CURTIN MEDICAL SCHOOL

OPHTHALMOLOGY

(CROSS-PLACEMENT: DURING GENERAL PRACTICE, SURGERY AND ACUTE CARE PLACEMENTS)

INTRODUCTION

As humans we each have an egocentric representation of the world, from which perspective we contemplate the environment and guide action in it. Our sensory perception is predominantly visual, with optic nerve signalling accounting for 30% of total cerebral input. Ensuring good ocular health and function is necessary for acute visual perception, but not sufficient. Visual processing is distributed widely in the brain: from the brain stem to every lobe of the cerebral cortex. Visual attention is an essential component for competence with most visual tasks, including driving. A complete assessment of visual function requires more than an eye examination.

Abnormal visual function may affect mood, mental health, attentiveness, circadian rhythm, sociality, and willingness to explore or experiment. Loss of vision has much more profound effects on human flourishing than simply loss of visual acuity.

Prevalence and causes of blindness

According to the WHO, 1.3 billion people have vision impairment, of whom 36 million are blind (<3/60 in the better eye). 80% of all vision impairment is preventable, and the two commonest causes are uncorrected optical error and cataracts. Other significant causes are glaucoma, macular degeneration, diabetic retinopathy, corneal opacity, and trachoma (http://www.who.int/news-room/fact-sheets/detail/blindness-and-visual-impairment). Children who do not have a well-focused retinal image may develop a range of disorders including amblyopia (lazy eye) and high myopia (extreme short sightedness). Loss of vision in childhood is especially tragic since the consequences may be lifelong and affect the entire family.

Cataract

Cataract surgery can be performed quickly, cheaply and safely in most healthcare environments but is not available to all who need it. In Australia and most western countries cataract surgery is the most commonly performed surgical procedure, with over 9,500 operations per million of population. The rate per million of population is closely correlated with economic indicators like GDP, and is less than 500 in many third world countries.

Diabetic retinopathy

The incidence of diabetes in Australia is over 5% (http://www.health.gov.au/internet/main/publishing.nsf/content/chronic-diabetes) and amongst diabetics the prevalence of clinically detectable diabetic retinopathy increases with both duration of diabetes and average blood sugar level. A study in 2017 reported the prevalence at 28.5% (https://www.aaojournal.org/article/S0161-6420(16)32256-4/fulltext) but it is significantly higher among Indigenous Australians than non-indigenous Australians. If left untreated diabetic retinopathy may lead to blindness, but timely treatment will prevent that result.

Glaucoma

Glaucoma is caused by loss of optic nerve fibres due to pressure damage. The commonest type is ‘open angle glaucoma’ that progresses slowly over years and produces virtually no early symptoms. If detected it can be managed by drops or surgery that lower the eye pressure. Unfortunately if it is not detected by routine screening the patient usually does not present until they notice significant loss of peripheral visual field, and that loss is not reversible. Any health care professional can examine the optic disc with an ophthalmoscope, and if an abnormality is suspected further testing can be arranged to establish the diagnosis at a stage when treatment may still prevent vision loss. In the Blue Mountains Eye study the prevalence in Australians among over 49 year olds was 3%, of whom half were not diagnosed (https://www.ncbi.nlm.nih.gov/pubmed/8874440).

Age related macular degeneration

With increasing longevity the prevalence of age related macular degeneration (AMD) in Australia is increasing. There are two types: Dry - no retinal oedema, and Wet - retinal oedema due to growth of a vascular membrane beneath the central retina (macula). The disease starts with yellowish subretinal deposits called ‘drusen’ and atrophy of the retinal pigment epithelium. As the atrophy progresses both depigmention and ‘graininess’ of pigmentation become visible with an ophthalmoscope. Over many years the pigment epithelial cells beneath the macula become so disrupted that the overlying light detectors atrophy, producing a central visual field defect. The gradual age related progression of the dry form may be interrupted by a sudden loss of vision when exudate or haemorrhage leak into the overlying retina from a sub-retinal membrane (Wet AMD). Significant vision loss from either the wet or dry types occurs in 0.96% of Australians over 50 years of age (https://jamanetwork.com/journals/jamaophthalmology/article-abstract/2656336). There are treatments that are effective in some cases of AMD but at present they are a minority.

PLEASE REFER TO THE OPHTHALMOLOGY SPECIFIC LEARNING OBJECTIVES