IOP) changes measured by an ocular response analyzer (ORA) after phacoemulsification and intraocular lens (IOL) implantation.

METHODS

Fifty-one eyes scheduled for cataract surgery were included in the study. Corneal hysteresis (CH), corneal resistance factor (CRF), corneal-compensated intraocular pressure (IOPcc), and Goldmann-correlated IOP (IOPg) were measured by ORA preoperatively and 1 week and 1 and 3 months postoperatively. Central corneal thickness (CCT) was measured using the ORA's integrated handheld ultrasonic pachymeter.

RESULTS

The mean preoperative CCT (537 mum +/- 46 [SD]) did not change significantly by the end of 1 month postoperatively. The mean preoperative IOPcc (17.2 +/- 3.0 mm Hg) decreased significantly by 3 months postoperatively (15.2 +/- 3.7 mm Hg) (P = .018). The mean CH decreased from 10.36 +/- 1.48 mm Hg preoperatively to 9.64 +/- 1.26 mm Hg at 1 week (P = .028); it increased to preoperative values at the end of 1 month (10.20 +/- 1.70) and 3 months (10.74 +/- 1.54) (P>.05). The mean CRF decreased from 10.94 +/- 2.54 mm Hg preoperatively to 9.99 +/- 1.77 at 1 week (P = .026); it increased to preoperative values at 1 month (10.26 +/- 1.59) and 3 months (10.35 +/- 1.46) (P>.05).

CONCLUSIONS

Although CH and the CRF decreased in the early postoperative period, the parameters increased and reached preoperative values by 3 months postoperatively, showing that corneal biomechanical properties are influenced by phacoemulsification and IOL implantation.

Half-moon supracapsular nucleofractis phacoemulsification: safety, efficacy, and functionality

Can I, Takmaz T, Genç I.

J Cataract Refract Surg. 2008 Nov;34(11):1958-65.

Atatürk Training and Research Hospital, 2nd Ophthalmology Department, Ankara, Turkey, e-mail: izzet-can@yahoo.com

PURPOSE

To compare the safety, efficacy, and functionality of half-moon supracapsular phacoemulsification, a variation of the nucleofractis technique, with those of the stop-and-chop technique.

METHODS

This prospective randomized study comprised 100 eyes having phacoemulsification with the half-moon supracapsular (Group 1, 50 eyes) or stop-and-chop (Group 2, 50 eyes) technique. The half-moon supracapsular technique is based on hydrodissection-assisted partial prolapse of the nucleus. After the prolapsed nucleus is chopped horizontally and the first wedge removed, quadrant removal is performed endocapsularly. Follow-up examinations were at 1, 7, 30, and 90 days.

RESULTS

The 2 groups were similar in demographic features and surgical difficulty factors. There was no difference in the complication rate. The phaco time (mean: Group 1, 0.2 minutes +/- 0.1 (SD); Group 2, 0.4 +/- 0.4 minutes), average power (mean 11.3% +/- 6.9% and 18.3% +/- 7.3%, respectively), effective phaco time (1.7 +/- 1.8 seconds and 4.8 +/- 6.5 seconds, respectively), and total operation time (12.3 +/- 3.2 minutes and 14.3 +/- 4.3 minutes, respectively) were significantly lower in Group 1 than in Group 2. One day postoperatively, the increase in central corneal thickness increase was significantly greater in Group 1 (P = 0.011), with no significant differences thereafter. The visual acuity increase and contrast sensitivity scores at 90 days were similar in the groups.

CONCLUSIONS

The half moon supracapsular technique shortened the phacoemulsification procedure and lowered phaco energy, indicating it protects surrounding intraocular tissue. There was no difference between techniques in reliability and functionality.

The laparotomy incision: a technique to facilitate capsulorhexis in microincision cataract surgery

O'Connor JC, O'Connell ED, Sciscio A, Mulhern MG.

Ophthalmic Surg Lasers Imaging. 2008 Nov-Dec;39(6):519-21

Ophthalmology department, Waterford Regional Hospital, Waterford, Ireland

Microincision cataract surgery is a new technique in the development of cataract surgery and is not without difficulties. Creation of the continuous curvilinear capsulorhexis as performed in conventional coaxial phacoemulsification surgery does not apply as readily. The authors describe a method for initiating the continuous curvilinear capsulorhexis (the laparotomy incision) using only an inexpensive 25-gauge bent needle cystototome. The technique involves a long linear incision in the anterior capsule down the belly of the lens as a means of initiating the capsulorhexis. Advantages of the technique include the creation of a large capsular flap, which allows easier completion of the continuous curvilinear capsulorhexis through a smaller range of movement, avoiding "oar locking" in the small incision and creation of striae in the cornea. It also allows better maintenance of anterior chamber depth, minimizing risk of radial tears.

Effect of intraocular lens design on posterior capsule opacification

Buehl W, Findl O.

J Cataract Refract Surg. 2008 Nov;34(11):1976-85.

Department of Ophthalmology, Medical University of Vienna, Vienna, Austria

Posterior capsule opacification (PCO) remains the most common long-term complication after cataract surgery. Many studies have attempted to identify factors that influence the development of PCO. The aim of this systematic review based on Cochrane methodology was to summarize the effects of intraocular lens (IOL) geometry, including modifications of the IOL optic (especially optic edge design) and haptics, on the development of PCO. Twenty-six prospective randomized controlled trials with a follow-up of at least 12 months were included. In 5 of 7 studies, visual acuity was better in sharp-edged IOLs than in round-edged IOL. The PCO score was significantly lower with sharp-edged IOLs but did not differ significantly between 1-piece and 3-piece open-loop IOLs. Because of the significant difference in the PCO score, sharp-edged IOL optics should be preferred to round-edged IOL optics.

Second instrument tip breaks during phacoemulsification

Nazemi F, Odorcic S, Braga-Mele R, Wong D.

Can J Ophthalmol. 2008 Dec;43(6):702-6.

Background

Second instrument tip breaks during phacoemulsification are complications that are anecdotally recalled, yet little information exists on why and how often they occur, whether they are consistently tracked, and how they are managed. They may be an underreported, but potentially serious, complication of phacoemulsification.

Methods

We surveyed 114 cataract surgeons in Ontario to determine reported rates of second instrument tip breaks, their management, and presumed etiology. We reviewed 4 Toronto cataract centres for incident reports, instrument sterilization processes, and purchase histories. Using scanning electron microscopy (SEM), we compared the characteristics of a broken Sweeney tip to new and used second instruments.

Results

Of the 35 surgeons responding to the survey, 34% had experienced a second instrument tip break during their careers. Approximately 73% (16 cases) of the 22 cases reported were managed successfully during the procedure by the primary surgeon, 14% (3 cases) required imaging by computerized tomography or x-ray, and another 14% (3 cases) required pars plana vitrectomy for tip retrieval. Purchase histories revealed that 1 Sweeney hook was exchanged monthly, equivalent to 100 to 150 surgeries. SEM of new and used second instruments revealed signs of metal fatigue on both new and used second instruments.

Interpretation

Although both physicians and hospitals lack a method for ensuring quality control of second instruments, approximately one third of cataract surgeons encounter second instrument tip breaks during the course of their careers. Although most cases are managed intraoperatively, consistent hospital tracking records and standardized instrument inspection by institutions and surgeons are needed to determine how these complications occur and to establish protocols for complication reporting and management.

DOS Correspondent
Shubha Bansal DNB

Forthcoming Events : National

December 2008

4-6 WEST BENGAL

XVII Annual Conference of Vitreoretinal Society of India
Fort Radisson, RAICHAK, West Bengal
Contact Person & Address
Secretary, VRSI
Dr Ajit Babu Majji
L V Prasad Eye Institute, L.V. Prasad Marg,
Banjara Hills, Hyderabad- 500 034, India
E-mail: ajit@lvpei.org, Website: vrsi.in

5-7 GURGAON, HARYANA

Oculoplasty Panorama 2008
19th Annual Conference of the Oculoplasty Association of India
Contact Person & Address
Dr. Anita Sethi, *Organizing Secretary*
Venue: Artemis Health Institute, Gurgaon, Haryana
Ph.: +91-1246767999 Ext. 1925, 1234, +91-9810199636
E-mail: oculoplastypanorama08@gmail.com

13-14 PURNEA, BIHAR

46th Annual Congress of Bihar Ophthalmological Society
Purnea, Bihar
Contact Person & Address
Dr. Rajan Anand, Organising Secretary,
(M): 09431239315,
E-mail: visionbihar@2008gmail.com

January 2009

10-11 INDORE, M.P.

Annual Conference of Indore Division Ophthalmological Society
Contact Person & Address
Dr. Radhika Bandi
Greater Kailash Hospital
11/2,Greater Kailash Road, Old Palasia,
Indore(M.P.)- 452 018.
Cell: 9826030606
Ph. 0731-2494175, 4051160, Fax:91-731-4043929
Email: ophthtomorrow@gmail.com

February 2008

5-8 JAIPUR

67th Annual Conference of AIOS
B.M. Birla Science & Technology Research Centre,
Statue Circle, Jaipur
Contact Person & Address
Prof. P.K. Mathur, Organising Secretary,
C-126, Moti Nagar, Bapunagar, Jaipur-302015
Phone: 0141-2705972, 0141-2701030,
(M) 982901592, E-mail: pradeepmathur@hotmail.com

10-11 PUDUCHERRY

International Symposium on Diabetic Retinopathy
Contact Person & Address
Dr. Umesh Chandra Bahera,
Venue: Aravind Eye Hospital, Puducherry
1, Anna Nagar, Madurai - 625 020
Phone: 0452-4356100, Fax: 0452-2530984,
E-mail: umeshcbehera@gmail.com, uma@aravind.org

25-26 CHENNAI

Neuro-Ophthalmology Update 2009
Sankara Nethralaya, 18, College Road,
Chennai, Tamil Nadu
Contact Person & Address
S. Ambika, Conference Secretariat
E-mail: ddrag@snmail.org, drsa@snmail.org

March 2009

20-22 NEW DELHI

Annual Conference of Delhi Ophthalmological Society
Contact Person & Address
Dr. Namrata Sharma
Room No. 474, 4th Floor,
Dr. Rajendra Prasad Centre for Ophthalmic Sciences,
All India Institute of Medical Sciences,
Ansari Nagar, New Delhi – 110029
Ph.: 011-65705229, ***Fax:*** 26588919,
E-mail: dosonlin@vsnl.net, ***Website:*** www.dosonline.org

Forthcoming Events : International

November, 2008

8th ATLANTA, GEORGIA

Clinical Trials Education Series: Design, Conduct and Management of Clinical Trials in Eye Research
Atlanta, Georgia, United States
Contact Name: Grammer, Jot
Phone: 240.221.2933 *Fax:* 240.221.0370
Email: jgrammer@arvo.org
Web Site: http://www.arvo.org/eweb startpage.aspx?site=clinictria

8-11 ATLANTA, GEORGIA

American Academy of Ophthalmology Annual Meeting
Atlanta , Georgia , United States
Phone: 415-561-8500 ext. 320 *Fax:* 415-561-8576
Email: meetings@aao.org , *Web Site:* http://www.aao.org

12-14 BRIGHTON, UK

Annual Meeting of the United Kingdom of Ireland Society of Cataract and Refractive Surgeons
Brighton Dome, Brighton, East Sussex, UK
Website: www.ukiscrs.org.uk

16-19 FLORIDA, UNITED STATES

XXX Inter-American Course in Clinical Ophthalmology
Miami, Florida, United States
Contact Name: Department, CME
Phone: 305-326-6110 Fax: 305-326-6518
Email: curso@med.miami.edu
Web Site: http://www.bascompalmer.com/ site/info/info_inter.asp

22-26 MELBOURNE

RANZCO Annual General Meeting and Scientific Congress,
Melbourne Convention Centre,
Melbourne, Victoria
Contact Name: Mr. Kevin Wickham
Phone: 61-03-9859 6899, Fax: 61-03-9859 2211
Website: www.ranzcome!@wickhams.com.au

December, 2008

6th PALM BEACH, FLORIDA

Retinal & Glaucoma Imaging 2009
Palm Beach, Florida, United States
Contact Name: Department, CME
Phone: 305-326-6110 Fax: 305-326-6518
Email: bpeicme@med.miami.edu
Web Site: http://www.bascompalmer.org

January, 2009

15-18 HYDERABAD, INDIA

Asia-ARVO
Hyderabad, Andhra Pradesh, India
Contact Name: Honavar, Santosh
Email: asiaarvo@lvpei.org
Web Site: http://www.arvo.org/asiaarvo

February, 2009

6-8 ROME, ITALY

13th ESCRS Winter Refractive Surgery Meeting
Rome, Italy
Phone: +3535 1209 1100 / Fax: +353 1209 1112
Email: escrs@escrs.org
Web Site: http://www.escrs.org

March, 2009

17-22 CHICAGO

Illinois Eye Review
Chicago, Illinois, United States
Contact Name: Cindy
Phone: 312.996.6590 Fax: 312.996.7770
Email: IllinoisEyeReview@gmail.com
Web Site: http://www.IllinoisEyeReview.org

April, 2009

4-8 SAN FRANCISCO, CA, USA

ASCRS/ASOA Symposium and Congress
Francisco, USA
Phone: 701 591 2220 / Fax: 1703 591 0614
Web Site: http://www.ascrs.org

May, 2009

3-7 FLORIDA

Greater Fort Lauderdale/Broward County Convention Center
1950, Eisenhower Blvd.,
Fort Lauderdale, Florida - 33316
Phone: 1.240.221.2900, *Email:* arvo@arvo.org

September, 2009

12-16 BARCELONA, SPAIN

XXVII Congress of the ESCRS
Phone: +35312091100, Fax: 35312091112
Email: escrs@escrs.org
Web Site: http://www.escrs.org

October, 2009

3-7 SAN FRANCISCO, CA, USA

American Academy of Ophthalmology
Joint meeting with PAAO
Phone: +1415 447 0320, Fax: 1415 561 8576
Web Site: http://www.org/annual_meeting

Delhi Ophthalmological Society

(LIFE MEMBERSHIP FORM)

Name (In Block Letters) _____

S/D/W/o _____ Date of Birth _____

Qualifications _____ Registration No. _____

Sub Speciality (if any) _____

ADDRESS

Clinic/Hospital/Practice _____

_____ Phone _____

Residence _____

_____ Phone _____

Correspondence _____

_____ Phone _____

Email _____ Fax No. _____

Proposed by

Dr. _____ Membership No. _____ Signature _____

Seconded by

Dr. _____ Membership No. _____ Signature _____

[Must submit a photocopy of the MBBS/MD/DO & State Medical Council / MCI Certificate for our records.]

I agree to become a life member of the Delhi Ophthalmological Society and shall abide by the Rules and Regulations of the Society.

(Please Note : Life membership fee Rs. 3100/- payable by DD for outstation members. Local Cheques acceptable, payable to Delhi Ophthalmological Society)

Please find enclosed Rs._____in words _____ by Cash

Cheque/DD No._____ Dated_____ Drawn on_____

Three specimen signatures for I.D. Card.

Signature of Applicant with Date

FOR OFFICIAL USE ONLY

Dr._____has been admitted as Life Member of the Delhi Ophthalmological Society by the General Body in their meeting held on_____

His/her membership No. is _____. Fee received by Cash/Cheque/DD No._____ dated_____ drawn on _____.

(Secretary DOS)

INSTRUCTIONS

1. The Society reserve all rights to accepts or reject the application.
2. No reasons shall be given for any application rejected by the Society.
3. No application for membership will be accepted unless it is complete in all respects and accompanied by a Demand Draft of Rs. 3100/- in favour of **"Delhi Ophthalmological Society"** payable at New Delhi.
4. Every new member is entitled to receive Society's Bulletin (DOS Times) and Annual proceedings of the Society free.
5. Every new member will initially be admitted provisionally and shall be deemed to have become a full member only after formal ratification by the General Body and issue of Ratification order by the Society. Only then he or she will be eligible to vote, or apply for any Fellowship/Award, propose or contest for any election of the Society.
6. Application for the membership along with the Bank Draft for the membership fee should be addressed to Dr. Namrata Sharma, Secretary, Delhi Ophthalmological Society, R.No. 474, 4th Floor, Dr. R.P. Centre for Ophthalmic Sciences, AIIMS, Ansari Nagar, New Delhi - 110 029.
7. Licence Size Coloured Photograph is to be pasted on the form in the space provided and two Stamp/ Licence Size Coloured photographs are required to be sent along with this form for issue of Laminated Photo Identity Card (to be issued only after the Membership ratification).
8. Applications for 'Delhi Life Member' should either reside or practice in Delhi. The proof of residence may be in the form Passport/ Licence/Voters Identity Card/Ration Card/Electyricity Bill/MTNL (Landline) Telephone Bill.

DOS Quiz

Anagram Time

Each of the following words is a jumbled ophthalmic or related term. There is, however, an extra letter in every set of letters. These extra letters will also form a six letter ophthalmic word when unjumbled.

So get cracking.

1. GNARLO ___ ___ ___ ___ ___ ___
2. DOEDIE ___ ___ ___ ___ ___ ___
3. KONTRAPY ___ ___ ___ ___ ___ ___ ___ ___
4. SECREMIX ___ ___ ___ ___ ___ ___ ___ ___
5. RTICOMMONROACH ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___
6. STOPGULATICHOOONA ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___

Saurabh Sawhney *DO, DNB* ***Ashima Aggarwal*** *MS, DNB*
Insight Eye Clinic, New Delhi

Answers on page number 47

Life Time Achievement Award

Details of the awards, eligibility criteria and procedure to apply are given below:

General Conditions

1. Any Member of the Society who is eligible for the Award shall be entitled to be considered for the same.
2. Nomination should be signed by one of the following:
   a. Any of the Past Awardees
   b. Any of the Past Presidents
   c. At least 5 members of the Executive Committee
   d. At least 15 members of the Delhi Members of DOS.
3. Recommendations should be sent to the Secretariat, DOS with 5 copies of BIO-DATA and Photograph.
4. The person shoud have significant Life time achievements in the field of Ophthalmology.
5. Recipient of the Award shall be selected and recommended by the Selection Committee, which has to be approved by the executive.

Eligibility

1. The Member should be 65 years of age or more
2. Active participation in Society for 20 years
3. Contribution in improvement of standard of Ophthalmology in India
4. Award will carry a citation.

Periodicity

1. Maximum 2 Awards in a year.
2. The nominations must be received in DOS Secretariat no later than 5.00 p.m. on **January 31st, 2009**.

Secretary, DOS

Dr. P.K. Jain Oration & Dr. S.N. Mitter Oration

Nominations are invited for the above orations. The nominee should be a voting member of the Delhi Ophthalmological Society.

Selection Procedure

Nomination should be signed by one of the following:

1. Any of the Past Awardees
2. Any of the Past Presidents
3. At least 5 members of the Executive Committee
4. At least 15 members of the Delhi Members of DOS.

The nomination must include an introductory paragraph justifying the nomination, a biodata of the nominee, a statement to the effect that the nominee would accept the award if awarded and would deliver an oration of his choice at the annual conference of the DOS. The topic should be intimated to the society at least 4 weeks before the conference and a typed script of the same should be sumitted at least 15 days before. The awardee will have to transfer the copyright of the text of his talk to the society.

Selection Process

The selection will be made by a Selection Committee consisting of the President, Secretary and 3 senior, distinguished members from 3 different sub-specialties of Ophthalmology. The Executive Committee would take the final decision on the basis of the recommendations of the Selection Committee. The nominations must be received in DOS Secretariat no later than 5.00 p.m. on **January 31st, 2009**.

Advance copy of the nominations may be sent by email. The hard copy must however be received in the DOS Secretariat by the last date for receiving the nominations.

DOS Fellowship

Last date for submission of application for fellowship for Partial Financial Assistance to Attend International Conference : **31st January, 2009**