



British and Éire Association of Medical Retina Specialists

Vitrectomy is a type of eye surgery used to treat a variety of retinal and vitreous (gel-like substance inside the eye) conditions. The procedure involves the removal of the vitreous humour, which is the gel-like substance that fills the centre of the eye. The vitreous is then often replaced with a clear solution, gas, or silicone oil, depending on the specific condition being treated.

When is Vitrectomy Performed?

Vitrectomy is commonly performed to treat several conditions, including:

1. Retinal Detachment:

- When the retina becomes detached from its underlying tissue, vitrectomy can be used to remove the vitreous and relieve traction on the retina, allowing it to reattach. The procedure may also involve sealing retinal tears using laser or cryotherapy.

2. Diabetic Retinopathy:

- In cases of diabetic retinopathy, where abnormal blood vessels grow in the retina and cause bleeding or scarring, vitrectomy may be needed to remove the vitreous gel, clear any haemorrhages, and address traction that may be pulling the retina.

3. Macular Hole:

- A macular hole is a small tear in the central part of the retina, the macula, which can lead to vision loss. Vitrectomy can be performed to remove the vitreous and relieve any pulling on the macula. In some cases, a gas bubble is inserted to help close the hole.

4. Macular Oedema:

- When swelling of the macula (macular oedema) occurs, often due to retinal vein occlusion or diabetic retinopathy, vitrectomy may be used in severe cases where other treatments have not worked. The surgery can help remove any fluid and improve the healing process.

5. Vitreous Haemorrhage:

- If bleeding occurs in the vitreous (e.g., due to diabetic retinopathy, retinal vein occlusion, or trauma), vitrectomy is performed to remove the blood and clear the vitreous cavity to restore vision.

6. Trauma or Injury:

- In cases of severe eye trauma, where there may be bleeding or retinal detachment, vitrectomy may be necessary to repair the damage and restore vision.

7. Intraocular Infections (Endophthalmitis):

- For severe infections within the eye, vitrectomy can be performed to remove infected vitreous and prevent further damage to the retina.

8. Retinal Diseases with Severe Vitreous Traction:

- Conditions like retinal tears or proliferative vitreoretinopathy, in which scar tissue grows and pulls on the retina, may require vitrectomy to relieve the traction and prevent retinal detachment.

How is Vitrectomy Performed?

The vitrectomy procedure typically involves the following steps:

1. Preparation:

- The patient is given local anaesthesia (usually an injection around the eye) to numb the eye, although general anaesthesia may be used in certain cases, especially for children or in complex surgeries.
- The eye is dilated with special eye drops to allow the surgeon to see the retina clearly.

2. Making Small Incisions:

- The surgeon makes tiny incisions in the sclera (the white part of the eye). Through these incisions, specialized instruments are inserted, including a light source, a vitreous cutter, and tools for laser or cryotherapy.

3. Removal of the Vitreous:

- The surgeon uses a vitreous cutter to carefully remove the vitreous gel from the centre of the eye. This step helps to eliminate any traction or fluid that is interfering with the retina.

4. Addressing Retinal Issues:

- Depending on the specific condition being treated, additional steps are taken:
 - Retinal tears or holes: The surgeon may use a laser or cryotherapy (freezing) to seal the retinal tears and prevent further detachment.
 - Retinal detachment: If necessary, the retina may be reattached, and a gas bubble may be injected into the eye to hold the retina in place until it heals.
 - Macular hole: If a macular hole is present, a gas bubble is typically inserted to help close the hole.

5. Replacement of the Vitreous:

- After the vitreous is removed, it is typically replaced with either a saline solution, gas bubble, or silicone oil:
 - Gas bubbles are used to hold the retina in place, particularly for conditions like retinal detachment or macular hole. The bubble gradually dissipates over time.
 - Silicone oil may be used in more complex cases, as it can stay in the eye longer than a gas bubble, but it may need to be removed in a follow-up surgery.

6. Closing the Incisions:

- Once the procedure is complete, the small incisions are typically self-sealing, meaning no sutures are required. However, in some cases, stitches may be used.

Postoperative Care and Recovery

- Face-down Position: If a gas bubble was used during the surgery (especially in cases of retinal detachment or macular hole), the patient may need to maintain a face-down position for a period of time after surgery to help the bubble hold the retina in place.

- Vision Recovery: The recovery process varies depending on the individual and the underlying condition. It may take several weeks to several months for vision to improve. However, some patients may notice an immediate improvement, while others may take longer.

- Follow-Up Visits: After vitrectomy, patients will need regular follow-up visits to monitor the healing process, check for complications (such as infection or increased intraocular pressure), and assess the retina's condition.

- Activity Restrictions: Patients may be advised to avoid activities like heavy lifting, strenuous exercise, or bending over for a period of time after surgery. If a gas bubble was used, patients should avoid flying or going to high altitudes until the bubble dissipates.

Risks and Complications of Vitrectomy

Although vitrectomy is generally a safe and effective surgery, there are some risks and potential complications, including:

1. Increased Intraocular Pressure (IOP):

- Elevated IOP can lead to glaucoma, especially after surgery, requiring monitoring and potential treatment with medication.

2. Infection:

- Though rare, infection (such as endophthalmitis) can occur after any eye surgery and may require prompt treatment with antibiotics or additional surgery.

3. Retinal Re-detachment:

- In some cases, the retina may re-detach, particularly if the initial problem (like a tear or hole) was not fully addressed.

4. Cataract Formation:

- If the patient has not already developed cataracts, vitrectomy can increase the risk of cataract formation, especially in older adults.

5. Bleeding:

- There is a small risk of bleeding during or after the surgery, particularly in patients with diabetic retinopathy or other retinal diseases.

6. Macular oedema or Fluid Accumulation:

- Swelling in the macula (macular oedema) or accumulation of fluid may occur after vitrectomy, leading to blurry or distorted vision.

7. Floaters:

- After vitrectomy, some patients may experience floaters (dark spots or strings in the vision) due to changes in the vitreous and its replacement.

8. Vision Disturbances:

- Some patients may experience visual disturbances, such as glare, halos, or distorted vision. These can improve over time but may persist in some cases.

Outcomes of Vitrectomy

Vitrectomy surgery can be highly successful in treating retinal conditions and restoring vision. The outcomes vary based on the underlying condition being treated, the timing of the surgery, and the individual patient's response to treatment. In cases like retinal detachment, diabetic retinopathy, or macular holes, vitrectomy can prevent further vision loss, and in many cases, improve vision significantly. However, the success of the surgery depends on the specific circumstances, and not all patients achieve complete restoration of vision.

Conclusion

Vitrectomy is a critical surgical procedure that can save and restore vision for patients with various retinal conditions, including retinal detachment, diabetic retinopathy, macular holes, and vitreous haemorrhage. The surgery involves removing the vitreous gel from the eye and addressing any underlying retinal issues. Although it has a high success rate, it does come with some risks and requires careful postoperative management and monitoring. Working closely with an experienced retinal specialist is essential to ensure the best possible outcomes for patients undergoing vitrectomy.