



British and Éire Association of Medical Retina Specialists

Anti-VEGF injections are a type of treatment used in ophthalmology to manage a range of eye conditions, particularly those involving abnormal blood vessel growth in the retina. VEGF stands for vascular endothelial growth factor, a protein that plays a key role in the formation of new blood vessels (a process known as angiogenesis). In some eye conditions, VEGF stimulates the growth of abnormal blood vessels, which can leak fluid and cause damage to the retina and other parts of the eye.

Anti-VEGF medications block the activity of VEGF, thereby preventing the growth of these abnormal blood vessels and reducing fluid leakage. These injections are typically administered directly into the eye to treat specific retinal conditions.

Conditions Treated with Anti-VEGF Injections

1. Wet Age-Related Macular Degeneration (Wet AMD):

- Wet AMD is a leading cause of vision loss in older adults. It occurs when abnormal blood vessels grow under the macula, the part of the retina responsible for sharp central vision. These blood vessels can leak fluid, causing swelling and damage to the macula.
- Anti-VEGF medications are used to prevent the growth of these abnormal vessels and reduce the leakage, stabilizing vision and in many cases improving it.

2. Diabetic Macular Oedema (DME):

- DME is a complication of diabetic retinopathy, where fluid leaks from damaged blood vessels into the macula, leading to swelling and vision impairment.
- Anti-VEGF injections help reduce fluid accumulation and prevent further damage to the retina.

3. Retinal Vein Occlusion (RVO):

- In retinal vein occlusion, a blockage in the veins of the retina causes fluid buildup, leading to swelling (oedema) in the macula.
- Anti-VEGF injections reduce this fluid buildup and the growth of abnormal blood vessels in the affected eye.

4. Retinopathy of Prematurity (ROP):

- This condition affects premature infants and involves abnormal blood vessel growth in the retina. In severe cases, it can lead to retinal detachment and blindness.
- Anti-VEGF injections can help treat abnormal blood vessel growth in ROP, preventing further damage to the retina.

5. Myopic Choroidal Neovascularization (CNV):

- This is a condition where abnormal blood vessels grow under the retina due to high myopia (nearsightedness).
- Anti-VEGF therapy helps control this abnormal blood vessel growth and leakage, improving or stabilizing vision.

6. Other Retinal Conditions:

- Anti-VEGF injections may be used in other conditions characterized by abnormal blood vessel growth and leakage, such as macular oedema due to various causes and choroidal neovascularization.

Mechanism of Action

Anti-VEGF injections work by inhibiting the activity of VEGF, a protein that promotes the growth of new blood vessels. When VEGF is blocked, the abnormal blood vessels in the retina shrink, and the fluid leakage decreases. This helps prevent further damage to the retina and reduces swelling in the macula, leading to improved vision or stabilization of existing vision.

Common Anti-VEGF Medications

Several anti-VEGF drugs are commonly used in ophthalmology, including:

1. Ranibizumab (Lucentis):

- Ranibizumab is a recombinant humanized monoclonal antibody fragment that specifically binds to VEGF and prevents it from promoting the growth of abnormal blood vessels.
- It is approved for use in conditions like wet AMD, DME, and RVO.

2. Aflibercept (Eylea):

- Aflibercept is a fusion protein that acts as a VEGF receptor blocker, binding to VEGF and preventing it from interacting with its receptors on the surface of cells.
- Eylea is used to treat conditions like wet AMD, DME, RVO, and diabetic retinopathy.

3. Bevacizumab (Avastin):

- Bevacizumab is a full-length monoclonal antibody that blocks VEGF. It is typically used for cancer treatment but is also used off-label in ophthalmology for conditions like wet AMD and DME.
- Avastin is often a more affordable option, although its use for eye diseases is off-label.

4. Brolucizumab (Beovu):

- Brolucizumab is a newer anti-VEGF drug that works similarly to others but is designed to have a higher affinity for VEGF and potentially offer longer-lasting effects.
- It is approved for the treatment of wet AMD.

Procedure for Administering Anti-VEGF Injections

1. Pre-Treatment:

- Before the injection, the eye is typically numbed with local anesthetic eye drops to minimize discomfort.
- The area around the eye may be cleaned and sterilized to reduce the risk of infection.

2. Injection:

- The ophthalmologist injects the anti-VEGF medication directly into the vitreous, the gel-like substance inside the eye. This is done using a fine needle, and the injection typically takes only a few minutes.

3. Post-Treatment:

- After the injection, the patient may be monitored for a short period to ensure there are no immediate adverse reactions.
- Most patients can go home the same day, though they should avoid rubbing the treated eye and follow their doctor's instructions carefully.

4. Follow-up:

- Patients typically need follow-up appointments after the injection to monitor the effects of the treatment. The frequency of injections depends on the condition being treated and the patient's response to the therapy.

Benefits of Anti-VEGF Injections

- Improved Vision: Many patients experience improved visual acuity (sharpness of vision), especially in conditions like wet AMD and DME.
- Prevention of Vision Loss: Anti-VEGF treatments can help stabilize vision by preventing the growth of abnormal blood vessels and fluid leakage.
- Non-Surgical: Anti-VEGF therapy is a non-invasive alternative to surgery, making it a preferred option for many patients.
- Long-Term Control: In many cases, anti-VEGF injections help control chronic conditions, reducing the need for more aggressive treatments.

Risks and Side Effects of Anti-VEGF Injections

Though anti-VEGF injections are generally considered safe, there are some potential risks and side effects:

1. Infection (Endophthalmitis):

- There is a small risk of infection inside the eye, which could lead to vision loss. This is why the procedure is performed under sterile conditions.

2. Increased Eye Pressure:

- The injection can sometimes cause a temporary increase in intraocular pressure (IOP), which can be problematic for patients with glaucoma.

3. Retinal Detachment:

- Rarely, the injection can cause retinal detachment, which requires immediate treatment to prevent permanent vision loss.

4. Vitreous Hemorrhage:

- Bleeding inside the eye is a rare complication of the injection, which may cause a temporary loss of vision or discomfort.

5. Inflammation:

- Some patients may experience inflammation inside the eye (uveitis), which can cause redness, pain, or blurred vision.

6. Cataract Formation:

- In some cases, repeated injections may contribute to the development of cataracts, particularly in patients with existing risk factors.

7. Pain or Discomfort:

- While the procedure is generally quick and well-tolerated, some patients may experience mild discomfort or a sensation of pressure in the treated eye.

Frequency of Anti-VEGF Injections

The frequency of anti-VEGF injections depends on the specific condition being treated and the individual patient's response. For example:

- In conditions like wet AMD, initial treatment may require monthly injections, but once the disease is under control, the interval may be extended to every two months or longer.

- For diabetic macular oedema (DME), patients might need injections every 4-6 weeks initially, followed by less frequent injections as the condition stabilizes.

Some newer anti-VEGF medications, like Aflibercept (Eylea), can provide longer-lasting effects, which may reduce the frequency of injections.

Conclusion

Anti-VEGF injections are a highly effective treatment option for a variety of retinal conditions characterized by abnormal blood vessel growth and fluid leakage. These injections can help improve vision, prevent vision loss, and manage chronic eye diseases like wet AMD, diabetic macular oedema, and retinal vein occlusion. Though the procedure is relatively safe, there are some risks, and patients should follow their ophthalmologist's advice for aftercare and follow-up appointments to ensure the best outcomes.