

Cataracts

Cataracts are one of the main causes of visual impairment, accounting for 47.9% of blindness worldwide. It is estimated that more than half of people over the age of 65 years have some degree of cataract development in one or both the eyes. In England and Wales, the Royal College of Ophthalmologists estimates that 2.4 million people aged 65 years or older have at least one visually impairing cataract. Surgical treatment accounted for 329 447 operations in 2008–2009: the most common elective surgical procedure. Familiarity with the diagnosis, consequent functional limitations and the role of secondary care are essential in order to provide effective management of this common condition.

The GP curriculum and cataracts

Clinical example 3.16: Care of people with eye problems identifies learning objectives in clinical management of eye problems. The following abilities related to cataracts are:

- Eliciting appropriate signs and symptoms and subsequent investigation, treatment and/or referral of persons presenting with disorders of refraction including cataracts
- Examination of the pupil and assessment of the red reflex
- Appreciate the importance of the social and psychological impact of eye problems on the patient
- Describe and be able to implement the key national guidelines that influence health care provision for eye problems

Aetiology

A cataract is the development of an opacity within the lens. As we age, there is a disturbance in the structure of the lens and accumulation of pigment. The clarity of the normal lens is maintained through a precise structural arrangement of fibres and balance of chemical constituents. This change to the microstructure results in opacification, which consequently alters the penetration and refraction of light. This is illustrated in Figure 1. Clouding of the lens will cause a degree of scattering of light rather than focusing it to a point on the retina. The more opaque it becomes, the greater the scatter and the worse the vision.

Although the majority of cataracts are simply age related (see Figure 2), there are other factors that are also implicated in their development in adults. These are listed in Table 1.

Symptoms

The typical initial presentation of a cataract in general practice is with sight disturbance, described as blurred

or cloudy. Patients may also attend following an incidental finding by an optometrist or optician. The onset is usually slow with a progressive deterioration in visual functioning. This may manifest as difficulty in reading fine print or requiring more light to see things clearly. Complaints of 'glare' from either the sun or the oncoming car lights at night are also frequent. Alteration of colour perception can occur with reduced intensity, lack of contrast or a yellowish distortion. In those with a unilateral cataract, this can more easily be detected by comparing vision in one eye with the other.

Cataracts continue to develop with time, causing progressive deterioration of sight. A visually impairing cataract is defined as visual acuity on a Snellen chart of less than 6/12, which is attributable to a lens opacity. Despite this, the visual outcome following surgery at this stage is very similar to that when treatment is carried out earlier.

A hypermature lens itself can occasionally cause complications. It can leak with the release of protein and pigment into the anterior chamber. The resultant inflammatory response can cause an anterior uveitis or obstruct the drainage angle producing a secondary glaucoma.

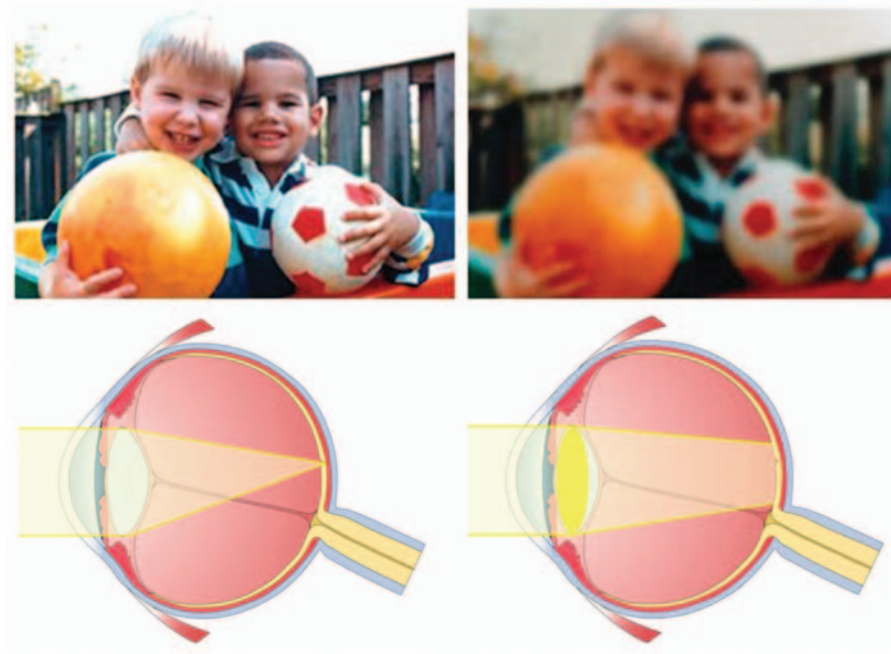


Figure 1. Pathophysiology of visual changes.
Photos of the two boys courtesy of the National Eye Institute, National Institutes of Health.

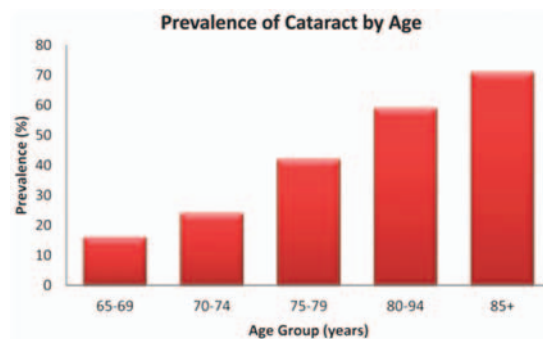


Figure 2. Prevalence of cataract by age.

There are several different types of cataract morphology. The variations can result in subtle differences in the pattern of visual symptoms. The most common three types and their associated features are shown in Table 2.

Management in primary care

When an individual presents to a GP with a cataract, which is not advanced or particularly impairing, the patient should be referred to an optometrist who is recognised as being part of the perioperative cataract service – the majority are. Those attending with

advanced cataracts should be considered for direct referral to an ophthalmologist for surgical intervention.

In assessment of the patient, a focused history is needed. Visual symptoms should be elicited, including near and distance vision, past history of eye disease, binocular function and amblyopia. The presence of any of the main risk factors should also be established. From a primary care perspective, the main aim is to assess the need for specialist referral.

A key factor to determine this requires identification of the effects of the cataract on the individual. Patients should be asked about:

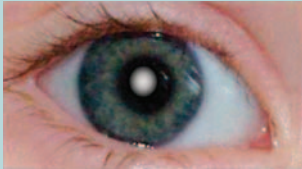
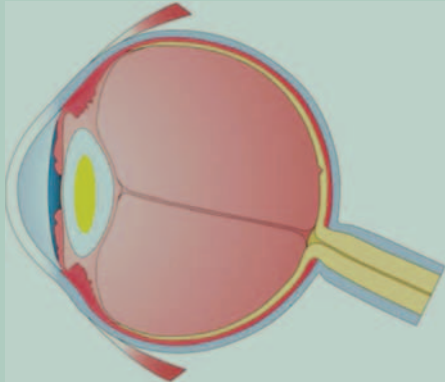
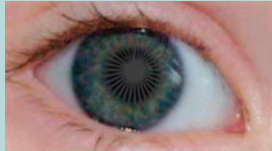
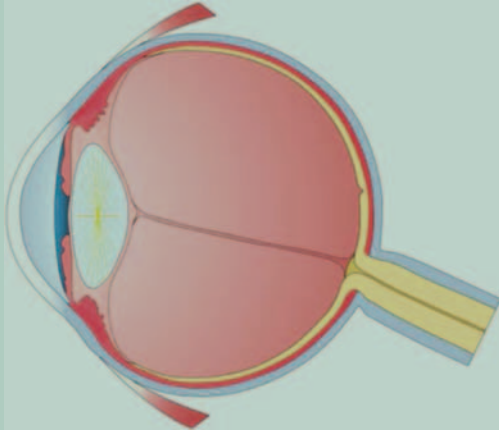
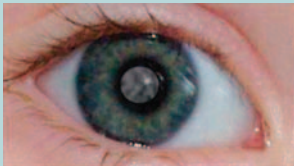
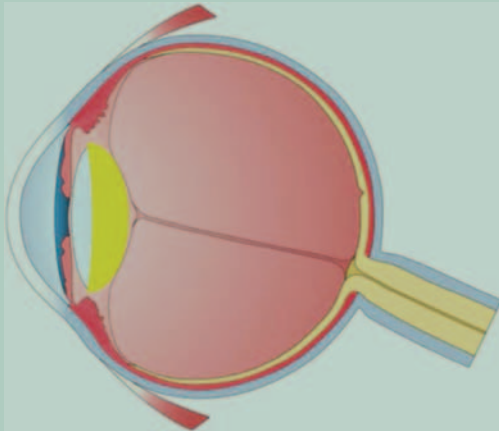
- how the cataract has affected their quality of life
- any restrictions on activities such as work or leisure pursuits
- their perceptions of their vision and
- whether they drive

Reflection on any history of falls can be useful as the patient may not have attributed these to visual difficulties.

Medications should also be reviewed, paying particular attention to the prescription of α -adrenoceptor antagonists (especially tamsulosin) and anticoagulants. Current or previous use of α -adrenoceptor agonists raises the risk of floppy iris syndrome. This can result in excessive mobility of the iris during surgery and increase the risk of complications. The Royal College of Ophthalmologists

Table 1. Causes of cataract.

Non-modifiable factors	
Female gender	Slightly higher risk.
Familial	Heritability of age-related cataract estimated at 48–59%.
Medical conditions	
Diabetes	The most notable medical cause. The duration of disease and degree of control determine the extent of this risk. Diabetes mainly affects the incidence and development of cortical and posterior subcapsular opacities.
Acute extreme dehydration	Especially at a young age. This is an important risk factor in the developing world.
Atopic disorders	The disorders themselves and a consequence of their treatment.
Other conditions for which there is less robust evidence	Hypertension Gout (over 10 years duration)
Trauma	
Eye surgery	Especially glaucoma surgery and vitrectomy (removal of haemorrhage/relief of retinal traction).
Penetrative eye injuries	
Contusion of the eye	
Irradiation	
Electrocution	
Other eye conditions	
Glaucoma	The disease process itself and surgical treatment thereof.
Uveitis	Cataracts develop secondary to chronic inflammation.
Retinitis pigmentosa	
Extreme myopia	
Drug-induced	
Corticosteroids	Especially those receiving oral doses greater than 15 mg/day or long term (over 1 year). Prolonged use of steroid eye drops is also a significant risk. There are weaker associations with the use of inhaled, nasal or topical steroids. Steroids tend to cause posterior subcapsular cataracts.
Statins	According to an observational study published in 2010
Topical agents used in the treatment of glaucoma	
Other drugs for which there is less robust evidence	
	Amiodarone, phenothiazines, tricyclic antidepressants and antihypertensives (especially diuretics and beta blockers)
Lifestyle	
Tobacco smoking	Multiple studies have demonstrated that the degree of exposure is related to the incidence and progression of cataracts (especially nuclear cataracts).
Ultraviolet-B light exposure	Reliably shown in several studies. Particularly implicated in cortical cataracts.
Other factors for which there is less robust evidence	Some studies show a link between high alcohol intake and posterior subcapsular opacities in particular. However, these results may be skewed by a number of biases. There is also data that suggests nutritional status may be implicated.

Table 2. Types of cataract.		
Cataract morphology	Pathological changes	Typical symptoms
Nuclear Yellowing and sclerosis of the nucleus of the lens 		Reduced contrast. Reduced colour intensity. Difficulty recognising faces or number plates. Reading vision typically preserved more than would be expected.
Cortical Gradually develops from the outside of the lens to the centre. 		Glare when driving at night. Difficulty reading. Patients with diabetes commonly develop cortical cataracts.
Subcapsular Occupies the posterior capsular area — begins at the back of the lens. 		Difficulty in daytime driving. Difficulty reading. Often in patients with diabetes, extreme longsightedness, retinitis pigmentosa or those taking high dose steroids.

(RCOphth) recommends that anti-coagulative medication is continued but the international normalised ratio (INR) should be within the desired treatment range. Hypertension should also be well controlled, but the RCOphth warn against a sudden reduction in blood pressure pre-operatively.

Visual acuity should be measured using a Snellen chart, both with and without refractive correction using glasses. General eye examination should also be performed looking for indicators of any other eye disease. Ophthalmoscopy is used to assess the red reflex and can yield some information on the accumulation of yellow-brown pigmentation of the lens.

Co existing morbidities that may make surgery awkward, for example advanced cardiovascular or respiratory disease, which makes lying flat difficult, should be noted. The patient's amenability to surgery also needs to be established; otherwise, there is little benefit in secondary care referral.

There are no curative non-surgical treatments available for cataracts. In those who are unsuitable, due to physical or ophthalmological co-morbidities or unwilling for surgery, there are some measures that may help reduce symptoms. However, these cannot reverse the disease process. They may include:

- limiting ultraviolet-B exposure
- reducing glare—for example by using sunglasses or a hat or specialised tinted glasses
- optimising refractive correction
- increasing light levels—this increases contrast, aiding visual clarity
- stopping smoking
- consideration of visual aids and support to reduce disability

Secondary care

Referral to secondary care for surgery is not always clear cut (see Figure 3). In a patient who has a cataract of sufficient severity to account for the symptoms, the decision about surgical intervention is made in secondary care. It typically encompasses consideration of alternative strategies, such as refractive correction or the presence of coexisting eye conditions. Consequential limitations to occupation, interests or driving are also important. Diseases such as glaucoma, age-related macular degeneration or diabetic retinopathy are present in up to 30% of cataract patients, and lens opacity can impair monitoring and management of these irreversible conditions.

In the majority of patients, the surgery is carried out as a day case. Inpatient surgery is only recommended for patients with other eye conditions, which need particular observation post-operatively or those who have severe medical morbidity. Surgery under local anaesthesia is usual practice and does not require the patient to have someone stay with them, whereas general anaesthesia requires supervision overnight.

Surgical management

The operation itself typically only takes 10–40 minutes. The lens is removed, most commonly using a process called phacoemulsification. In this procedure, the lens capsule remains in place. The lens is broken down into small pieces using an ultrasonic tip, which are then suctioned out. This only requires small incisions, preserves the shape of the cornea (which is responsible for around 66%

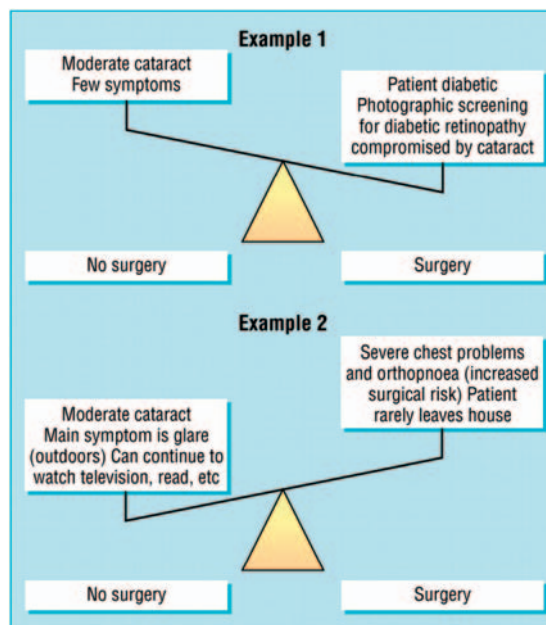


Figure 3. Considerations for surgery. Reproduced from Allen, D. (2006). *BMJ*, 333, p. 128, with permission from BMJ Publishing Group Ltd.

of light refraction) and does not affect the posterior chamber, thus impacting less on intraocular pressure. An alternative is conventional extracapsular cataract extraction (ECCE) but as this requires a larger incision, it is usually reserved for cases where phacoemulsification is problematic.

A replacement lens is then inserted into the capsule. These implants are typically designed to produce optimal distance vision, so nearly all patients require reading glasses post-operatively. Multifocal lenses are an area under development but at present not widely available on the National Health Service (NHS). Another option may be to implant one lens with zero refraction, for successful distance vision, and the other with refraction achieving mild myopia for near vision. This will however not yield normal binocular vision or depth perception.

Patients should be counselled to expect mild discomfort, which can be managed with simple analgesia. They are likely to experience itching, mild eyelid bruising, light sensitivity and some discharge. Information and advice are given to patients regarding eye care and activities. This usually recommends avoiding swimming, strenuous exercise, heavy lifting and contact sports for the first 7–10 days. Patients should also be counselled to avoid rubbing the eye and to protect it from irritants, such as dust or shampoo. Improvement to vision is not always immediate, although within a week the individual should notice some change. An end-point improvement is seen in 80–90% of patients, with better acuity, colour vision and subsequent functional gain. Treatment of cataract usually causes myopic shift, and as a result, all patients will need

to have their refraction checked after 4–6 weeks. New lenses/glasses are required in the majority of cases.

Even in those individuals who have a good outcome following surgery, treatment of the second eye (if affected) is still indicated. There is good evidence that failure to do so results in binocular inhibition, which can have significant functional effects, such as difficulties with driving. The timing of second eye surgery is controversial. It is possible to operate simultaneously and this may aid visual rehabilitation and reduce costs to both the patient and the society. However, the risk of bilateral endophthalmitis has to be borne in mind, due to its potentially catastrophic consequences.

As with all interventions, cataract surgery does carry the risk of adverse outcomes. The most important ones are summarised in Table 3. Medications at discharge usually include antibiotic and steroid eye drops, which are used to try to reduce post-operative complications. Increasing swelling, worsening pain, deteriorating vision or

excessive discharge should alert GPs to the possibility of serious complications and the patient should be referred for emergency reassessment by a member of the specialist team.

Posterior capsule opacification is a notable problem as it is the most common complication, occurring in 28% of cases by 5 years. It can develop some years after surgery and is due to clouding or thickening of the posterior capsule of the lens, which was left in place. The symptoms are of a return of the cataract. It is easily managed in secondary care as an outpatient, using laser treatment. It is more common in those treated at a younger age and with the use of silicone-based lenses.

Prognosis

The evaluation of surgical outcome is about more than just visual acuity. Perhaps of greater importance is the beneficial effect on symptoms and activity limitation.

Table 3. Significant post-operative complications requiring urgent specialist reassessment.

Complication	Presentation
Raised intraocular pressure	Some rise in pressure is common and self-limiting. However, rapid elevation presents as an acute glaucoma with a painful red eye. This is usually inflammatory in aetiology.
Acute post-operative infective endophthalmitis	This develops within days of surgery, presenting with sudden reduction in vision and increasing eye pain. Examination may show eyelid swelling, marked conjunctival redness, hypopyon or diminished red reflex.
Delayed post-operative infective endophthalmitis	This develops weeks to months after surgery, with an average of 9 months. Visual loss is insidious but it occurs with minimal pain. Examination may show hypopyon, inflammatory clumps in the anterior chamber and corneal oedema.
Retinal detachment	This is rare; however, the calculated excess risk over 10 years following cataract surgery versus eyes without surgery is 5.5. The presentation is as with any other cause of retinal detachment.
Macular oedema	Blurred central vision. This presentation is usually a little delayed but is the commonest cause of unexpected visual loss following cataract surgery.
Intraocular lens dislocation	Reduced vision, haloes, ghosting of images and diplopia. The presence of pain and/or a red eye make anterior capsule dislocation more likely—caused by the mechanical injury or inflammatory response to the displaced lens.
Choroidal/suprachoroidal haemorrhage	Sudden excruciating, throbbing pain with an immediate loss of vision. The risk is increased by straining.
Toxic anterior segment syndrome	The passage of exogenous material into the anterior chamber causes an inflammatory reaction. The presentation is similar to acute post-operative infective endophthalmitis but with only mild or minimal pain. The onset is typically a more acute, occurring within the first 24 hours of surgery.

The ability to perform visual tasks (activities that require visual function) is a better indicator of benefit than acuity alone. Postoperatively 95% of those without any other eye pathology will have best corrected vision of 6/12.

Untreated cataracts will continue to progress. This deterioration is not linear, nor predictable. Ultimately, however, most will develop a severe visual impairment with potential adverse social, psychological and physical consequences. It is an easily manageable condition and in a large proportion of cases, the clinical conundrum is not and if to treat, it is when to treat.

Cataracts in children

Congenital or infantile cataracts are diagnosed in nearly 3 in 10000 children under the age of 1, each year. They occur either as an inherited trait or as a secondary to a harmful event *in utero*. The more common causes are infections in pregnancy (particularly rubella or varicella), Down's syndrome, myotonic dystrophy and intrauterine/neonatal hypocalcaemia. In those neonates with bilateral cataracts and no family history, it is prudent to exclude galactosaemia. Galactokinase deficiency should also be considered in developmental cataracts.

Long-term visual impairment predominantly results from amblyopia. The deprivation of vision causes structural changes in the brain. However, during the first 6 weeks of life, the visual system is sufficiently immature that these changes do not take place. This time is often referred to as the 'latent' period—where vision is reliant upon subcortical pathways rather than the higher visual system. This means that temporary visual deficiency in the first 6 weeks of life does not usually have long-term consequences. The structural changes in the brain differ depending on whether the cataract is unilateral or bilateral. The latent period in those with bilateral deprivation is longer, estimated at 10 weeks. Treatments occurring beyond these time frames are associated with progressively poorer outcomes.

Even with surgical intervention, those with unilateral cataract still require occlusion (patching) treatment and accurate visual refractive correction to achieve the best possible outcome. This may only be 'useful' vision of 6/60 or better. When congenital cataracts are bilateral, the infant typically has strabismus, which often persists post-operatively. This is managed with occlusion of lower intensity. Nystagmus is another recognised complication of congenital cataracts, even with appropriate management. It typically develops around 3 months of age and once present, it is likely to persist, even post-operatively. These issues emphasise the critical need for a timely referral of affected infants to secondary care and highlight the importance of a thorough neonatal examination (see Figure 4). Failure to do so will further impair an already suboptimal outcome.



Figure 4. Neonatal cataract.

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The absence of a red reflex in a child is not pathognomic of cataract but does require urgent specialist referral. Differentials include retrolental fibroplasia (a consequence of retinopathy of prematurity), ocular toxocariasis (ocular infection by a nematode parasite found in cats and dogs) and retinoblastoma.

There is not unanimous agreement about the optimal timing of surgery. It is influenced by age but also by factors such as severity of opacity and consequences to the visual system. The risk of future development of glaucoma is thought to be increased if surgery is carried out in the first year of life.

Decisions about when and how best to manage children with cataracts can be complex and are made in secondary care. Our importance, as GPs, is in identification and referral of these individuals as early as possible.

Key points

- Cataracts are a common but easily treatable cause of visual impairment
- The majority are due to ageing, but secondary causes need to be excluded
- Identifying and referring cataracts in infants are critically time-dependent in order to optimise outcome
- The decision for surgical intervention in the adult patient is not simply based on visual acuity
- There are few absolute contraindications to surgery, even in the very elderly

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AKT question relating to post-traumatic stress disorder

Extended Matching Question

- A. Amitriptyline
- B. Citalopram
- C. Cognitive behavioural therapy (CBT)
- D. Fluoxetine
- E. Hypnotherapy
- F. Non-directive therapy
- G. Paroxetine
- H. Relaxation therapy
- I. Venlafaxine
- J. Watchful waiting

Complete the answers to the following statements that relate to post-traumatic stress disorder, by selecting the SINGLE MOST appropriate treatment from the list. Each option may be used once, more than once or not at all. Select ONE option only.

Dr Sean McDermott
Locum GP, Northern Ireland

Question 1

The current first line treatment recommended by the National Institute of Health and Care Excellence (NICE) in managing mild post-traumatic stress disorder presenting 2 weeks after the event

Question 2

The current first-line treatment recommended by the National Institute of Health and Care Excellence (NICE) in managing severe post-traumatic stress disorder presenting 4 weeks after the event

Answer DOI: 10.1177/1755738013497655