Abstracts

Wednesday, July 5, 2017

Anatomy and Physiology of the Eye

S Sugrim

Objective: To review and summarise the important anatomical and physiological points of the eye that will guide ophthalmic assistants.
Content: Key concepts that will be covered include basic structure of the orbit and the globe, the anatomical terms used in describing the eye, the surface anatomy of the eye, eye adnexa, the extra-orbital space and orbital contents, the layers of the eye, the chambers of the eye, the various structures of the eye with special focus on the cornea, lens, optic nerve and the retina. Physiological concepts of the maintenance of the clarity of the cornea and the lens, aqueous humor formation and drainage, photo-transduction and the visual pathway will also be drained.

Pupil Anatomy and Diagnostic Considerations

S Sugrim

Objective: To review and summarise the important anatomical and physiological points of the pupil that will guide ophthalmic assistants.
Content: Key concepts that will be covered include basic structure of the pupil and the pupillary muscles, physiological concepts of mydriasis and miosis and the neurological control' pupillary reflex pathway and accommodation. Examination and assessment of the pupil with regards to the shape, size, direct and indirect pupillary reflex, RAPD, abnormalities of the pupil, drugs affecting the pupil and some clinical conditions of the pupil will be covered.

Thursday, July 6, 2017

Friday, July 7, 2017

Retinoscopy

D Singh

Retinoscopy and refraction are integral to the assessment of the refractive state of the eyes.

The streak retinoscope is commonly used to objectively assess refraction. The intercept, retinoscope beam, is directed into the pupil close to the visual axis and moved in a direction perpendicular to its length. The movement of the reflex is observed; "with" being in the same direction as movement of the intercept or "against", movement in the opposite direction.

The object of the retinoscopy is to eliminate or neutralize such movement by placing appropriate lenses in increasing power in the path of the intercept. In the plane mirror mode – plus lenses neutralize with movement; minus lenses neutralize against movement. The patient keeps both eyes open and looking at the wall chart. The examiner addresses the subject "right-to-right and left-to-left", not blocking the patient's view and reduced background illumination may be useful. The brightness and speed of movement of the reflex increase as neutrality is approached. To avoid errors induced by accommodation, fogging is used. In children, this requires cycloplegia.

Reversing the sleeve position (plane mirror to concave mirror effect) converts 'against' movement to 'with' movement. This is useful if the 'against' motion is difficult to see. Following neutralization, compensation is made for working distance (WD) in order to obtain the refraction of the eye.

A reflex that is skewed from the intercept indicates astigmatism. The axis of astigmatism is defined by rotating the sleeve to make the intercept coincident with the reflex. Retinoscopy may be done using plus cylinders or minus cylinders.

Verifying neutrality: i) Move slightly in (towards the patient) and out (away) of one's usual WD. At neutralization, moving in produces 'with' movement and moving away will result in 'against' movement. ii) Alternately, adding slightly more minus and plus lenses will produce similar effects. iii) Sleeve reversal will produce no movement.

Scissoring: A spilt reflex moving in opposite directions is seen in eyes with distorted corneas (keratoconus), large pupils, moderate-to-high astigmatism.

Other approaches: I) Radical retinoscopy in cases of small pupils and media opacities that render the reflex difficult to see. Reducing the WD improves visibility of the reflex.

II) Dynamic retinoscopy determines the refractive error at the distance of the retinoscope and aims to eliminate the need for a WD lens.

Refractometry

D Singh

Refractometry is the art of determining the refraction of the eye *eg*, for spectacle prescription. Three steps are: 1) Estimate sphere. 2) Refine cylinder axis and power. 3) Refine sphere power.

A refractor (phoropter) or loose lenses in a trial frame may be used. At the start, the patient is briefed on the procedure to ensure cooperation and appropriate responses. The refractor or trial frame is properly aligned in front of his/her face. With experience, one needs to develop a method of communicating choices in a manner that is readily understood.

The starting lenses are determined by i) retinoscopy, ii) autorafractor measurements, iii) previous refraction results or iv) and current spectacles.

An initial determination of sphere is made. "Push plus" sphere to avoid errors due to accommodation.

The cylinder axis and power are next defined using the astigmatic dial or cross cylinder.

If no astigmatism is detected, this is confirmed by judging the effect of introducing small cylinders.

Finally, sphere power is adjusted depending on the cylinder power (+0.25 DS per -0.50 DC).

Other methods to refine the cylindrical correction: i) The Paraboline; ii) Using higher-power cross cylinders (*eg* for vision less than 20/40); iii) Patient rotating the cylinders; iv) the four diamond charts and v) The stenopeic slit. The latter is a useful tool in cases of irregular astigmatism *eg* keratoconus.

Cycloplegia is used routinely in the paediatric age group to avoid errors due to accommodation. There is data to suggest that cycloplegia refraction should be done-up to age 20 years.

Refining sphere: i) +1.00 D fogging. 2) Duochrome test to prevent over minusing. Note that myopes often prefer to be slightly (-0.25D) more minus.

The pinhole may be used to confirm that the end point of refraction has been achieved.

Binocular balance tests: 1) 6 Dioptre Prism dissociation and II) Duochrome.

In presbyopes, the near add is adjusted for working distance according to the tasks undertaken *eg* reading at 14 – 16 inches, computing at 24 inches. It is useful to remember that a person should be corrected at near to provide twice as much accommodation as what is required for the desired working distance. It may be necessary to measure amplitude of accommodation.