**Paediatric glaucoma patients present a challenge**

Dr Levin. Physicians need to be cognisant of this when recommending these tests, and the frequency of using them.

As for how often these tests are worthwhile in glaucoma suspects, it depends on the risk level of the patient, said Ike Ahmed, MD, assistant professor at the University of Toronto. For most suspects, yearly exams using one imaging technology may suffice. And, except in rare exceptions, imaging more often than every six months is not likely to show any changes in the eye.

“In most cases, physicians should follow similar guidelines as you would when you do a clinical exam or visual field. Base it on your risk factors. It’s important to do more than just cup-disc ratios,” Dr Ahmed said.

**Pachymetry also useful**

Pachymetry is another potential tool to use in the paediatric population, Dr Freedman said. The Ocular Hypertension Treatment Study (OHTS) showed that adults who had a central corneal thickness (CCT) of less than 555 microns had an increased risk for primary open-angle glaucoma. It also showed that the mean CCT was 573 microns in adults who participated in the OHTS, and was about 23 microns thinner in “black” than in “white” people.

However, CCT varies in normal eyes depending on the pachymetry type, and can vary 10 to 20 microns in different readings of the same eyes. Normative data on normal children and children with glaucoma are currently being developed, Dr Freedman said.

At least one study has suggested that mean CCT may be slightly age dependent, with thickness increasing slightly with age. Generally, CCT is stable in children who are over the age of one. Other research shows that CCT may vary between races. In addition, a recent study suggests that measured IOP may increase 3.2 mmHg per 100 microns of increased CCT in normal eyes of children.

However, CCT can vary depending on the cause of glaucoma. Eyes of children with primary congenital glaucoma tend to have thinner corneas than those of normal eyes. By contrast, eyes with aphakia and aphakic glaucoma have thicker CCT than in the fellow phakic eye. Children with congenital aniridia have thicker CCT than normal subjects. Keep in mind that CCT may be higher in “black” people.

**Glaucoma**

**Optic nerve evaluation**

In older children optic nerve evaluation is critical. Things to look for include enlarged optic nerve cups and asymmetric cupping. Optic nerve head anatomy can vary widely in patients. Adult optic disc areas range from 1.15 to 4.94mm² in Caucasians and 0.90 to 6.28mm² in blacks. Mean vertical cup-disc ratios range from 0.4 to 0.5 in Caucasians, to 0.5 to 0.7 in blacks. In children, similar data have been reported, Dr Freedman said.

There are some specific things to look for in paediatric glaucoma “suspects”, said Dr Freedman. Suspects may have smaller optic discs with either small or absent cups. Conversely, patients may have larger optic discs with larger optic cups but with more nerve fibres than smaller discs. Suspicious findings in a child’s optic nerve exam include asymmetry in the cup-disc ratio of more than 0.2, notching, and a focal or diffuse thinning of the rim, she said.

In a panel discussion following Dr Freedman’s talk, the point was brought up that enlarged cups can be a familial trait and it does not necessarily mean glaucoma.

“The most important test is to examine the parents. If you see a similar cup in the parent as the child, check to make sure the parent doesn’t have glaucoma. If the parents’ pressures are normal, then it is likely that the child has autosomal dominant physiologic cupping—a normal variant. But it’s hard to make that diagnosis because sometimes the cupping can be very dramatic,” said Alex Levin, MD, from the University of Toronto.

Dr Levin emphasised the importance of family history. “We have family history of glaucoma is present, everybody is at risk. The next step is to determine what type of glaucoma is present,” he said.

“When in doubt, start screening early and screen regularly, at least once a year. For kids at significantly high risk of glaucoma, it may be worth examining them under anaesthesia just to get the examinations done,” he said.

“For kids at significantly high risk of glaucoma, it may be worth examining them under anaesthesia just to get the examinations done,” said Alex Levin, MD.

**New diagnostic scanning useful in paediatric glaucoma**

Dr Freedman discussed the use of Heidelberg Retinal Tomograph (HRT) in paediatric glaucoma suspects. The technology consists of a confocal scanning laser ophthalmoscope that provides three-dimensional analysis of the retina and optic disc. A limitation of the device is that it needs a reference plane from which all measured indices are derived. Also, there can be marked variations in normal optic head topography in terms of size and tilt, which can make interpretation difficult.

The GDx nerve fibre analyser (Laser Diagnostic Technologies) uses a confocal scanning laser ophthalmoscope and polarimetry to measure the thickness of the nerve fibre layer (NFL). An advantage is that results can be compared to an age and raced-matched database. A limitation of this technology is that there can be some interference in results caused by the cornea and lens.

Optical coherence tomography may be useful in the future. In adults, OCT has revealed that nerve fibre layer and macular thickness are thinner in glaucomatous eyes.

Age matched control data for all three techniques is still lacking for children. The question is whether these non-invasive technologies would be useful in children as an adjunct to optic nerve assessment.

Dr Levin conducted a study with OCT-T in 156 eyes in children with a mean age of nine years (ranging from three to 17 years) to measure nerve fibre layer and macular thickness. The results were similar to what would be expected in adults.

Normal eyes had significantly thicker NFL and larger macular volume than eyes with glaucoma,” she said.

A downside of the newer technologies is that they are not widely available, and in many places patients have to pay for the tests out of pocket. Even in Canada’s public healthcare system, some provinces don’t cover the costs of OCT or HRT, said Dr Levin.