

Sparfloxacin corneal deposits

Dear Editor,

Fluoroquinolones are broad spectrum, bactericidal agents with activity against both gram-positive and gram-negative corneal pathogens. Topical fluoroquinolones are widely used in the treatment of bacterial corneal ulcers. They are safe, but a white crystalline deposit, that in most cases spontaneously dissolves, has been reported with topical ciprofloxacin 0.3% and norfloxacin 0.3% and very recently with ofloxacin 0.3%.¹⁻³ Sparfloxacin, a newer quinolone, is now available as 0.3% eye drops for the treatment of serious corneal and conjunctival infections. It has better penetration and a high therapeutic index. I noticed sparfloxacin corneal deposits after prolonged topical use in four patients. Two patients were treated for graft infiltrate and two for corneal ulcer. A representative case is described briefly.

Case

A 65-year-old patient presented with acute dacryocystitis in her right eye. She had previously undergone corneal grafts for bullous keratopathy in both eyes. The grafts in both eyes were clear at presentation and she was on prednisolone acetate 1 % eye drops once daily in both eyes. She was prescribed sparfloxacin eye drops 0.3% five times a day in the right eye along with oral amoxicillin 500 mg and ibuprofen 400 mg + paracetamol 325 mg combination, both thrice daily for 5 days. The patient did not return for follow up and continued using the drops. On her next visit two months later, multiple refractile crystalline deposits were seen in the corneal graft. The deposits were seen throughout the stroma and also along the suture tracks (Figure). The eye was quiet, there was no inflammation and the patient was asymptomatic. She was advised to discontinue topical sparfloxacin and continue the topical prednisolone only. She was also advised a dacryocystorhinostomy in the right eye. At her next visit two months later the graft was clear with complete resolution of the deposits.

Comments

Analysis of ciprofloxacin, norfloxacin and ofloxacin eye drops related drug deposits have confirmed the presence of quinolones. The specific factors contributing to the formation of the fluoroquinolone precipitate are unknown, but pH solubility profiles are of importance. Sparfloxacin is deposited as a refractile crystalline deposit in all layers of the corneal stroma. Deposits can develop in the absence of an epithelial defect, ulceration



Figure. Sparfloxacin corneal deposits

or inflammation. Unlike surface deposits noted with other quinolones, sparfloxacin is deposited throughout the corneal stroma. The deposits do not cause any inflammation and patients are asymptomatic. This was not suspected initially. However the absence of any other known cause of crystalline corneal deposits suggested a possibility of drug deposition. The deposits also resolved on discontinuation of sparfloxacin drops. The deposits can be analysed biochemically only if a corneal graft or biopsy is done in a patient who has these deposits. Clinicians should be aware that refractile deposits can occur after prolonged topical use of sparfloxacin; these deposits resolve slowly after cessation of therapy.

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References

1. Castillo A, Benitez Del Castillo JM, Toledano N, Diaz-Valle D, Sayagues O, Garcia-Sanchez J. Deposits of topical norfloxacin in the treatment of bacterial keratitis. *Cornea* 1997;16:420-23.
2. Eiferman RA, Snyder JP, Nordquist RE. Ciprofloxacin microprecipitates and macroprecipitates in the human corneal epithelium. *J Cataract Refract Surg* 2001;27:1701-2.
3. Claerhout I, Kestelyn Ph, Meire F, Remon JP, Decaestecker T, Van Bocxlaer J. Corneal deposits after the topical use of ofloxacin in two children with vernal keratoconjunctivitis. *Br J Ophthalmol* 2003;87:646.

Debris in phacoemulsification handsets. A potential cause of endophthalmitis after cataract surgery?

Dear Editor,

Postoperative infections in the eye can have devastating effects on visual outcome after surgery, and are unfortunately not uncommon in India.¹ In the absence of an organised reporting system, such infections are often underreported, but outbreaks have been described. Recently, the increasing popularity of phacoemulsification has improved the success rate of cataract surgery though postoperative infections including epidemics continue to occur. They have been traced to internal contamination of the tubings in the phacoemulsification machine.²

We experienced a cluster of infections after phacoemulsification for cataract extraction at our centre. This communication describes the results of our investigations and highlights a potential new source of such infections. From January to August 2003, we had 10 culture-proven infections in 5,706 patients undergoing phacoemulsification for cataract. This rate of 0.18% was higher than the 0.04% (3 infections among 6997 phacoemulsification procedures), recorded during 2002, and 0.02% (1 of 4,335 surgeries) of non-phacoemulsification cataract surgery performed during the same period. Our suspicion was directed towards the phacoemulsifiers and associated equipment. We performed the following procedures on the phacoemulsification and irrigation-aspiration (IA) handsets. After routine scrubbing and gloving, the autoclaved instrument trays were set up and the phacoemulsifier was connected. A bottle of Ringers Lactate solution (Sri Krishna Keshav Laboratories, Gujarat, India) was hung on the pole of the instrument and a sterile intravenous (IV) infusion set was connected. Fluid from the bottle was collected in a sterile container through the IV set, and sent for microbiological analysis. After this was done, the fluid from the bottle was collected in a sterile bowl and a 20 ml syringe was used to flush 100 ml of the fluid through the irrigation and aspiration lines of the phacoemulsification and IA handsets. This washing was collected in sterile containers and sent for microbiological analysis. In addition to cultures, the washings were also centrifuged (Remi Laboratory Centrifuge, India) and the deposits were studied under light microscopy. Seven pairs of phacoemulsification and IA handsets were studied, and in two pairs only the irrigation lines were flushed, providing 24 samples of washings.

While none of the samples of fluid taken from the bottle were positive for microorganisms 11 of 24 samples collected after flushing the phacoemulsification and IA handsets were culture positive. These included *Acinetobacter calcoaceticus* and *Alkaligenes fecalis*. Similar organisms were cultured from the intraocular fluids in

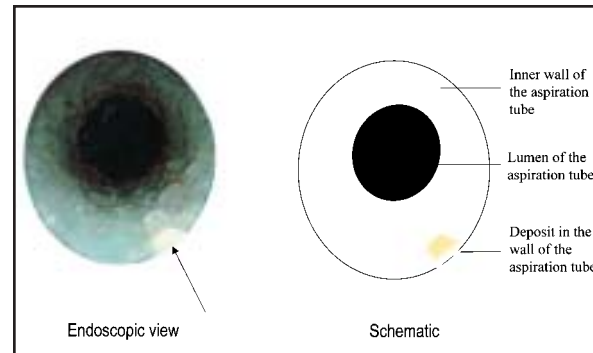


Figure. Endoscopic visualisation of the inner bore of the aspiration tube of the phacoemulsification handset

7 patients with post-phacoemulsification endophthalmitis. The sediments obtained from the washings were examined by light microscopy. This showed presence of deposits 5 to 40 μm in size; these were needle shaped and suggestive of lens matter. To further confirm the presence of such debris accumulation in the bore of the handset tubings we procured a flexible fibre optic micro-endoscope (Storz) with a diameter of 1 mm, which allowed us to image the inner surface of the handset tubings. This examination confirmed the presence of significant deposits in the aspiration lines (Figure) of all the 5 handsets examined.

Such materials, even if sterile, are capable of inciting a sterile inflammatory reaction due to their pyrogenic nature. It is also likely that in the presence of such organic debris, microorganisms sequestered in these regions are protected from routine sterilisation procedures. When the debris buildup in the handsets exceeds a critical level, some of it can be washed into the eye during surgery and cause infection. Similar incidences have been reported from Glasgow,³ although the authors did not include direct endoscopic visualisation of these deposits.

The relatively infrequent episodes of infections despite the prevalence of such deposits in the handsets may be because routine cleaning and sterilisation procedures retain some of their effectiveness in this milieu.

The manufacturers of the phacoemulsifiers were contacted and although they did not have an established protocol for the treatment of such deposits, a protocol was worked out which uses an enzyme cleaner (Endozime, Ruhof, Minnesota, USA) to reduce these deposits. The use of this cleaner has reduced the size of the established deposits, although its true value may be in preventing such buildup from occurring, if used regularly in new probes. An automated flushing system using distilled water and air has also been proposed as an effective measure. Considering the increased longevity of the current generation phacoemulsification handsets the maintenance protocols will have to be more robust.

In conclusion, we report another possible source of contamination in phacoemulsification surgery that could lead to postoperative endophthalmitis. It is important that phaco surgeons devise reliable protocols for the care of their handsets. Since most surgeons use more than one handset for surgeries, it may be prudent to note the serial number of the handset in the case notes as this can aid epidemiological investigations if infections occur.

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References

1. Das T. National endophthalmitis survey. *Indian J Ophthalmol* 2003;51:117-18.
2. Zaluski S, Clayman HM, Karsenti G, Bourzeix S, Tournemire A, Faliu B et al. *Pseudomonas aeruginosa* endophthalmitis caused by contamination of the internal fluid pathways of phacoemulsifiers. *J Cataract Refract Surg* 1999;25:540-45.
3. Leslie T, Aitken DA, Barrie T, Kirkness CM. Residual debris as a potential cause of post phacoemulsification endophthalmitis. *Eye* 2003;17:506-12.

Essential parameters for accurate intraocular lens (IOL) power estimation in post refractive surgery cataract patients

Dear Editor,

Corneal refractive surgery, photorefractive keratectomy (PRK) and laser in situ keratomileusis (LASIK) have revolutionised the correction of refractive errors since the early 1990s. It is estimated that approximately 1.3 million refractive procedures were performed in the United States alone in 2001.¹ Although a majority of the patients treated are in their second or third decade of life, a significant number of patients over the age of 40 also undergo refractive procedures. With time some of these patients tend to develop visually significant lens changes requiring cataract extraction. Current methods of IOL power estimation perform well with great accuracy when used for eyes with physiologic prolate corneas. But, when these formulae are applied for eyes which have undergone refractive surgical procedures, they do not seem to function well and result in postoperative refractive surprises.² Eyes that have had

myopic refractive procedures tend to develop hyperopia and vice versa. This is quite disturbing to patients, who have high expectations and expect good unaided visual acuity, similar to one following refractive procedures.

There have been several publications regarding methods of estimating the effective keratometry value of the post refractive surgery cornea for accurate IOL power calculation in these patients.^{2,3} The preferred method is the clinical history method of deriving the post refractive surgery keratometric values, suggested by Holladay in 1989.⁴ This method requires three variables, i) preoperative manifest refraction, ii) preoperative keratometry values, and iii) stable postoperative manifest refraction. The change in spherical equivalent refraction induced by the refractive procedure is subtracted from the preoperative keratometry power to derive the actual keratometry power post refractive surgery. This keratometry value when used for IOL power calculation, reduces the risk of postoperative ametropia following cataract surgery.

The number of centres providing facilities for refractive surgery is on the rise in India. Although we do not have exact figures on how many patients undergo laser refractive surgery every year, a rough estimate would be approximately 50,000 to 80,000 considering that each centre treats 1,000 to 1,500 patients per year. Managing cataracts in these patients can be challenging with regards to postoperative refractive outcome. Hence it is essential that certain information should be provided to every patient undergoing a refractive surgical procedure. The refractive surgeon should provide a report containing the three variables mentioned earlier, i.e., the preoperative refractive error, keratometry values and stable postoperative refractive error.

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References

1. United States Census 2000. Available online at : <http://www.census.gov/prod/2001pubs/c2kbr01-12.pdf>.
2. Odenthal MT, Eggink CA, Melles G, Pameyer JH, Geerards AJ, Beekhuis WH. Clinical and theoretical results of intraocular power calculation for cataract surgery after photorefractive keratectomy for myopia. *Arch Ophthalmol* 2002;120:431-38.
3. Hamilton RD, Hardten DR. Cataract surgery in patients with prior refractive surgery. *Curr Opin Ophthalmol* 2003;14:44-53.
4. Holladay JT. IOL calculations following RK. *Refract Corneal Surg* 1989;5:203.

Rhino-orbital-cerebral mucormycosis. A retrospective analysis and treatment option

Dear Editor,

We read with great interest the article "Rhino-orbital-cerebral mucormycosis. A retrospective analysis and treatment options".¹ We congratulate the authors for this very informative article on this rare and important topic. The authors have defined the management and prognosis of mucormycosis. However, we would request a clarification. They have stated that there was no difference in ophthalmoplegia and central retinal artery occlusion in clinical stage II between Treatment group A (TG - A) and Treatment group B (TG - B), which is contradictory to the data given in Table 3. In TG-A four patients received local amphotericine B and four patients received oral ketoconazole. It would be interesting to discuss the comparison in speed of response, outcome and side effects with other patients in the same group as the efficacy of these modalities is yet to be fully established. Advantages of local amphotericine B reported in literature are lower risk, and its aid in delivery of AMP-B to poorly perfused and infected tissues, while consistent efficacy of ketoconazole against *Mucoraceae* has not been found.² Hyperbaric oxygen therapy should have been considered in the management as this has been shown to be valuable due to its fungistatic effect.² It was also mentioned that in seven patients CT scan could not demonstrate soft tissue lesion despite clinical evidence of involvement. It would have been better if an MRI could have been done in these patients as the MRI is considered to be superior in demonstrating characteristic findings of hypo intensity of mycetoma on T-2 weighted MR images, better soft tissue delineation and multiplanar images.^{2,3}

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References

1. Nithyanandam S, Jacob MS, Battu RR, Thomas RK, Correa MA, D'Souza O. Rhino cerebral mucormycosis. A retrospective analysis and treatment options. *Indian J Ophthalmol* 2003;51:231-36.
2. Yohai RA, Bullock JD, Aziz AA, Markert RJ. Survival factors in Rhino-orbital-cerebral mucormycosis. *Surv Ophthalmol* 1994; 39:3-22
3. Som Pm, Curtin HD. Orbit embryology, anatomy and pathology. In: Mahmood F Mafee, editors. *Head and neck imaging*. St.Louis, Mosby. 2003. Vol. 1, pp 5629-55.

In reply

We appreciate the interest shown by Dr. Betharia et al. in our manuscript titled "Rhino-orbital-cerebral mucormycosis: A retrospective analysis of clinical features and treatment outcome". We concur with their view that there is significant difference in the occurrence of total ophthalmoplegia between Treatment group A and Treatment group B in clinical stage II. However the difference in the occurrence of CRAO in the 2 groups was not significantly different. The error is regretted.

We agree with the authors that consistent efficacy of oral ketoconazole in the treatment of mucormycosis is not established. However, there are anecdotal reports of cases managed with only the Azole group of anti-fungal agents including ketoconazole in literature.¹⁻³ All 4 patients treated in our series belonged to Treatment group A, in which the outcome was uniformly good.

We do not have the facility to deliver hyperbaric oxygen in our institution. Moreover this modality of treatment was not considered, as our patients were too ill to be transported to the only other centre in our city with this facility. The suggestion is well taken. It would be interesting to study the effect of this treatment modality on outcome in future studies.

MRI is considered a better imaging option than CT scanning due to its superior soft tissue delineation and multiplanar capability.⁴ However MRI findings in sino-orbital mucormycosis are also nonspecific and these include diffuse enhancement of orbital fat ("dirty fat appearance") and preseptal and orbital soft tissue oedema.^{1,4,5} Unfortunately abnormalities are not always present or changes can be minimal even with severe orbital involvement, on both CT scanning and MR imaging done concurrently.⁴ The term "mycetoma" refers to one of the manifestations of non-invasive fungal sinusitis and mucormycosis is associated with only the invasive form of fungal sinusitis.⁴

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References

1. Auerbach DB, Bilyk JT. Lung cancer, proptosis and decreased vision. *Surv Ophthalmol* 1999; 43:405-12.
2. O'Keefe M, Orcutt JC, Seifter LS. Orbital mucormycosis with survival. *Br J Ophthalmol* 1989;73:634-36.

3. Kocak R, Tetiker T, Kocak M. Fluconazole in the treatment of three cases of mucormycosis. *Eur J Clin Microbiol Infect Dis* 1995;14:559-61.
4. Eustis HS, Mafee MF, Walton C, Mondonca J. MR imaging and CT of orbital infections and complications in acute rhino-sinusitis. *Int Clin Ophthalmol* 1998;36:1165-83.
5. Hejny C, Kerrison JB, Newman NJ, Stone CM. Rhino-orbital mucormycosis in a patient with acquired immunodeficiency syndrome and neutropenia. *Am J Ophthalmol* 2001;132:111-12.

Digital ophthalmic photography

Dear Editor,

I read with great interest the article on ophthalmic photography using a digital camera by Fogla et al.¹ The authors have to be commended for throwing more light on this less expensive yet equally effective alternative to slitlamp-based digital workstations. Many private practitioners in India routinely use this technique (private communications; eyesurgeons @ yahoo-groups.com). Being an avid enthusiast of such cameras, I would like to supplement certain points in the article.

1. Alternatives to the 995

The Nikon Coolpix 995 is a 3 Megapixel camera. There

are some digital cameras with 4 mega pixels from companies such as Olympus, Sony, Casio, Toshiba and Canon that are good alternatives to the 995. While it is not possible to provide all details, the table below compares the Canon Power Shot G2 with Coolpix 995.

2. Additional tips on taking the photographs

a. The authors note that the ambient room illumination should be good enough to allow the subject to be clearly viewed on the LCD monitor. However, it is important to remember that the bright and fluid 1.8" LCD of the 995 is useable in most situations except outdoors, when all LCDs are useless. An LCD hood would come in handy in situations such as ophthalmic photography in outdoor eye camps.

b. While taking slitlamp photographs using diffuse illumination, it is better to use a light diffuser (ground glass) in front of the mirror of the slitlamp than just a wide slit beam alone.

3. Cheap alternative to Scheimpflug photography?

The authors have mentioned that they have started to use the digital camera to record posterior capsule changes following implantation of different types of intraocular lenses. This has been analysed by Scheimpflug photography in various studies. The latter is an expensive tool that has also been employed for densitometric analysis of lens opacities. It is very helpful

Table 1. Highlights of the differences between the G₂ and 995

Parameter	G ₂	995	Camera with a better score
Cost	US \$ 999	US \$ 800	995
Megapixel rating	In terms of no. of effective pixels (4.13 million actual pixels; 4 million effective pixels)	In terms of actual pixels (3.34 million actual pixels only)	G ₂
Rechargeable battery	BP-511, takes only 80 minutes to get fully recharged	EN-EL1 (small lithium ion battery) takes 2 hours to get fully charged	G ₂
Picture mode	RAW mode (the 'raw' data from the CCD)	TIFF mode; hence larger file size	G ₂
File storage capacity	Greater; 10 RAW files can be stored on a 32 MB card	Only 3-4 TIFF files can be stored on the same card	G ₂
Waiting time for file writing	Less waiting time for the camera to write the file to the memory card	More waiting time	G ₂
Focal range	Shorter (7-21 mm; equivalent to 34-102 mm in the 35 mm format)	Longer (8-32mm; equivalent to 32-152 mm in the 35 mm format)	995
Immediate photo deletions	Facility not available	Can pause and delete photos just after they are taken	995
Group deletions of photos	Facility not available	A group of photos can be deleted at once after marking the relevant thumbnails	995

to investigate the time course of cataract development or to detect early changes in clinical studies when cataract is suspected as a possible side effect.² Proficiency in use of a simple digital camera as the authors have suggested would bring research and documentation even in such areas within the reach of the common practicing ophthalmologist.

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References

1. Fogla R, Rao SK. Ophthalmic photography using a digital camera. *Indian J Ophthalmol* 2003;51:269-72.
2. Hockwin O, Dragomirescu V, Laser H, Wegener A, Eckerskorn U. Measuring Lens Transparency by Scheimpflug Photography of the Anterior Eye Segment - Principal, Instrumentation and Application to Clinical and Experimental Ophthalmology. *J Cutaneous and Ocular Toxicol* 1987;6:251-71.

Dear Editor,

We read with great interest the article by Fogla and Rao on ophthalmic photography using a digital camera.¹ The

authors must be commended for their efforts. We are also using a digital camera for the same purposes as reported by the authors and would like to share a few practical tips based on our experience. In patients with corneal problems like infiltrates and uclers, it may sometimes be very difficult to hold the eyelids apart (even with the assistance of a paramedic) to take photographs. In such cases, the use of a simple lid retractor or wire speculum can help the physician take good clinical pictures. A drop of local anesthetic will also make patient more comfortable with facing the bright diffuse light of the slitlamp.

For extreme close-up photography of the external eye, even with a macro close-up mode it is difficult and time consuming to get a clear focus. In order to avoid these problems, we have fitted a +10 dioptre lens to the plastic container of the Kodak film roll, which can in turn be easily fitted to the camera to get clearer magnified pictures, without using the macro close-up mode (Figures 1A and 2). For slitlamp and microscope photography, our instrument maintenance lab has developed cost-effective "coupling devices" made of brass, which can be inserted into the eye piece of the slitlamp/microscope, with the other side "threaded" on to the camera lens (Figures 1B and C). The thread is already available on the camera (Nikon Coolpix 950) for fitting a UV filter lens. As a result pictures can be comfortably taken without supporting the camera (Figure 3).

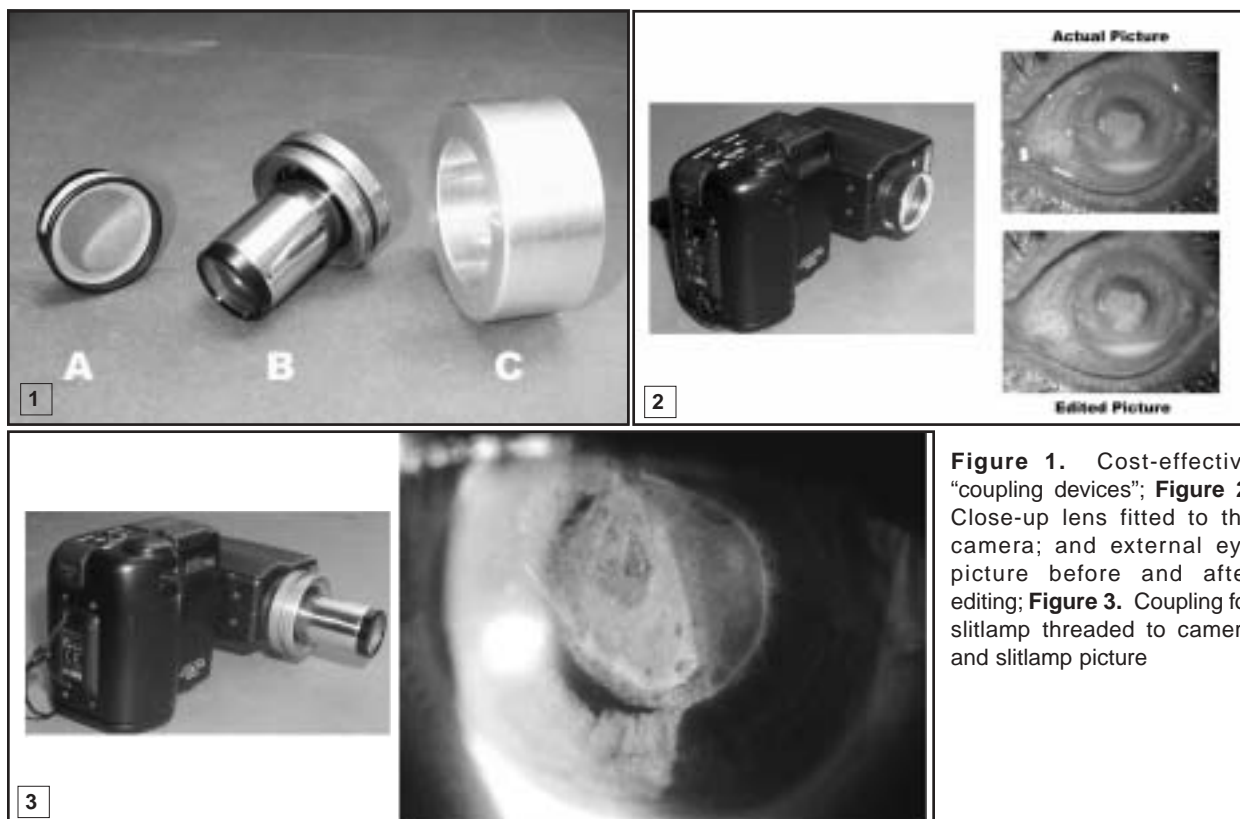


Figure 1. Cost-effective "coupling devices"; **Figure 2.** Close-up lens fitted to the camera; and external eye picture before and after editing; **Figure 3.** Coupling for slitlamp threaded to camera and slitlamp picture

Glaucoma specialists have found it particularly helpful to take pictures of the optic disc and store them for future use. Initially it was difficult to do this with the slitlamp using a 78D or 66D lens, but we trained our paramedic to hold the lens at a particular distance from the eye, allowing us to take pictures more comfortably. However, we agree with the authors that the best way to take fundus pictures (especially the optic disc) is with the gonio lens (Goldmann three mirror).

Digital camera pictures usually have artifacts produced by flashlight reflections on the surface of the cornea, but these can be easily removed without disturbing areas of clinical relevance using photo-editing software (e.g., Adobe Photoshop, Figure 2). This technology of digital photography has also helped in routine teaching and training thereby avoiding multiple examinations of patients by our residents, and showing more concern for the patient's privacy. We foresee that the digital camera will become a part of every ophthalmic practitioner's toolkit in the future.

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Reference

1. Fogla R, Rao SK. Ophthalmic photography using a digital camera. *Indian J Ophthalmol* 2003;51:269-72.

In reply

We appreciate the comments made on our article on digital photography. However, we would like to clarify certain issues raised by Dr. Vedantham. The Nikon Coolpix model 995 is a 3.34 megapixel camera and not a 3 megapixel camera. This model was replaced in 2002 by the newer model, Nikon Coolpix 4500, a 4 megapixel camera. As we mentioned in our article, a major advantage with the Nikon Coolpix as compared to other digital cameras is that the diameter of the camera lens and the slitlamp eyepiece is identical. Hence it is easy to attach the camera to the slitlamp eyepiece with an adapter. This also allows us to capture the entire field of view, during routine slitlamp biomicroscopy. The zoom mechanism of the Nikon Coolpix is within the camera, so there are no moving parts outside the camera, unlike other digital cameras. This is important for stable attachment of the camera to the slitlamp eyepiece. The Nikon coolpix stores images both in JPEG and TIFF format. A higher resolution obviously requires more space. Hence one can put in a 256 MB card to store more images at very high resolution. To get photographic

quality prints of these images, it is essential to have the images in TIFF format. This is important especially if the images captured are to be submitted for publication. For external photography, there are a variety of digital cameras available, with resolution approaching 6 megapixels. The Topcon slitlamp model SL 3F, recommended in our article has a built-in ground glass diffuser used for photography under diffuse illumination.

We recommended the retroillumination technique for observing changes in the posterior capsule following cataract surgery. We do not understand how Scheimpflug photography can be used for the same purpose. However we agree that the digital camera can be used to assess the nuclear density of cataracts in a manner similar to the Scheimpflug technique of photography.

In conclusion, we still recommend the Nikon Coolpix 995 (now 4500) for ophthalmic photography using the standard slitlamp biomicroscope. Other digital cameras can also be used, though mainly for external photography, or as attachments to photo slitlamp instruments.

We also appreciate the comments made by Dr. Venkatesh. We agree that in uncooperative patients, it is helpful to use a wire speculum to separate the eyelids after application of topical anaesthetic agent. This makes it easier to obtain good photographs. Regarding extreme close up photography in the macro mode, as we mentioned in our article, one should not increase the zoom to beyond 50%. Within this limit of magnification, it is possible to focus on the area of interest with ease. With the help of our bio-engineering department, we modified the eye piece of the slitlamp biomicroscope, by creating threads on the outer end, which can be easily threaded into the eyepiece of the Nikon coolpix. They also helped design a stand to be attached to the slitlamp biomicroscope, which supports the camera attached to the eyepiece. This prevents the camera from rotating downwards, and decreases the strain on the outer rim of the camera lens.

We are sure that many people use digital photography in ophthalmology. With practice and increased use, one can make modifications both in instrumentation and technique, which makes it easier to obtain good clinical photographs.

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Transpupillary thermo therapy for the treatment of choroidal neovascularisation secondary to age related macular degeneration in Indian eyes.

Dear Editor,

We read with interest the article on "Transpupillary thermo therapy for the treatment of choroidal neovascularisation secondary to age-related macular degeneration in Indian eyes" by Nagpal et al. We congratulate the authors for the same

We have been doing transpupillary thermo therapy (TTT) for neovascular age-related macular degeneration (AMD) since September 2000. We agree with the authors that overall, the results of TTT are encouraging. In a study on 50 eyes of patients of subfoveal choroidal neovascularisation (CNV), we found that the letter acuity stabilised or improved (a shift of one line on ETDRS chart) in 72% of eyes ($P < 0.05$) at 12 weeks' follow-up and reading speed improved from a mean of 27.04 words/minute to 37.33 words/minute at 12 weeks. Further, TTT works better in occult CNV.

We further agree that the power settings for the Indian pigmented eyes are significantly lower than recommended in the literature for Caucasian eyes. At our centre we have been using power settings of 200 - 300 mW, 350 - 450 mW and 400 - 550 mW for 1.2, 2.0 and 3.0 mm spot size using a quadraspheric lens.

The power to be delivered needs to be individualised. We would like to supplement certain points which are of importance while deciding on the power for a particular patient. Besides fundus pigmentation, these include media clarity, squeezing by the patient, pressure exerted by the contact lens (this tends to enhance the effect of TTT by decreasing choroidal blood flow and decreasing the dissipation of heat thus increasing the local temperature and the effect of TTT), wear and tear of the fiber-optic cable, coating, tilting and focus of the contact lens, age of the patient, haemorrhage, exudation and elevation of the lesion.

Giving a test spot outside the arcades may not always indicate the power setting to be used. We feel this is because one cannot always extrapolate the reaction seen on a normal retina to an abnormal area of retina. At times no reaction may be seen even with power setting of 1200 mW on normal retina.

The authors have used two spots of 3mm size when the lesion was not fully covered with the spot size; here we suggest that when the spot does not cover the entire membrane and one is using Goldman's lens for laser delivery, use of two adjacent spots leads to undertreatment of the triangles which are above and below the overall spot. This could lead to recurrence or persistence of the lesion. We would recommend one to use quadraspheric lens which magnifies the spot by 2.06 times thus

necessitating only one spot. The other strategy should be to use overlapping spots in such a way that the entire lesion is covered and the centre that is overtreated should not lie on the centre of the foveal avascular zone.

In the study, the authors have used Snellen's visual acuity chart to document visual acuity. In our view, ETDRS charts would be preferable for documentation of visual function. The letters which have near equal difficulty score are used in making the ETDRS chart, and all the lines hence have almost equal difficulty scores. Moreover, as one moves down the chart, the visual angle doubles at every third line. This is not so in case of Snellen's acuity charts.

Another point worth noting is that juxtafoveal lesion so far has been treated according to the MPS recommendation. Juxtafoveal lesions which are close to the fovea and are treated with thermal laser photocoagulation fare no better than the natural history.² In the era of TTT and PDT, such lesions should be treated with these newer modalities to prevent immediate reduction of visual acuity. We have treated 22 eyes of 22 patients with fluorescein angiographic evidence of juxtafoveal CNV (14 secondary to AMD and 8 eyes with idiopathic CNV). In a mean follow up of 24.6 weeks in the AMD group, the visual acuity improved or stabilised in 78.57% eyes ($n = 14$) at 3 months, 57.24% eyes ($n = 7$) at 6 months, 50% eyes ($n = 4$) at 9 months and 50% eyes ($n = 2$) at 1 year follow up. In a mean follow-up of 32.5 weeks in the idiopathic group, visual acuity improved or stabilised in 87.5% ($n = 8$) eyes at 3 months, 71.42% ($n = 7$) eyes at 6 months and none of eyes at 9 months and 1 year. Hence juxtafoveal CNVs are better dealt with non thermal lasers rather than thermal (Transpupillary Thermo Therapy as an alternative treatment of Juxtafoveal Choroidal Neovascular membranes in pigmented Eyes. 3rd EURETINA Congress, May 15 - 17, Hamburg, Germany).

Once again we congratulate the authors for sharing their experiences of the use of TTT in subfoveal choroidal neovascular membranes.

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References:

1. Nagpal M, Nagpal K, Sharma S, Puri J, Nagpal PN: Transpupillary Thermo Therapy for the treatment of choroidal neovascularization secondary to age related macular degeneration in Indian eyes. *Indian J Ophthalmol* 2003; 51: 243 - 50.
2. Lee MJ, Lance S: Treatment of juxtafoveal and extrafoveal Choroidal Neovascularization in the era of

photodynamic therapy with Verteporfin. *Am J Ophthalmol* 2002;134, 99-101.

In reply

The comments and experience shared by Verma, et al concerning transpupillary thermotherapy (TTT) for neovascular age-related macular degeneration (AMD) are noteworthy. They, like other authors,¹ have suggested that TTT works better in occult choroidal neovascular membrane (CNV). We also found that eyes with occult membranes did better. But we felt that the difference was only marginal. The factors – namely, media clarity, squeezing, contact lens pressure, state of fiberoptic cable, etc - as rightly mentioned by Verma et al are known to alter the laser reaction. The same holds true for all laser treatments of retina. We have not noted any difference in laser reaction with patient's age. For instance, when treating young myopes for CNV with TTT we do not need to significantly alter the power settings. However, as rightly pointed out, the energy required can vary with clinical picture, particularly, haemorrhage exudation or elevation.

Extrapolation of the reaction seen outside the arcades to that within is a rough guideline and is especially recommended for beginners. Under-treatment of triangular areas (not encompassed by the laser beam) above and below two separate spots is a definite theoretical possibility. In our experience, the incidence of persistent or recurrent lesions was not different from those treated with only a single shot compared to the ones who needed multiple spots. In this context, use of the quadraspheric lens with its increased magnification may be a better option, though we have no experience of the same. We completely agree with Verma et al that use of ETDRS charts for accurate documentation of visual acuity is important. This omission remains a limitation in our study.

The point concerning treatment of juxtafoveal lesions with TTT is well made. We too have had similar encouraging results in this group. However, it has to be emphasised that TTT is an under-treatment and subsequent recurrence of membrane with foveal involvement is a distinct possibility. Therefore, we recommend considering TTT only after thorough deliberation of pros and cons with the patient.

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Reference

1. Reichel E, Berrocal AM, Michael IP, Kroll A J, Vinay D, Duker JS, et al. Transpupillary thermotherapy of occult subfoveal choroidal neovascularization in patients with age-related macular degeneration. *Ophthalmology* 1999;106:1908-14.

Suture and surgically induced astigmatism after cataract surgery

Dear Editor,

I read with great interest the reply letter by Dr.Sood¹ as a response to the comments on her article on keratometric astigmatism after ECCE.² I would like to clarify as well as supplement some of the points mentioned.

The cut-off value for against-the-rule (ATR) or with-the-rule (WTR) astigmatism on either side of the vertical (90°) or horizontal (180°) axis is 20°, and not 30° as mentioned by Dr. Sood. Beyond this is oblique astigmatism.³

With the greater understanding of corneal topography, terms such as “suture-induced astigmatism” (difference in astigmatism between the pre and postoperative measurements with the sutures still in place) and “surgically induced astigmatism” (difference between the pre and postoperative measurements after all the sutures have been released or removed) are probably more appropriate than ATR and WTR.³ The authors have tried to analyse the former by two different techniques of suturing.² Suture-induced astigmatism arises from suture-tension, tissue oedema, and the underlying surgically induced astigmatism. However, surgically induced astigmatism that results primarily from the incision, its realignment and wound healing, is a better index of the actual amount of astigmatism produced by a surgical procedure. The authors could have analysed this. Interestingly, there is no mention of any suture release for postoperative astigmatism for any of the cases in Dr. Sood's series.² The post-suture release keratometric value could have been utilised to calculate the surgically induced astigmatism.

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References

1. Sood A. Astigmatism after ECCE in Eastern Nepal. Continuous versus interrupted sutures (Letter in reply). *Indian J Ophthalmol* 2003;51:284-85.
2. Sood A, Thakur SKD, Kumar S, Badhu B. Keratometric astigmatism after ECCE in eastern Nepal. Continuous versus interrupted sutures. *Indian J Ophthalmol* 2003;51:53-57.
3. Swinger CA. Postoperative astigmatism. *Surv Ophthalmol* 1987;31:219-48.