Three of the later patients underwent intraoperative gonioscopy, which was performed after cataract extraction but before the VGP and it was observed that a variable amount of PAS remained after cataract removal but was broken during VGP.

There were no intraoperative complications in this cohort of patients. Visual acuity (VA) remained unchanged in seven eyes, improved by one Snellen line in seven eyes, by two to four Snellen lines in 12 eyes and more than four Snellen lines in two eyes. VA did not worsen in any patient following phaco/IOL and VGP.

Comment

It is difficult to be precise about the mechanisms of narrow angle in all eyes.² It may well be that a combination of some or all of a number of factors—for example, small eyes, large lenses, abnormal insertion of the iris, or adhesion of iris to lens, is responsible for the narrowing. Whatever the mechanisms that produce these “occludable” angles, removal of the underlying cause does not inevitably result in decrease in IOP. The main reason for this is the presence of residual PAS and the results of this study indicate that by performing VGP the PAS can be broken with a subsequent fall in the IOP.

It seems likely that the eyes of the patients described in our study had, as an initial mechanism, lens induced narrowing of their drainage angles, which led to subsequent iridotrabecular adhesions. To form this more homogeneous group we excluded patients with obvious iris plateau and all patients had had a laser PI so that pupillary block was excluded. Although the effect of cataract extraction in this group of patients has been shown to be relatively effective in lowering pressure it has also been shown that in glaucoma associated with extensive PAS, removal of lens alone may be insufficient for adequate IOP control.^{3,4} Because of this, several glaucoma procedures have been advocated to open the angle in patients with extensive PAS including cutting and lasering of the synaechiae.^{1,5-7} However complications reported from these “direct” angle procedures include mild to severe haemorrhage from iris or trabeculum, fibrin exudation, choroidal haemorrhage, choroidal detachment, and shallow anterior chamber.⁸

The technique we have described, viscogonioplasty, has the advantage over the techniques above in that viscoelastic instead of a surgical instrument is used to break PAS. The angle itself is never touched but is gently dissected open by the viscoelastic. For this reason we think VGP is safer than surgical procedures on the angle and with potentially less damage to the trabecular meshwork. There does, however, remain a possibility that a trabecular meshwork that has been occluded for some time, even though the angle becomes anatomically opened by this procedure, does not resume full function. The fact that four of our patients still required IOP lowering medication suggests this is a possibility. Long term studies will make this clearer.

The fact that cataract extraction itself can reduce IOP in patients with narrow angle needs to be taken into consideration when looking at the efficacy of VGP. There are a number of reasons why we think that VGP offered additional IOP lowering over cataract extraction alone:

- (1) The IOP reductions shown in table 1 are around 4–5 mmHg more than we found in our own CNAG patients undergoing cataract surgery alone before our use of VGP.
- (2) The IOP decrease and reduction in numbers of antihypertensive medications described in our study are generally more than that described in the literature for cataract surgery alone in NAG.^{4,9-11}
- (3) Although only performed in the last three patients of this study, intraoperative gonioscopy showed residual PAS after cataract removal, which was absent after VGP.

Of course it is difficult to know the true relative contributions of cataract extraction and VGP to the IOP reduction in a consecutive case series study. For this reason we are designing a randomised control trial to compare eyes with NAG who have cataract extraction with and without VGP. This will also reduce the problem of accurately diagnosing the underlying cause of the occluded angle—our recent experience with VGP has suggested that it also has a role in IOP reduction in other narrow angle situations such as plateau iris and PAS associated with inflammatory glaucomas. It may be that although there are a number of mechanisms that can lead to narrowing of the angle a common end point is PAS. At present, because of its safety and potential benefit, we suggest all eyes with narrow angles—with or without obvious PAS—that are undergoing cataract extraction, should also have VGP.

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References

- 1 Varma D, Baylis O, Wride N, et al. Viscogonioplasty: an effective procedure for lowering intraocular pressure in primary angle closure glaucoma. *Eye* 2005 Jan 13;[Epub ahead of print].
- 2 Foster PJ, Aung T, Nolan WP, et al. Defining “occludable” angles in population surveys: drainage angle width, peripheral anterior synechiae, and glaucomatous optic neuropathy in east Asian people. *Br J Ophthalmol* 2004;88:486–90.
- 3 Issa SA, Pacheco J, Mahmood U, et al. A novel index for predicting intraocular pressure reduction following cataract surgery. *Br J Ophthalmol* 2005;89:543–6.
- 4 Hayashi K, Hayashi H, Nakao F, et al. Effect of cataract surgery on intraocular pressure control in glaucoma patients. *J Cataract Refract Surg* 2001;27:1779–86.
- 5 Teekhasaene C, Riich R. Combined phacoemulsification and goniosynechiolysis for uncontrolled chronic angle closure glaucoma, after acute angle closure glaucoma. *Ophthalmology* 1999;106:669–74.
- 6 Senn P, Kopp B. Nd:YAG Laser synechiolysis in glaucoma due to iridocorneal angle synechiae. *Klin Monatsbl Augenheilkd* 1990;196:210–13.
- 7 Campbell DG, Vela A. Modern goniosynechiolysis for the treatment of synechial angle closure glaucoma. *Ophthalmology* 1984;91:1052.
- 8 Tanihara H, Negi A, Akimoto M, et al. Long term results of non filtering surgery for the treatment of primary angle closure glaucoma. *Graefes Arch Clin Exp Ophthalmol* 1995;233:563–7.
- 9 Shingleton BJ, Chang MA, Bellows AR, et al. Surgical goniosynechiolysis for angle closure glaucoma. *Ophthalmology* 1990;97:551.
- 10 Canlas OA, Ishikawa H, Leibmann JM, et al. Ultrasound biomicroscopy before and after goniosynechiolysis. *Am J Ophthalmol* 2001;132:570–1.
- 11 Jacobi PC, Dietlin TS, Luke C, et al. Primary phacoemulsification and intraocular lens implantation for acute angle-closure glaucoma. *Ophthalmology* 2002;109:1597–603.

Acanthamoeba detection in the anterior chamber

Among the spectrum of infectious keratitis, acanthamoeba keratitis (AK) represents one of the most difficult entities to diagnose and to treat properly, thus threatening the visual function. It affects immunocompetent patients and the main risk factors for the development of AK are the use of contact lenses, the exposure to contaminated water or contact lens solution, and corneal trauma.¹ Clinically, this infection may appear as corneal stromal infiltrates, recurrent epithelial erosions, disciform keratitis, and kerato-neuritis. An anterior uveitis and/or a hypopyon may be present too. The diagnosis is usually made by scraping and culturing the corneal tissue and by performing a corneal biopsy if the epithelium is intact.

We report the case of a patient with an AK diagnosed by culturing the hypopyon. We would like to emphasise the value of this procedure in making the diagnosis in patient suffering from AK.

Case report

An 81 year old woman patient was admitted to the uveitis unit of the Geneva University Hospital with ocular pain, ocular redness, and blurring of vision affecting her right eye (RE) over the previous 2 days. She wore soft contact lenses and had no other ophthalmological co-morbidity. Her medical history was unremarkable. She was not receiving any systemic treatments, apart from Reminyl (galantamine hydrobromide) because of a mild Alzheimer's disease. Ophthalmological examination revealed a visual acuity less than 0.01 at presentation. Anterior segment examination disclosed a diffuse ciliary injection, a corneal abscess with an oedema, and an 0.5 mm hypopyon. It was not possible to examine the fundus because of the anterior chamber inflammation.

On the day of admission, an anterior chamber tap and corneal scrapings were performed (aerobes, anaerobes, fungi, acanthamoeba). Both contact lenses were sent for culture. An empiric topical treatment of ofloxacin and garamycin was started at the same time. Progress was favourable with a decrease of the hypopyon and healing of the abscess. The aqueous humour bacteriological cultures were negative. On day 6 culture of the anterior chamber tap gave positive results for AK. The antibiotic drops were stopped and a topical treatment of Brolene and chlorhexidine was started. Furthermore, the corneal scrapings were positive after 15 days. Healing was satisfactory and the patient was discharged from the hospital on day 15. At the end of follow up (11 months), she presented with a calm anterior chamber and corneal scarring, with a visual acuity of 0.4.

Comment

Acanthamoeba spp is an ubiquitous amoeba and an opportunistic pathogen found world-

wide in thermally polluted streams, coastal and fresh water, dust, soil, and sewage, and heating, ventilating, and air conditioning units. Acanthamoebiasis is rare, except AK, and is mostly limited to the immunocompromised host. The mode of contamination to humans and animals is through breaks in the contaminated skin or through the upper respiratory tract by cysts carried by air. Acanthamoeba by haematogenous spread is responsible for central nervous system and other organ failures, including encephalitis, nasopharyngeal, cutaneous and disseminated infections. The most frequent acanthamoeba infection is keratitis. The incidence of AK was estimated to be in the United Kingdom 1.13–1.26/million adults and 17.53–21.14/million contact lens wear. More than 80% of the cases occurred in contact lens wearers. Diagnosis of AK infection is usually made by corneal scrapings or by cultures of contact lenses and disinfectant. Early diagnosis and treatment are necessary to improve the visual outcome.² Because of the diagnostic difficulties, the delay between the onset of symptoms and appropriate treatment is often more than 1 month. The presence of a hypopyon in AK is unusual and is often a late manifestation of the disease. In our case the hypopyon culture allowed us to reduce the diagnostic delay to 7 days, which allowed a prompt treatment and visual recovery for the patient.

Despite good results, this procedure has not gained much acceptance because of the isolated serious complications such as infectious keratitis in the paracentesis tract and purulent anterior segment endophthalmitis following paracentesis reported after the procedure. From a practical point of view, we suggest that the examination of the hypopyon should be performed in suspected cases, within the list of investigations, to diagnose or exclude AK.

To conclude, we report one case of ocular infection confined to the anterior segment in which anterior chamber tap was helpful in the diagnosis, management, and treatment. This procedure should be performed under strict aseptic conditions because of potentially disastrous infectious complications.

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References

- 1 Bacon AS, Frazer DF, Dart JKG, et al. A review of 72 consecutive cases of Acanthamoeba keratitis 1984–1992. *Eye* 1993;7:719–25.
- 2 Claerhout I, Goegebeuer A, Van Den Broecke C, et al. Delay in diagnosis and outcome of Acanthamoeba keratitis. *Graefes Arch Clin Exp Ophthalmol* 2004;242:648–53.

Choriocarcinoma metastatic to the choroid

We present an unusual case of metastatic choriocarcinoma in a patient whose visual symptoms led to diagnosis and treatment of his underlying malignancy. He presented with vision loss and a visual field defect in his left eye, representing a choroidal mass and large exudative retinal detachment. In addition, metastatic investigation revealed abdominal, chest, and brain metastases. Metastatic choriocarcinoma was suspected because of an elevated β -human chorionic gonadotrophin (HCG), and the diagnosis was confirmed by fine needle aspiration of one pulmonary mass. A retroperitoneal mass was identified as the primary site, which is the first reported case of metastatic choriocarcinoma from the retroperitoneum.

Case report

A 34 year old man presented initially to his physician with complaints of back pain and pain with coughing for 2 years. Abdominal computed tomograph (CT) scan revealed a retroperitoneal mass with an elevated β -HCG level to 137 420. CT guided biopsy was performed but was inconclusive.

He returned 2 weeks later complaining of blurred vision with loss of his inferior visual field in the left eye. The patient was found to have a best corrected visual acuity of 20/25 in the right eye, 20/40 in the left eye with no afferent pupillary defect. The anterior segment and intraocular pressure were normal in both eyes. Confrontational visual fields demonstrated an inferior temporal field cut in the left eye. The left eye examination revealed an amelanotic choroidal mass superior to the disc with significant overlying haemorrhage. A large bullous exudative retinal detachment around the mass was noted with subretinal haemorrhage (fig 1A, B). On A-scan and B-scan echographic evaluation, the mass was multilobulated with moderate internal reflectivity. Early hypo-fluorescence with late leakage over the centre of the tumour was observed on fluorescein angiography.

A full metastatic examination was undertaken. Testicular ultrasound of the scrotum demonstrated microcalcifications but no

mass. Head CT showed multiple metastatic lesions including lesions in the right basal ganglia, the parietal and temporal lobes. Chest CT revealed multiple metastatic lung nodules. CT guided fine needle aspiration was performed of one of the pulmonary nodules, and microscopic examination revealed pleomorphic tumour cells with irregular large nuclei and large nucleoli (fig 1C). Immunohistochemical stains for β -HCG (fig 1D) and keratin (fig 1E) were positive, supporting the diagnosis of metastatic choriocarcinoma.

Despite chemotherapy and whole brain irradiation with posterior ocular irradiation, the patient continued to lose vision in the left eye, and presented 1 month later with dense vitreous haemorrhage. He never regained vision and died from metastatic disease 18 months after initial presentation.

Comment

Metastatic tumours with distant primaries represent the most common uveal malignancy in adults.¹ Tumour cells are disseminated haematogenously and the choroid is the most common site of ocular involvement because of its rich vasculature. Approximately one third of patients have no history of a primary cancer upon diagnosis of ocular metastasis.²

Choriocarcinoma is an extremely rare cause of choroidal metastasis. Choriocarcinoma can be gestational, or it can be associated with testicular disease. A retroperitoneal primary for metastatic ocular choriocarcinoma has never been previously described.

A meta-analysis of the literature was performed using the search terms choriocarcinoma, uvea, ocular, eye, and metastases (table 1); 15 additional cases of testicular choriocarcinoma metastasising to the choroid have been reported^{3–8} along with one case of primary mediastinal choriocarcinoma in a male metastasizing to the choroid.⁹

Recently the expression of vascular endothelial growth factor (VEGF) mRNA has been demonstrated to be dramatically upregulated by hypoxia in choriocarcinoma cells.¹⁰ Our analysis of the literature shows that in patients with ocular findings, significant haemorrhage associated with this tumour was reported in 9/11 or 82% of patients. This finding is not typical of metastatic ocular disease in general and should raise suspicion for this primary.

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Figure 1 (A) Colour fundus photograph of the left eye showing an amelanotic mass with bullous exudative retinal detachment and subretinal haemorrhage. (B) Colour fundus photograph of the left eye showing mass with significant overlying haemorrhage. (C) Fine needle aspiration of metastatic lung nodule revealed pleomorphic tumour cells with irregular large nuclei and large nucleoli (D) Fine needle aspiration of metastatic lung nodule positive for β -HCG stain. (E) Fine needle aspiration of metastatic lung nodule positive for keratin stain.