

## Complications of Cataract Surgery

Please note that it is impossible to give an exhaustive list of all the possible complications that may arise during or after a surgical procedure, or to predict the severity of a complication and its effect on the ultimate outcome of the operation.

It is important to appreciate the difference between the complication itself and its severity or consequences. A complication may be common but only rarely have an adverse impact on the outcome and vice versa.

In terms of the outcome of the operation there are three factors to consider:

- the outcome for the vision (improvement in the visual symptoms, visual acuity etc.), and
- the optical outcome (i.e. what the final spectacle prescription is, whether it needs correction etc.),
- the time taken to reach the final outcome.

Again, it is possible to have a suboptimal optical outcome but the visual outcome may be satisfactory, or vice versa. Similarly, the post-operative recovery may be delayed but the ultimate visual and optical outcome are unaffected.

### Complications during the operation

The chance of any intraoperative complication, or combination of complications, is likely to be of the order of 5%. Specific intra-operative complications:

- Vitreous loss / anterior vitrectomy (2%): if there is a problem with the capsular bag or the zonules the vitreous jelly in the back of the eye can come forward. If this occurs an anterior vitrectomy is required during the operation to remove the prolapsed vitreous. Vitreous loss is associated with an increased risk of post-operative complications such as retinal detachment, cystoid macular oedema, excessive post-operative inflammation and glaucoma.
- Iris injury or prolapse (0.5%): the iris is the coloured part of the eye. Iris injury can lead to excessive post-operative inflammation, impaired pupil function, abnormal pupil size or shape, and photophobia/glare.
- Zonule dialysis (0.5%): this is weakness of the fibres that support the cataract. It may prevent implantation of the intraocular lens, or require a different type of lens implant.

- Problems with the incision (0.3%): these may require one or two stitches to be placed. These are usually removed a few weeks post-op.
- Corneal abrasion (0.2%): a scratch on the corneal surface. Can be painful for 24-48 hours but usually heals without longer term consequences.
- Corneal endothelial damage / Descemet's tear (0.2%): the corneal endothelium is responsible for maintaining corneal clarity and damage can lead to corneal swelling (oedema) and blurred vision. This is usually temporary and resolves over several weeks post op but may lead to permanent corneal decompensation.
- Loss of the cataract into the vitreous (0.2%): if the capsular bag or zonules are damaged a fragment of the cataract may drop through the defect into the vitreous cavity and require pars plana vitrectomy to retrieve it. It may be possible to do this during the planned operation or it may be necessary to do so as a further procedure.
- Lens implant problems (0.1%): if the lens implant is unstable or faulty it may need to be removed and replaced.
- Suprachoroidal haemorrhage (1 in 1500): this is bleeding into the potential space between the wall of the eye and the retina and can be very serious. If it occurs it is usually necessary to halt the surgery and allow the eye to stabilise for up to two weeks. Further procedures may be necessary to drain the haemorrhage and/or to complete the original operation.

There is a list of other intraoperative complications (e.g. corneal oedema, hyphaema etc.), all of which are individually rare (<0.1%), and which do not usually affect the final outcome although they may delay the recovery.

## **Complications after the operation**

- Retinal detachment (1%): the retina is the light sensitive "film" in the back of the eye, which can come away especially if there are intraoperative complications such as vitreous loss. May occur weeks to months after surgery. Retinal detachment is sight-threatening and may require multiple operations to repair.
- Endophthalmitis (1 in 1500): this is infection in the eye which usually manifests within the first week or two of the operation but, for low grade infections, may not be apparent for several months after the surgery. Endophthalmitis can be severe and sight-threatening, and require aggressive treatment with antibiotic injections into the eye, frequent eye drops, oral antibiotics and corticosteroids, and surgery.

- Cystoid macular oedema (10%): swelling of the retina in the back of the eye due to post-operative inflammation or intra-operative complications such as vitreous loss. Usually develops a few weeks post op and results in variable blurred vision and/or distortion. Usually mild and self-limiting (i.e. gets better without treatment), but it is customary to treat with eye drops if CMO is identified. Uncommonly CMO can be unresponsive to eye drops and require anti-inflammatory injections around or into the eye. Rarely CMO can become chronic (unresponsive to all treatments) and cause permanent impairment of vision.
- Post-operative inflammation (100%): all surgery causes inflammation and you will use eye drops to control it. It is common for the inflammation to be more severe or prolonged in eyes that have had previous surgery, where the operation is prolonged, or when there are intraoperative complications. In such cases a more prolonged course of eye drops is required, and the inflammation may predispose to other complications such as CMO or glaucoma. Rarely the inflammation can become chronic and require long-term treatment.
- Wound leak / flat anterior chamber (uncommon): the incision is constructed to be self-sealing without the need for sutures, but if the wound leaks the anterior chamber at front of the eye can flatten and surgery to suture the wound may be required.
- Corneal decompensation (uncommon): this is failure of the corneal endothelium to keep the cornea clear and leads to blurred vision. It may recover over weeks to months post-op but can be permanent. Sometimes drops and other measures can improve corneal decompensation but corneal transplant surgery may be required.
- Lens implant instability / subluxation / dislocation (uncommon): it is intended that the new lens implant will be stable within the eye but this may not be the case, especially if there are intra-operative complications. If the lens implant is unstable or out of position this may degrade the optical or visual outcome and require further surgery.
- Posterior capsule opacification (30%): this is scarring around the lens implant that leads to mild blurring of vision. PCO is easily treated with a laser (YAG laser capsulotomy).
- Glaucoma (common): high pressure within the eye is common after any eye operation but is usually short-lived and controlled with eye drops. Uncommonly, and typically in people predisposed to glaucoma or with other complications such as vitreous loss or post-operative inflammation, the pressure problem can become permanent and require life-long eye drops or other treatment (including glaucoma surgery).

- Ptosis (common): this is drooping of the upper eyelid caused by stretching of the eyelid muscles during surgery and when putting post-operative eye drops in. It is more likely with repeated surgical procedures and can require surgical correction.
- Sympathetic ophthalmitis (very rare for anterior segment procedures): this is sight-threatening inflammation in the fellow eye of the one receiving surgery. Figures are difficult to come by but it is thought that the risk goes up with repeated operations. The highest risk is reported to occur with pars plana vitrectomy, at around 1 in 800; PPV is not planned for your procedure but may be required to deal with complications such as suprachoroidal haemorrhage, retained lens fragments or retinal detachment.
- Double vision (uncommon)
- Complete loss of vision / loss of the eye (very rare).

## Other changes after the operation

- Increased grittiness, dryness or watering of the eye – usually relieved with lubricating drops or artificial tears.
- Increased awareness of facial features due to improved clarity of vision.
- Increased awareness of the eye, or that it feels “different”, which cannot always be explained.

## Visual outcome

The visual outcome is how well you see after the operation (with spectacle correction if required). There are many components to visual function, some of which we can measure (quantitative, e.g. visual acuity), and some of which we cannot (qualitative, e.g. unwanted changes in the vision called dysphotopsia). These are often independent, e.g. the visual acuity outcome after cataract surgery is can be good but the quality of vision affected.

With respect to visual acuity (the “sharpness” of vision, measured by how far down the letter chart you can read), the risk of worse vision after surgery is about 5%. The amount of vision lost is usually small, with a limited effect on day-to-day function; greater degrees of loss of acuity are progressively less likely, e.g. total loss of sight in occurs in only 1 in 20,000 people.

Data on the quality of vision are much more limited because we cannot measure the patients’ experiences and reduce them to a number. The types of symptoms include:

- Haloes or arcs around point light sources or with lights to the side: these arise from the lens implant in conjunction with the pupil size and whether the lens implant is well centred.
- Glare in bright light: this may be caused by the lens implant, capsular opacification, pupil size, corneal scarring, glaucoma, or eye colour (blue-eyed people are typically more susceptible to glare than those with brown eyes).
- Starbursts with point light sources: this is most likely to result from capsular opacification, corneal incisions, corneal scarring, and astigmatism.
- Shimmering of the vision: this may indicate instability of the lens implant-capsular bag complex, but usually settles with time.
- Negative dysphotopsia: this is the sensation of a dark shadow usually on the outer side of the vision in the operated eye. It can occur despite apparently perfect surgery and is poorly understood. It usually becomes less noticeable with time, but rarely further treatment, including surgery, is required.

## Optical outcome

The optical outcome is the spectacle prescription of the eye after surgery, and one of the challenges of cataract surgery is to work out what power of lens implant to place in an eye to give a particular optical outcome. The optical aim of cataract surgery is to give the patient the spectacle prescription that suits their needs, and to reduce their pre-existing astigmatism to 0.75 dioptres or less.

We take measurements pre-op (“biometry”) and plug them into prediction algorithms, the output from which is an estimate of the optical outcome with a specific power of lens implant. The predictions are statistical probabilities and tell us “on average” where the optical outcome will lie, but there is variability around that target. For example, we expect to achieve an optical outcome within 0.5 dioptres of target in about two thirds of eyes, and within 1 dioptre in 90-95%. The lack of perfect predictability means that, despite our best efforts, some people need glasses to get the best possible vision after surgery, and it may also be necessary to perform additional procedures to optimise the outcome.

There are two components to the optical outcome – the “spherical equivalent” (SE) and astigmatic outcome. The SE tells us where in space the focal point of the eye is located – near or far. Astigmatism is where the optics of the eye are different in different planes, and therefore a point light source cannot be brought into sharp focus by the eye. The two components are independent, and it is possible to have a good spherical outcome but with residual astigmatism and vice versa. Both can usually be corrected with glasses, but additional procedures may also be required.