Current Practice

THE SPECIAL SENSES

Cataracts

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A cataract is an opacity within the lens of the eye. Just as the hairs tend to become grey with age, the lens, which is similarly a derivative of the epidermis, tends to become grey and opaque; and by the age of 70 over 90% of the population show some evidence of cataract, though the visual impairment is often very slight and its progress extremely slow.

Opacities may occur anywhere within the lens substance, so producing an endless variety of morphological patterns of cataract. In the most common forms there is a sclerosis of the lens nucleus, or sector-shaped wedges may be seen encroaching from the periphery; but the opacities may resemble fine spindles, snow-flakes, rosettes, coral-like encrustations, or leaf-like fronds, and they occasionally appear as brightly coloured dots scattered through the lens substance.

Though the vast majority of cataracts represent this simple senile change, such opacities may form as the standard response of the lens to any insult it receives, whether from trauma (concussion or perforation), endocrine upset (such as hypoparathyroidism or diabetes), radiation (infra-red, gamma rays), chemicals (such as naphthalene and lactose), or as an associated feature of a variety of skin disorders and other metabolic defects (such as myotonia or mongolism). In addition to these, lens opacities may be the sequel to local eye disease (such as uveitis or retinal detachment), when they generally take the form of a "polychromatic lustre" over the posterior surface. They may also occur as a congenital mishap, when the opacities may occupy the zone of the lens that was being laid down at the time when some noxious influence (such as lowered blood calcium) had its impact, leaving an opacity that is shaped like a sea-urchin enclosing the lens nucleus.

Presenting Features

The over-riding and usually the only presenting symptom of a developing cataract is failing vision, which will be most marked when the central areas of the lens are affected. Sometimes the failure of vision is evenly progressive, but the rate of progress of cataracts is rarely predictable, and often they may remain apparently stationary for years. The second eye usually follows the same course as its fellow some months later. Occasionally there are coincidental symptoms: a positive scotoma (which, unlike the common "musca volitans," does not float about with movements of the eye), an indefinite unocular polyopia, an adventitious myopia (due to sclerosis of the lens nucleus), and even a change in colour-values when the cataract is brownish and the blue end of the spectrum becomes submerged (this gradual change is rarely noticed at the time, but patients sometimes complain of the sudden translation into a relatively cold blue world after the cataract has been extracted).

The principal sign of a well-advanced cataract is a whitish opacity within the pupil (Fig. 1); but an earlier cataract may well be recognized during ophthalmoscopy, when it presents as a dark silhouette against the reddish fundus reflex (Fig. 2).

Medical Treatment

Lens opacities are immutable. The protein cannot be uncoagulated, and the only way to disperse the opacities is to remove the lens. There is similarly no known method of preventing the progress of any naturally occurring cataract. The only reversible changes associated with cataract are those of hydration, and these can be rectified or further progress prevented only in the rare cases in which they are due to known biochemical derangements which can rapidly be adjusted.

FIG. 1.—The mature cataract, presenting as a white opacity behind the pupil.

FIG. 2.—The early cataract, presenting on ophthalmoscopy as a silhouette against the bright fundus reflex.

Since these patients find themselves to be threatened with the remorseless advance of blindness—the only hope of its alleviation lying in a drastic operation of which the uncertainties and terrors are easily inflated during the preceding

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inactivity—it is not surprising that spurious cataract-cures† abound, on which an array of charlatans thrive.

The medical treatment of cataract is thus symptomatic, aiming to assist the laboured vision by careful refractive correction and optimum illumination. If the opacities lie centrally, the illumination may be reduced or dark glasses prescribed, while weak mydriatic drops may give a little extra definition. In the early stages the term “cataract,” so sinister to the lay mind, should be avoided, and the passage of the subsequent years should be lightened by optimism and reassurance, until the visual impairment is sufficiently burdensome to merit a cataract extraction. It is not amiss to investigate the patient for any coincident systemic failings, particularly in relation to the endocrine systems, and to treat accordingly, though there is no evidence that the progress of a senile cataract is relieved by such measures.

Surgical Treatment

Indications

Senile cataracts should normally be extracted when the patient can no longer see well enough with either eye to continue in his normal activities. In most civilizations this point is reached when it becomes a burden to read normal print at normal reading-range—which roughly corresponds to an acuity of 6/18—so that the cataract is generally removed from the worse eye when the other eye can just read 6/18 (with its refractive correction). Operation may well be deferred until the optimum vision has fallen well below this level if especial risks are involved (as from coincident systemic disease) or if the patient's visual requirements are not very exacting; but extraction is not justified from an eye that cannot discern a light and the direction from which it comes. The degree of maturity and the geographical distribution of the opacities within the lens have thus no direct bearing on the time for extraction.

Unilateral cataracts, the other lens being clear or virtually so, need not normally be removed. If such a cataract is extracted, the patient will have the advantage of achieving some (very indistinct) vision in the temporal field on that side, but the aphakic eye will not tolerate its correcting spectacle lens since the dissimilarity of the two corrected images is too great to allow any comfortable binocular vision. With a contact lens in the aphakic eye, this dissimilarity may be reduced to within the limits of fusion (in the minority of cases in whom it is found that the affected eye has not yet become “lazy” through suppression); and in those patients who are sufficiently young and adaptable and whose occupation renders binocular vision a particular advantage, such contact lenses may be justified. The insertion of an acrylic implant in the place of the lens that has been extracted will avoid this dissimilarity of the two retinal images, but at the expense of a greater surgical risk to the eye. Otherwise such monocular cataracts may merit removal if they are mature (=complete), either for cosmetic reasons, or on the grounds that they occasionally cause trouble by swelling or becoming “hypermature.”

Complicated cataracts secondary to a uveitis may be removed with greater difficulty and with less expectancy of good resultant vision, since apart from the structural damage already caused by the inflammation the postoperative uveitis is often severe. Nevertheless, if both eyes are so affected that the patient cannot see his way about, extraction is justified, for the patient will have little to lose by the operation, and even a limited improvement in the sight may be all-important.

† The retinue of suggested medications tail off from the barely defensive (such as iodide—“removing sclerosed tissues”) and the exuberant (such as whole-embryo extract—“one of the endocrines is sure to work”) to the unvarnished but at any rate economic deception of injections of sterile water. Recently desensitizing doses of “fish lens protein” became fashionable in America on the hypothesis (for which there is no evidence) that senile cataract was produced by sensitivity to lens antigens: the only effect on the eye was an occasional phacoanaphylactic endophthalmitis that inevitably damaged the sight that remained.

A *congenital cataract*, if unioocular, should generally be removed unless the opacities are very localized; but there is little occasion to operate before school age, especially since 50% have associated developmental anomalies which make for a poor visual result. The operation is often mainly justified for cosmetic reasons.

If congenital cataracts are present on both sides they must be removed at an early stage in order to allow the development of good macular function, unless there is already sufficient space around the lens opacities to permit useful vision (assisted if necessary by the constant use of mydriatics or by an optical iridectomy). When such binocular cataracts are virtually complete they should be removed at the age of about 6 months. If they are incomplete operation may be postponed for a year or two to allow a better assessment, since if the vision is better than the equivalent of 6/36 amblyopia is unlikely to develop. In an infant the vision can be assessed only by the crude tests of his recognition of objects; but when in doubt and especially if a searching nystagmus develops such cataracts should be removed.

Methods of Cataract Removal

In youth the lens matter is soft, and if it is liberated into the aqueous by making a hole in the intervening capsule it will gradually be absorbed and dissipated into the blood stream; thus juvenile cataracts can be removed simply by tearing open the anterior lens capsule with a needle and allowing the aqueous to wash the lens contents slowly away. This operation is called “discission.” As absorption is often

FIG. 3.—The technique of intracapsular cataract extraction. The lens capsule is grasped by forceps and coaxed out of a wide limbal incision, assisted by counter-pressure from a blunt hook.

FIG. 4.—The cataractous lens being extracted after being frozen on to a cryoprobe. (The iris is being brushed upwards, and the cornea held down by forceps to allow the lens to be delivered.)

very slow, an aspiration or surgical evacuation of the liberated lens matter may well be preferred.

By the age of 35 the fibres in the centre of the lens have become too hard to be dissolved by the aqueous. Then, after tearing open the lens capsule, this hard nucleus must be extracted through a wide incision in the eyeball (an "extracapsular extraction").

After both of these operations the posterior capsule remains intact, and, as this often becomes wrinkled or thickened by the adherence of residual lens matter or of fibrin from a postoperative uveitis, a subsequent puncture ("capsulotomy") is usually required.

The standard operation nowadays for removing a senile cataract is the "intracapsular extraction" in which the whole lens is removed (as opposed to the extracapsular extraction, in which the nucleus alone is removed and the capsule is left behind); this intracapsular technique (Fig. 3), requiring a rupture of the zonule without a rupture of the lens capsule or vitreous face, is fraught with slightly greater operative risks to the eye. It is normally the operation of choice, the earlier and better visual results and the relative freedom from post-operative uveitis affording an ample justification.‡

Various recent innovations have greatly facilitated this operation, particularly the use of a cryoprobe, which gains a firm hold of the cataractous lens by adhering to a frozen sector of its substance (Fig. 4) rather than by relying on the grip of fine forceps upon its tenuous lenscapsule. The availability of ultra-fine needles and suture materials (particularly silk which has been obtained by caesarean section of the virgin silk-worm) and of an enzyme that will dissolve the zonule before extraction have combined to render this operation so straightforward that they are declared to have taken all the finesse and elegance out of the performance.

‡ The earliest method of cataract dispersal, that of "couching," in which the opaque lens is dislocated back into the vitreous by a needle thrust through the limbus, is probably the oldest operation in history (punitive amputations hardly counting as "surgery"). It was established by Susruta (ca. 700 B.C.), and known to others of that enlightened Hindu civilisation centuries earlier. It is now discredited, since it usually leads to uveitis and glaucoma, but in remote parts of India it is still being performed by a technique that has altered little in over three thousand years.

The extracapsular extraction dates from Daviel (1748), and rapidly gained credit from the disastrous results of couching by the arch-charlatan Chevalier Taylor, at whose hands both Bach and Handel suffered in the following year. The intracapsular operation dates from Sharpe (1773) who evacuated the whole lens, simply by pressing on the lower limbus with his thumb-nail.

Even so, there are many technical complications of cataract surgery, particularly from postoperative haemorrhage and prolapse of the iris or vitreous, that may confound the outcome. The ultimate vision may be impaired after a flawless operation because of some retinal degenerative changes, common enough in such elderly patients, which could not previously have been discerned.

It is usually advisable for the patient to stay in hospital for about nine days after the operation; but the rigors and restraints of this convalescence have been greatly lightened during the last decades so that it is no longer thought necessary to bandage the unoperated eye, and (thanks to our efficient suturing techniques) the patient is usually allowed out of bed on the following day. Even so, the eye is rarely ready to be fitted with its correcting lens for a further four to five weeks.

Restoration of Sight

A cataract is by far the commonest cause of blindness in England. That a third of our blind in England should have lost their sight from this eminently curable condition is a paradox that is explained to some extent by the inertia, fear, ignorance, and fatalism of the elderly who are afflicted, and to some extent by their frequent reliance on the advice of untrained practitioners or pessimistic companions. Yet it must be admitted that the restoration of sight is not always as gratifying to the cataract patients as one might expect. Without their glasses they may see less than they did before the operation; and the thick "pebble" lenses that are necessary to give clear vision are at first both uncomfortable and confusing. Through these heavy spectacles objects seem magnified and straight lines curved, so that their distorted world squirms about with every movement of the eyes, like writhing snakes that never stay still; while in ordinary conversations, faces pop in and out of the blind area with the annoying insolence of a Jack-in-the-box. Many a successful operation is thwarted by a frail psyche that prefers to grope its way through life rather than cope with this formidable new visual world. But in the end the great majority of cataract patients triumph over these difficulties; and they can drive their cars, play their rounds of golf, and re-live the full life that had started receding from them when opacities first started to cloud the sight.

ANY QUESTIONS?

We publish below a selection of questions and answers of general interest.

Diagnostic Significance of Ocular Paralysis

Q.—*In failures of vergence due to lesions in the brain stress is laid on the differentiation between conjugate paralysis, in which all eye movement in a given direction is abolished, and supranuclear paralysis, in which movement still occurs if the eyes are following an object. Has this distinction any localizing value for the lesion? If so, where are the lesions located?*

A.—The wording of this question is a little confusing, but if the word "version" is substituted for "vergence" the answer is that the distinction is a real one.

It is most easily seen and understood if disturbances of horizontal gaze are considered. Thus a patient with a lesion in one frontal lobe (say the left) may be unable to

turn his eyes to the right if he is asked to do so. On the other hand, if he is asked to fix his gaze on a moving object he will probably be able to follow it as it moves to the right. If his eyes are fixed on an object ahead of him he will be able to maintain his fixation when his head is turned to the left.

On the other hand, with a pontine lesion conjugate gaze will be impossible when the patient attempts to move his eyes to command, when he is attempting to follow a moving object, or when he tries to fix on a stationary object and his head is turned.

There is a similar distinction between supranuclear and nuclear vertical-gaze palsies. In lesions affecting the upper part of the midbrain (above the oculomotor nuclei) following and "fixation" movements may be preserved, while movements to order are lost.

Respiratory Function Tests

Q.—*What simple tests can be carried out in the consulting room or at the bedside to provide a rough estimate of respiratory function and forced expiratory volume?*

A.—The ventilatory function of the lungs can be crudely assessed with the Snider match test, in which the patient is asked to blow out a lighted match held 15 cm. from his lips. It is important that the mouth is held wide open. If the patient cannot extinguish the flame ventilatory impairment is likely to be present. In a large series of patients who were unable to extinguish the match Snider found that the mean F.E.V._{1.0 second} was about 1 litre.¹ However, it should be pointed out that the scatter of these volumes was wide, and some patients who could not blow out the flame were