Cataracts in adults: management (large print version)

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Overview

This guideline covers managing cataracts in adults aged 18 and over. It aims to improve care before, during and after cataract surgery by optimising service organisation, referral and surgical management, and reducing complications. It further aims to improve the availability of information for people with cataracts before, during and after cataract surgery.

Who is it for

- Healthcare professionals
- Commissioners and providers
- People with cataracts, their families and carers

Recommendations

People have the right to be involved in discussions and make informed decisions about their care, as described in your care.

Making decisions using NICE guidelines explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing

medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

1.1 Patient information

1.1.1 Give people with cataracts, and their family members or carers (as appropriate), both oral and written information. Information should be tailored to the person's needs, for example, in an accessible format. For more guidance on giving information to people and discussing their preferences, see the NICE guideline on patient experience in adult NHS services, particularly recommendations 1.2.12 and 1.2.13 on capacity and consent. For guidance on eye tests for people living with dementia, see sensory impairment in the NICE guideline on assessing and managing dementia.

At referral for cataract surgery

1.1.2 At referral for cataract surgery, give people information about:

- cataracts:
  - what cataracts are
  - how they can affect vision
  - how they can affect quality of life
- cataract surgery:

- what it involves and how long it takes
- possible risks and benefits
- what support might be needed after surgery
- likely recovery time
- likely long-term outcomes, including the possibility that people might need spectacles for some tasks
- how vision and quality of life may be affected without surgery.

Before cataract surgery

1.1.3 At the preoperative outpatient appointment, review and expand on the topics in recommendation 1.1.2, and give people information about:

- the refractive implications of different intraocular lenses (see recommendation 1.5.3)
- types of anaesthesia
- the person's individual risk of complications during or after surgery (for example, the risk of postoperative retinal detachment in people with high myopia; also see recommendations 1.3.10 and 1.3.11)
- what to do and what to expect on the day of cataract surgery
- what to do and what to expect after cataract surgery
- what support might be needed after surgery

- medicines after surgery (for example, eye drops) and medicines that people may be already taking (for example, anticoagulants)
- the refractive implications after previous corneal refractive surgery, if appropriate (see recommendation 1.3.6)
- bilateral simultaneous cataract surgery, if appropriate (also see recommendations 1.6.3 and 1.6.4).

On the day of cataract surgery

1.1.4 On the day of surgery, before the operation, give people information about:

- their position on the list
- what to expect during and after surgery.

1.1.5 On the day of surgery, after the operation, give people information about:

- what visual changes to expect
- signs and symptoms of potential complications to look out for
- any restrictions on activities, for example, driving
- possible problems and who to contact
- emergency situations and who to contact
- eye drops
- pain management

- their next appointment and who they will see.

After cataract surgery

1.1.6 At the first appointment after cataract surgery, give people information about:

- eye drops
- what to do if their vision changes
- who to contact if they have concerns or queries
- when it is appropriate to get new spectacles and how to do so
- second-eye cataract surgery if there is a cataract in the non-operated eye
- arrangements for managing ocular comorbidities.

1.2 Referral for cataract surgery

1.2.1 Base the decision to refer a person with a cataract for surgery on a discussion with them (and their family members or carers, as appropriate) that includes:

- how the cataract affects the person's vision and quality of life
- whether 1 or both eyes are affected
- what cataract surgery involves, including possible risks and benefits
- how the person's quality of life may be affected if they choose not to have cataract surgery

- whether the person wants to have cataract surgery.

1.2.2 Do not restrict access to cataract surgery on the basis of visual acuity.

1.3 Preoperative assessment and biometry

Biometry techniques

1.3.1 Use optical biometry to measure the axial length of the eye for people having cataract surgery.

1.3.2 Use ultrasound biometry if optical biometry:

- is not possible **or**
- does not give accurate measurements.

1.3.3 Use keratometry to measure the curvature of the cornea for people having cataract surgery.

1.3.4 Consider corneal topography for people having cataract surgery:

- who have abnormally flat or steep corneas
- who have irregular corneas
- who have significant astigmatism
- who have had previous corneal refractive surgery **or**
- if it is not possible to get an accurate keratometry measurement.

Biometry formulas

1.3.5 For people who have not had previous corneal refractive surgery, use 1 of the following to calculate the intraocular lens power before cataract surgery:

- If the axial length is less than 22.00 mm, use Haigis or Hoffer Q.
- If the axial length is between 22.00 and 26.00 mm, use Barrett Universal II if it is installed on the biometry device and does not need the results to be transcribed by hand. Use SRK/T if not.
- If the axial length is more than 26.00 mm, use Haigis or SRK/T.

1.3.6 Advise people who have had previous corneal refractive surgery that refractive outcomes after cataract surgery are difficult to predict, and that they may need further surgery if they do not want to wear spectacles for distance vision.

1.3.7 If people have had previous corneal refractive surgery, adjust for the altered relationship between the anterior and posterior corneal curvature. Do not use standard biometry techniques or historical data alone.

1.3.8 Surgeons should think about modifying a manufacturer's recommended intraocular lens

constant, guided by learning gained from their previous deviations from predicted refractive outcomes.

Second-eye prediction

1.3.9 Consider using 50% of the first-eye prediction error in observed refractive outcome to guide calculations for the intraocular lens power for second-eye cataract surgery.

Risk stratification

1.3.10 Consider using a validated risk stratification algorithm for people who have been referred for cataract surgery, to identify people at increased risk of complications during and after surgery.

1.3.11 Explain the results of the risk stratification to the person, and discuss how it may affect their decisions.

1.3.12 To minimise the risk of complications during and after surgery, ensure that surgeons in training are closely supervised when they perform cataract surgery in:

- people who are at high risk of complications **or**
- people for whom the impact of complications would be especially severe (for example, people with only 1 functional eye).

1.3.13 Explain to people who are at risk of developing a dense cataract that there is an increased risk of complications if surgery is delayed and the cataract becomes more dense.

1.4 Intraocular lens selection

1.4.1 Please note: the recommendations around lens design and material have been removed to allow for further consideration.

1.4.2 Do not offer multifocal intraocular lenses for people having cataract surgery.

1.4.3 Offer monovision for use after cataract surgery to people who have either anisometropia or monovision preoperatively and would like to remain with it.

1.4.4 Please note: the recommendations around lens design and material have been removed to allow for further consideration.

Addressing pre-existing astigmatism

1.4.5 Consider on-axis surgery or limbal-relaxing incisions to reduce postoperative astigmatism.

1.5 Preventing wrong lens implant errors

Before cataract surgery

1.5.1 Before the preoperative biometry assessment, ensure that the person's correct medical notes are used by confirming the person's:

- name
- address **and**
- date of birth.

1.5.2 Immediately after the preoperative biometry assessment:

- check that the biometry results include the person's name, address, date of birth and hospital number
- either
  - use electronic data transfer to upload the biometry results to an electronic health record **or**
  - securely fix the printed biometry results to the person's medical notes
- do not transcribe the results by hand.

1.5.3 At the preoperative assessment:

- discuss the refractive implications of different intraocular lenses with the person

- base the choice of intraocular lens on the person's chosen refractive outcome
- record the discussion and the person's choices in their medical notes.

On the day of cataract surgery

1.5.4 The person's medical notes, including biometry results, must be available in theatre on the day of the cataract surgery.

1.5.5 Use a checklist based on the World Health Organization (WHO) surgical safety checklist, modified to include the following cataract surgery checks, to ensure that:

- the person's identity has been confirmed and matches information in:
  - the consent form
  - the biometry results **and**
  - the person's medical notes
- the eye to be operated on has been checked and clearly marked
- there is only 1 intraocular lens in the theatre, that matches the person's selected lens type and prescription

- at least 1 additional identical intraocular lens is in stock
- alternative intraocular lenses are in stock in case the selected lens needs to be changed if there are complications during surgery
- at least 2 members of the team, including the surgeon, have previously checked the appropriateness, accuracy and consistency of all:
  - formulas
  - calculations **and**
  - intraocular lens constants.

1.5.6 Before giving the person anaesthetic, ensure that:

- there is only 1 intraocular lens in the theatre, that matches the person's selected lens type and prescription
- at least 1 additional identical intraocular lens is in stock
- alternative intraocular lenses are in stock in case the selected lens needs to be changed if there are complications during surgery.

1.5.7 Immediately before the operation, the surgeon should:

- confirm the person's identity and ensure that the correct medical notes are being used, especially if using electronic patient records
- refer to the printed biometry results, not to transcribed information in the person's medical notes
- refer to the person's medical notes to check which refractive outcome they preferred
- verify that the correct intraocular lens has been selected and is available in theatre.

Occurrence of wrong lens implant errors

1.5.8 If a wrong lens is implanted, refer to NHS England's Never Events policy, and together with the whole multidisciplinary team:

- undertake a root-cause analysis to determine the reasons for the incident
- establish strategies and implementation tools to stop it from happening again.

1.6 Surgical timing and technique

Laser-assisted cataract surgery

1.6.1 Only use femtosecond laser-assisted cataract surgery as part of a randomised controlled trial that includes collection of resource-use data, comparing

femtosecond laser-assisted cataract surgery with ultrasound phacoemulsification.

Bilateral surgery

1.6.2 Offer second-eye cataract surgery using the same criteria as for the first-eye surgery (see referral for cataract surgery).

1.6.3 Consider bilateral simultaneous cataract surgery for:

- people who are at low risk of ocular complications during and after surgery **or**
- people who need to have general anaesthesia for cataract surgery but for whom general anaesthesia carries an increased risk of complications or distress.

1.6.4 Discuss the potential risks and benefits of bilateral simultaneous cataract surgery with people, which should include:

- the potential immediate visual improvement in both eyes
- how it will not be possible to choose a different intraocular lens based on the outcome in the first eye
- the risk of complications in both eyes during and after surgery that could cause long-term visual impairment
- the likely need for additional support after the operation.

1.7 Anaesthesia

1.7.1 Offer sub-Tenon's or topical (with or without intracameral) anaesthesia for people having cataract surgery.

1.7.2 If both sub-Tenon's and topical (with or without intracameral) anaesthesia are contraindicated, consider peribulbar anaesthesia.

1.7.3 Do not offer retrobulbar anaesthesia for people having cataract surgery.

1.7.4 Consider sedation, administered by an experienced ophthalmic anaesthetist, as an adjunct to anaesthesia for people if, for example:

- they have high levels of anxiety
- they have postural or musculoskeletal problems
- surgery is expected to take longer than usual.

1.7.5 Consider hyaluronidase as an adjunct to sub-Tenon's anaesthesia, particularly if trying to stop the eye moving during surgery.

1.8 Preventing and managing complications

Floppy iris syndrome

1.8.1 Consider intracameral phenylephrine to increase pupil size in people at risk of floppy iris syndrome.

Capsular tension rings

1.8.2 Do not use capsular tension rings in routine, uncomplicated cataract surgery.

1.8.3 Consider using capsular tension rings for people with pseudoexfoliation.

Endophthalmitis

1.8.4 Use preoperative antiseptics in line with standard surgical practice.

1.8.5 Use intracameral cefuroxime during cataract surgery to prevent endophthalmitis.

1.8.6 Use commercially prepared or pharmacy-prepared intracameral antibiotic solutions to prevent dilution errors.

Cystoid macular oedema

1.8.7 Consider topical steroids in combination with non-steroidal anti-inflammatory drugs (NSAIDs):

- after cataract surgery for people at increased risk of cystoid macular oedema, for example, people with diabetes or uveitis
- to manage cystoid macular oedema.

1.8.8 Offer topical steroids and/or NSAIDs after cataract surgery to prevent inflammation and cystoid macular oedema.

Posterior capsule rupture

1.8.9 When dealing with posterior capsule rupture, follow a protocol that covers:

- removing vitreous from the wound and anterior chamber
- minimising traction on the retina
- removing lens fragments in the posterior chamber or vitreous cavity
- removing soft lens matter
- implications for any lens insertion.

Postoperative eye protection

1.8.10 Offer eye protection for people whose eye shows residual effects of anaesthesia at the time of discharge after cataract surgery.

1.9 Postoperative assessment

1.9.1 Commissioners and service providers should ensure that the following are in place:

- Processes that identify complications after surgery and ensure that there is prompt access to specialist ophthalmology services.
- Processes to ensure that the UK Minimum Cataract Dataset for National Audit is completed.
- Arrangements so that healthcare professionals discuss second-eye cataract surgery with people who have a cataract in their non-operated eye.

1.9.2 Consider collecting patient visual function and quality-of-life data for entry into an electronic dataset.

1.9.3 Do not offer in-person, first-day review to people after uncomplicated cataract surgery.

Putting this guideline into practice

NICE has produced tools and resources to help you put this guideline into practice.

Putting recommendations into practice can take time. How long may vary from guideline to guideline, and depends on how much change in practice or services is needed. Implementing change is most effective when aligned with local priorities.

Changes recommended for clinical practice that can be done quickly – like changes in prescribing practice – should be shared quickly. This is because healthcare professionals should use guidelines to guide their work – as is required by professional regulating bodies such as the General Medical and Nursing and Midwifery Councils.

Changes should be implemented as soon as possible, unless there is a good reason for not doing so (for example, if it would be better value for money if a package of recommendations were all implemented at once).

Different organisations may need different approaches to implementation, depending on their size and function. Sometimes individual practitioners may be able to respond to recommendations to improve their practice more quickly than large organisations.

Here are some pointers to help organisations put NICE guidelines into practice:

1. **Raise awareness** through routine communication channels, such as email or newsletters, regular meetings, internal staff briefings and other communications with all relevant partner organisations. Identify things staff can include in their own practice straight away.

2. **Identify a lead** with an interest in the topic to champion the guideline and motivate others to support its use and make service changes, and to find out any significant issues locally.

3. **Carry out a baseline assessment** against the recommendations to find out whether there are gaps in current service provision.

4. **Think about what data you need to measure improvement** and plan how you will collect it. You may want to work with other health and social care organisations and specialist groups to compare current practice with the recommendations. This may also help identify local issues that will slow or prevent implementation.

5. **Develop an action plan**, with the steps needed to put the guideline into practice, and make sure it is ready as soon as possible. Big, complex changes may take longer to implement,

but some may be quick and easy to do. An action plan will help in both cases.

6. **For very big changes** include milestones and a business case, which will set out additional costs, savings and possible areas for disinvestment. A small project group could develop the action plan. The group might include the guideline champion, a senior organisational sponsor, staff involved in the associated services, finance and information professionals.

7. **Implement the action plan** with oversight from the lead and the project group. Big projects may also need project management support.

8. **Review and monitor** how well the guideline is being implemented through the project group. Share progress with those involved in making improvements, as well as relevant boards and local partners.

NICE provides a comprehensive programme of support and resources to maximise uptake and use of evidence and guidance. See our into practice pages for more information.

Also see Leng G, Moore V, Abraham S, editors (2014) Achieving high quality care – practical experience from NICE. Chichester: Wiley.

Context

A cataract is defined as any opacity in the crystalline lens of the eye. It can affect one or both eyes. The changes to the transparency and refractive index of the lens result in various levels of visual impairment. This impairment is associated with decreased quality of life because it may restrict the person's ability to carry out daily activities and function independently, while increasing the risk of accidents and falls.

Cataracts most commonly affect adults as a result of biological ageing (age-related cataracts) and may be classified according to the area of the lens that is affected (nuclear sclerotic, cortical or posterior subcapsular cataracts). Cataracts can also occur in children, and may be classified according to the age of onset (congenital or infantile/juvenile cataracts). This guideline only covers cataracts in people who are 18 years or older.

Cataracts may occur secondary to hereditary factors, trauma, inflammation, metabolic or nutritional disorders, and exposure to radiation. In addition, lifestyle factors such as tobacco smoking and high alcohol intake are associated with an increased risk of developing age-related cataracts. Most cataracts are progressive, although the decline in visual function may be variable and unpredictable. The natural history of cataracts depends on the type and severity of the cataract and the presence of comorbid ocular conditions. In severe,

untreated cases, cataracts can lead to significant reduction in vision, which is reversible with cataract surgery, although some level of visual impairment may persist.

Cataract surgery has a high success rate in improving visual function, with low morbidity and mortality. It is the most common operation performed in the NHS, with an ever growing need as the population ages.

Cataract management usually involves a multidisciplinary team that includes ophthalmologists, optometrists, nurses and technicians. Diagnosis is usually based on self-reported symptoms and a series of tests performed by an optometrist, normally based in the community. Symptoms may include blurred vision, difficulty seeing at night, sensitivity to light or glare, seeing ‘halos’ around lights and double vision in a single eye. Diagnostic tests include a visual acuity test, and slit-lamp and retinal examinations.

In adults with early age-related cataracts, non-surgical management may include prescription of spectacles. Alternatively, adults with age-related cataracts may be referred for surgery by an optometrist or a GP. The clinical threshold used to access cataract surgery varies across NHS trusts in England. This has resulted in differences in access to cataract surgery, because policies vary in scope and content and are not necessarily consistent with research evidence or guidance

provided by the Department of Health in Action on cataracts and the Royal College of Ophthalmologists' Cataract surgery guidelines.

Guidance on appropriate referral criteria for cataract surgery is needed to address patient need and to optimise the allocation of NHS resources. In addition, an understanding of the most clinically and cost-effective methods for undertaking cataract surgery, and recommendations to minimise complications and surgical errors such as wrong intraocular lens implants, are needed to further improve patient care.

More information

You can also see this guideline in the NICE pathway on cataracts.

To find out what NICE has said on topics related to this guideline, see our web page on eye conditions.

See also the guideline committee's discussion and the evidence reviews (in the full guideline), and information about how the guideline was developed, including details of the committee.

Recommendations for research

The guideline committee has made the following recommendations for research. The committee's full set of research recommendations is detailed in the full guideline.

1 Toric lenses for astigmatism

What is the cost effectiveness of toric lenses compared with on-axis or limbal-relaxing incision surgery, or non-toric lenses with no further intervention, in an NHS context, taking account of the whole care pathway cost implications from pre- to postoperative phases, stratified by the preoperative level of astigmatism?

Why this is important

There is clear evidence that toric lenses are effective at reducing levels of postoperative astigmatism, but evidence on their cost effectiveness is much less conclusive. Although a cost–utility analysis of toric lenses was evidenced from the USA, it was not possible to relate the costs to a UK NHS perspective. Acquisition costs of toric lenses are unlikely to exceed those of standard monofocal lenses, but their use has possible associated costs, including additional preoperative tests, biometry measurements, surgical time and equipment (toric markers), postoperative assessments and further surgery, which could be significant. A comparison with on-axis or limbal-

relaxing incisions would be advantageous because there are currently no resource constraints for using these techniques. Further cost-effectiveness research using UK NHS costings would be of benefit in helping to formulate future recommendations about their use.

2 Quality of life in cataract surgery

What vision-specific, quality-of-life measures best capture visual changes in a population with cataracts?

Why this is important

Although visual acuity is still commonly used to decide whether cataract surgery is needed, it is a crude measure that will often fail to detect other vision problems that may justify surgery (for example, glare and loss of colour vision). The best possible decision-making aids would be measures of preoperative and postoperative vision-related quality of life, which could then be used to identity groups of people who do not have an improvement in quality of life after surgery. However, most prioritisation criteria are based primarily on visual acuity and visual function (usually measured using the VF-14), which capture only part of the impact of a cataract on quality of life. The development and validation of suitable vision-specific, quality-of-life measures would aid the decision-making process for cataract surgery, and help to accurately quantify the quality of life gains that may be expected from surgery. Particular

consideration should be given to people with learning disabilities/cognitive impairment, or any other groups who may find it more difficult to self-report their own symptoms or quality of life.

3 Indicators and thresholds for referral for cataract surgery

What is the association between preoperative vision- and health-related quality of life, and postoperative vision-related quality of life, health-related quality of life, and self-reported postoperative improvement?

Why this is important

In contrast to the data linking preoperative visual acuity and visual function with postoperative visual acuity and visual function, there is a lack of evidence on the association between preoperative vision- and health-related quality on postoperative outcomes and levels of satisfaction for people having cataract surgery. This makes it difficult either to identify those groups of individuals who may achieve the largest gains from surgery, or to provide people with accurate information about what their potential gains may be. Robust information around the link between preoperative patient characteristics and outcomes would be useful both for prioritisation of surgery, and to help better inform individuals about the levels of gain they may individually expect to get from surgery.

4 Interventions to manage cystoid macular oedema

What is the most effective postoperative medical management for cystoid macular oedema?

Why this is important

Although there is evidence for using steroids and non-steroidal anti-inflammatory drugs (NSAIDs) in treating cystoid macular oedema, no evidence has been identified for interventions such as acetazolamide, steroid-based anti-inflammatory drugs or intraocular anti-vascular endothelial growth factors (anti-VEGFs). Further randomised controlled trials with increased numbers of participants would be of benefit to the evidence base, which would help lead to the formulation of future recommendations for the postoperative treatment cystoid macular oedema.

5 Interventions to prevent endophthalmitis

What is the effectiveness of postoperative antibiotic drops to reduce rates of endophthalmitis after cataract surgery?

Why this is important

There is a lack of evidence on postoperative antibiotics to reduce rates of endophthalmitis, which may be because they are provided as part of standard good clinical practice in the UK. In addition, it is recognised that patients are invariably

receiving other drops (for example, steroids), which are likely to be offered in combination with postoperative antibiotic drops, and often in a single-drop product. Well-conducted randomised controlled trials of postoperative antibiotics in people having cataract surgery would help add to the evidence base and so inform future recommendations on their use.

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