Nanophthalmos - Preparing for the challenge

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Nanophthalmos, a rare condition, is an important cause of secondary angle closure, especially in young adults. Cataract surgery in a nanophthalmic eye is challenging. Here we highlight the meticulous planning that is imperative to an uncomplicated outcome.

This is a report of a 40-year-old lady who came with complaints of decreased vision in both eyes since 1 year. She gave history of wearing thick glasses since childhood. On examination, she had small eyes and visual acuity was hand movements close to face. She had shallow anterior chamber with dense brunescent cataracts in both eyes precluding fundal view. The intraocular pressure (IOP) was 12 mmHg by Goldmann applanation tonometry. Gonioscopy showed appositional closure. Ultrasound Bscan showed increased retinochoroidal scleral thickness. Biometry findings are summarized in Table 1. Ultrasound biomicroscopy showed anteriorly placed ciliary body and no supraciliary effusion. Findings were suggestive of nanophthalmos. The patient underwent Laser peripheral iridotomy bilaterally followed by phacoemulsification with single-piece hydrophobic acrylic intraocular lens (40D) implantation under local anaesthesia, with prophylactic anterior lamellar sclerectomy with sclerotomy in two quadrants. Intraoperative and postoperative period was uneventful.

DISCUSSION

It is important to categorize the ‘Small eye’ phenotype as each has different implications—clinical and surgical

(a) Simple microphthalmos: Short axial length (>2 SD smaller than age-based normative) and no other ocular malformations.1 (b) Relative anterior microphthalmos: Normal axial length with disproportionately small anterior segment.1 (c) Nanophthalmos: Short axial length (<20.5 mm), shallow anterior chamber depth <2.2 mm, normal or increased lens thickness, thickened sclera, choroid >1.7 mm posteriorly with an increased predisposition for uveal effusion.1

Pathophysiology of effusion: Thickened sclera compresses vortex vein, impeding normal choroidal venous drainage.2 Transcleral protein egress is hampered and lack of lymphatic drainage results in suprachoroidal fluid retention.3

Common complications: Posterior capsular rupture (4–11.7%), aqueous misdirection (0–25%), suprachoroidal haemorrhage(0–2.7%), prolonged anterior uveitis (2.3–11.8%), and uveal effusion (9.3%).4 5 The variation in range is probably due to differences in the axial length considered by different authors for their definition of nanophthalmos.

Preoperative considerations: Axial length measurement by partial coherence interferometry/optical low coherence reflectometry is preferred over ultrasound biometry. Hoffer Q formula is more accurate for axial length <22 mm6. Peripheral iridotomy is warranted in the case of

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**Table 1**

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<tr>
<td>Bscan axial length</td>
<td>15.7</td>
<td>15.1</td>
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<tr>
<td>Bscan RCS thickness</td>
<td>2.7</td>
<td>2.7</td>
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<tr>
<td>UBM lens thickness</td>
<td>5.1</td>
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<td>UBM ACD</td>
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<td>IOL master axial length</td>
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<td>15.83</td>
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<td>Hoffer Q (emmetropia) IOL power</td>
<td>+59 D</td>
<td>+58 D</td>
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**Fig. 1** (a) 4–5 mm from the limbus, a 5 mm partial thickness rectangular scleral flap is raised. (b) V-shaped full-thickness scleral cut down is made under the flap to expose the suprachoroidal space. (c) The flap is then replaced and sutured with 10-0 nylon.
narrow angles and/or elevated IOP. Intravenous mannitol helps reduce vitreous pressure.

Intraoperative considerations: General anaesthesia is preferred, as it does not increase orbital volume and adequately relaxes rectus muscle tone. High-molecular-weight OVDs aid capsulorhexis. Many surgeons do two/four quadrant prophylactic sclerotomies which serves to drain uveal exudation and relaxes scleral tension, indirectly decompressing the vortex veins. Flap suturing helps reinforce globe integrity.7

Postoperative care: Postoperative concerns include correction of residual refractive error by glasses and contact lenses, inflammation control and prevention of aqueous misdirection with use of strong cycloplegics.

References

How to cite this article Kadambi S.V. and Krishnamoorthy S. Nanophthalmos - Preparing for the challenge, Sci J Med & Vis Res Foun 2017;XXXV:31–32.