

RECENT DEVELOPMENTS IN EYE SURGERY

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In the last three decades, eye surgery has become a micro surgical specialty . Cataract surgery has been transformed by changes in local anaesthesia, implants, phacoemulsification and small-incision surgery , which allows compressible/foldable silicone or acrylic implants to be inserted through a 2-mm incision. The implant power can be more accurately measured by new formulae and the use of A-scan ultrasonography or laser wavefront biometry , and multifocal and accommodative lenses are now available. An even more recent advance in cataract surgery is the development of femtosecond laser technology , which allows extremely controlled corneal incisions, lens capsule opening and lens fragmentation to be achieved automatically together with the facility to adjust the shape of the cornea at the time of surgery to improve visual outcome for some patients. The extent to which this technology improves long-term visual outcomes remains to be seen. There are new treatments for eye disorders that involve abnormal growth of blood vessels in the back of the eye, such as the wet form of age-related macular degeneration. Anti-vascular endothelial growth factor (VEGF) antibodies, such as the drug ranibizumab, may be injected directly into the vitreous cavity to reduce new vessel proliferation. Intravitreal steroid injections or anti-VEGF agents are now also being used in diabetic retinopathy or retinal vein occlusion. Developments in vitreous surgery have enabled membranes to be peeled off the retina and macular holes to be repaired, and have also increased success rates in retinal detachment surgery with the additional use of gases and silicone oil or heavy liquid inserted into the vitreous cavity to tamponade the retina. Advances in technology have also led to the development of photosensitive chips and camera systems that can be implanted into the eye to restore some vision in patients with severe and otherwise untreatable macular diseases. Some paralytic squints can be helped by the use of adjustable sutures or injections of botulinum toxin into the overacting muscles. Refractive errors can be treated by the excimer laser. These laser in situ keratomileusis (LASIK) surgery can be combined with phakic implants, which involves cutting a corneal flap (by femtosecond laser or surgery) and performing the laser surgery at a deeper level. There have been some concerns about defective contrast sensitivity and problems with night vision after laser correction of myopia. Phakic implants have also been used to correct high refractive errors. Corneal topography aids the accuracy of corneal and refractive surgery and the increased use and quality of CT and MRI scans has revolutionised the diagnosis of orbital and intracranial lesions involving the optic pathways (Figures 49.35–49.37). Fluorescein angiography and ocular coherence tomography (OCT) are invaluable in the diagnosis and treatment of macular conditions. OCT angiography has recently been developed; this allows assessment of the retinal microvasculature without the need for systemically administered agents. This technology may reduce the need for fluorescein angiography in the future. OCT as well as scanning laser polarimetry of the retinal nerve fibre

layer and Heidelberg retinal tomography (HRT) are widely used in the diagnosis and management of glaucoma. Surgical glaucoma management is also developing rapidly. Trabeculectomy surgery, where eye pressure is reduced by creating a fistula between the anterior chamber -

Figure 49.35 Magnetic resonance imaging scan, sagittal view. Craniopharyngioma.

The mass in the suprasellar cistern is of high signal intensity because of the proteinaceous fluid that the cyst contains (courtesy of Dr Juliette Britton).

George G Baerveldt, 1945–2021, ophthalmologist, Emeritus Professor of Ophthalmology, UC Irvine, CA, USA. A Mateen Ahmed, contemporary, Nigerian ophthalmologist, based in California, USA, developed the shunt that was approved by the US Food and Drug Administration in 1993. Jacques Rene Tenon, 1724–1816, surgeon, La Salpêtrière, Paris, France. become more refined in recent years, with better control of wound healing using topical application of antiscarring drugs such as mitomycin C. Alternatives to trabeculectomy have been developed using devices such as Baerveldt and Ahmed shunts that drain aqueous from the eye to lower the pressure. A new revolution is also under way using minimally invasive glaucoma surgical techniques, with a variety of tiny devices now available to shunt aqueous and reduce eye pressure.

Figure 49.36 High-resolution computed tomography through the orbits showing dense calcification of the optic nerve sheaths typical of optic nerve meningioma (courtesy of Dr Juliette Britton). Figure 49.37 Axial enhanced magnetic resonance imaging scan showing a mass involving the optic chiasma and extending down the optic nerves and tracts.

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