SHALLOW ANTERIOR CHAMBER
Forewarned is forearmed when performing cataract surgery in eyes with shallow anterior chambers
by Roibeard O’hEineachain in Istanbul

Shallow anterior chambers encountered during cataract extraction procedures can pose special challenges to surgeons, but forward planning in eyes likely to have the condition can ensure a good outcome, said Paul Rosen FRCoPrh, Oxford Eye Hospital, Oxford, UK. "Among the potential problems shallow chambers may cause is a difficulty in creating the corneal incisions with the risk of perioperative iris prolapse. In addition, the capsulorhexis becomes more difficult to perform because of increased vitreous pressure causing a tendency to rip outwards, which increases the risk of posterior capsule rupture and subluxation of the lens," Dr Rosen told the 15th ESCRS Winter Meeting. Eyes with shallow anterior chambers can be associated with endothelial complications, including the stripping of Descemet’s membrane.

Predisposing factors for a shallow anterior chamber include high hyperopia/short eyes. In older cataract patients there is increased risk because of the increased size and hardness of the lens, the increased risk of suprachoroidal haemorrhage, and the greater use of alpha agonists, which can induce IFIS syndrome. Another risk factor is nanophthalmos, defined as having horizontal corneal diameter less than 11.0mm and an axial length less than 20.0mm which is particularly associated with choroidal effusions.

Surgical considerations. The choice of anaesthesia is an important consideration when dealing with cataract patients who are likely to have shallow anterior chambers, Dr Rosen noted. Topical anaesthesia might be inadequate in such eyes because of their unusual anatomy and the higher likelihood of complications, he added. Peribulbar anaesthesia is contraindicated because it tends to increase intraorbital pressure. Sub-tenon’s anaesthesia with the Honan Balloon is a better choice since it reduces vitreous pressure, he said. General anaesthesia is also an option since it provides surgeons with the option to hyperventilate the patient which reduces the pCO2 and vitreous pressure.

In eyes with shallow anterior chambers, preoperative intravenous infusion of Mannitol can be given 30-60 minutes prior to surgery to reduce the intravitreal pressure. Although some have advocated vortex vein decompression in nanophthalmic patients, it is technically difficult to perform and there is little clinical evidence to support its use.

The corneal incisions in such eyes should not be too peripheral in order to avoid iris prolapse. Neither should they be too corneal, which could reduce the surgeon’s manoeuvrability and the visualisation of the anterior segment.

Factors that can lead to shallowing of the anterior chamber during a cataract procedure include choroidal effusion and choroidal haemorrhage. Other possible causes are aqueous misdirection, which is a condition where aqueous flows into the vitreous, and wound leak, resulting from an imbalance between inflow and outflow.

Should shallowing of the anterior chamber take place during surgery, the surgeon must assess whether it will be possible to complete the procedure, based on such factors as hardness or softness of the eye, the presence of iris prolapse and the status of the capsulorhexis.

When the completion of the procedure appears to be the best option, intracameral phenylephrine (six drops of 2.5 per cent phenylephrine in 1.0ml BSS) will reduce the chance of iris prolapse, and injection of a cohesive viscoelastic can help reposition iris and maintain the anterior chamber.

The use of trypan blue stain is helpful in reducing the difficulty of performing the capsulorhexis and the cohesive viscoelastic can relieve tension in the capsule and reduce the risk of the rhexis from ripping tangentially outwards. Dr Rosen said he has also tried one drop of pilocarpine two per cent perioperatively because it causes ciliary body contraction and therefore reduces the tension on zonules and the capsule, without affecting pupil dilation.

Vitrectomy sometimes helps
Limited vitrectomy may be necessary in some cases when it is associated with increased posterior vitreous pressure due to aqueous misdirection. In such cases, the anterior chamber will be becoming increasingly shallow and iris prolapse may occur and the eye becomes hard. It is important to exclude a suprachoroidal haemorrhage by observing if there are choroidal detachments and raised intraocular pressure if effusion where the pressure is low.

Dr Rosen recommended in such cases that the surgeon first secure the corneal wound with a suture and then carry out limited pars plana vitrectomy to decompress the posterior segment and allow completion of the phacoemulsification surgery. When performing the vitrectomy, the surgeon should use 20G or 23G instrumentation to create a single pars plana “sutureless” incision 3.5mm from limbus, using no infusion and placing the vitrectomy probe into the centre of the vitreous cavity. “Care must be taken not to come too close to the posterior capsule and risk damage which in turn can result in dislocation of the lens posteriorly,” Dr Rosen cautioned.

Another complication that can occur as a result of the pars plana vitrectomy is penetration of the retina when making the pars plana incision, because of the abnormal pars plana anatomy. That can in turn lead to peripheral retinal tears and retinal detachment. Furthermore, in the longer term, a portion of the vitreous can become incarcerated into the port and the procedure creates and that can also lead to retinal detachment.

Dr Rosen noted that when shallow anterior chamber is a result of choroidal haemorrhage, there is an urgent need for immediate action. The signs are increasing IOP, a progressive shallowing of the anterior chamber, iris prolapse and a dull red reflex.

In such cases the surgeon should close the wound. If this is not possible then one can decompress the eye with a 16G cannula inserted at the equator of the globe to allow decompression of the suprachoroidal space. With the scleral wound left unstented, corneal wounds can then be rapidly secured with multiple sutures.

If the choroidal haemorrhage re-absorbs, no further treatment is necessary. However, if the choroidal detachments are touching they can lead to a retinal detachment. The correct course of action in such eyes is to drain the blood and perform a vitrectomy as a secondary procedure.

"With all these situations you need to take rapid and decisive action to achieve a good visual outcome,” Dr Rosen added.