

ANTI-VASCULAR ENDOTHELIAL GROWTH FACTOR

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Abstract:

Anti-endothelial vascular growth factor has been used in many eye conditions in the last few years. It is becoming more common to use by the day due to the added benefits compared to other treatment modalities for same conditions and its unique ability to treat certain conditions such as neovascular age related macular degeneration. This article describes uses and a technique to inject anti-vascular endothelial growth factor.

Keywords: vascular, anti-endothelial, growth, factors, macular, edema, vein, occlusion

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Introduction:

Vascular endothelial growth factor (Anti-VEGF) which drives angiogenesis in a wide variety of tissues and lesions helps the development of much needed new blood vessels in conditions like stroke and cardiovascular blockade. The development of new anastomoses can in many cases be life-saving especially in elderly patients with narrow atherosclerotic blood vessels. It is also essential for maintaining homeostasis within the retina. On the other hand, vascular endothelial growth factor is also essential for tumor growth with the newly developed multiplying cells needing more blood and blood vessels to supply that blood. Long term inhibition of VEGF can lead to loss of ganglion cell layer of the retina.

Discussion:

Anti-Vascular endothelial growth factor, originally developed to control tumor growth by limiting multiplication of blood vessels and blood vessel growth within the rapidly multiplying cells, has now proved essential to many eye conditions. They are now replacing steroid injections in treatment of different eye conditions. Although the most famous example for their use is neo-vascular age related macular degeneration (nAMD), Diabetic retinopathy as well as retinal vein occlusion are becoming among the routine uses of Anti-VEGF.

Recently, Anti-VEGF has been tested as a method to prevent post-operative proliferative vitreoretinopathy (PVR) and epiretinal membranes, assuming it has a protective effect as the injection of Triamcinolone had with lower risks than steroid injection. It is common practice in this day and age to believe that Anti-VEGF are safer than steroid injections.

Although steroid injections are relatively cheap to treat conditions such as cystoid macular edema (CME), the risks involved can be deterring from their frequent use. Complications such as retinal artery

occlusion is among the worst side effects of steroid intravitreal injections. Other less drastic side effects include glaucoma and cataract formation. Those can be devastating as well especially if undetected.

The fact that vascular endothelial growth factor is a protective protein make the use of (Anti-VEGF) even more riskier than we ever thought. Anti-VEGF, although used in very small doses intravitreally with limited access to systemic circulation, they can over the long run limit a natural protective mechanism that helps save lives. Records of stroke or heart attacks while in Anti-VEGF treatment is minimal. However it is not particularly known whether their use on frequent basis as they are currently used would have any devastating effects even more devastating than loss of sight.

Technique of Intravitreal injection:

Intravitreal injection is a procedure that is normally dreaded by patients once it suggested as a treatment. The idea of a needle going into someone's eye is beyond belief for many people. Therefore, it is absolutely necessary to make this procedure as pain free as possible. The other important point here is to inject intravitreally with minimal risk spreading infection. Injection when infection is suspected should be prohibited at all costs. There is no need to increase the risk of an elective procedure which won't affect the course of treatment significantly if delayed by a few days until infection subsides.

Topical anesthesia can provide complete analgesia if administered properly. Patient will be given topical proxymetacaine or tetracaine at least three drops with about a minute between each. The last drop will be mixed with povidone iodine 5%. This will be a good test for the anesthesia. If the last drop still stings this means more anesthetic drop are still needed.

Once the three drops are completed, the eye prepped in the fashion preferable to surgeon. As a must the area around the eye should be cleaned with Povidone Iodine 10%. A speculum is inserted to keep the eyelid open so the patient won't worry about this. I find it helpful to give injections with the eye covered by a drape with a hole in the middle over the eye to be injected. The drape has the benefit of covering the other eye. Although most patient would prefer shutting both eye throughout the procedure, there will be a few who prefer to sneak a peek at what everyone in the room is doing to their eyes. Some patients, especially those with claustrophobia would find that drape even for the few seconds of the injection, completely unpleasant. In those patients I tend to cut a hole in the drape for the other eye to be open and for them to be able to get the feeling of an open space around them

After prepping, draping and speculum insertion, the site for injection is chosen. Injections can be given anywhere in the eye as long as you are giving it within the 3.5-4 mm distance from the limbus depending whether the eye is pseudophakic or phakic respectively. However, there are areas that are more favorable than others. Giving the injections in the horizontal meridian is normally more painful even with the most intense topical anesthesia. The horizontal meridian is when the long posterior ciliary nerve run their course to enter the sclera. Injections in the right eye can be given in the superior or inferior temporal quadrants for the right handed surgeon and superior or inferior nasal quadrants for left handed surgeons. Injections in the left eye would follow the same principle. Superior or inferior temporal quadrant for the left handed surgeon and superior or inferior nasal quadrant for the right handed surgeons. Inferior quadrants I more referable in my experience as they are location inferior to the macula. Should a retinal tear happen during the procedure, it is less likely to cause macula off retinal detachment if the tear is inferior than superior to the macular specially for the right handed surgeons. Another benefit of injection in the inferior quadrant is when injection Triamcinolone suspension which tend to obstruct vision if it is suspended in the middle of the vitreous gel in front of the macula right in the visual axis. With experience both hands can be trained to give injections in either side.

Once the site of injection is decided, a cotton tipped bud is soaked with tetracaine eye drops and pressed gently on the conjunctiva where the injection is likely to go. This bud should be left on the conjunctiva for about thirty seconds. Distance from the sclera is then measure and injection is done as indicated. The needle should be directed to the optic disc and should be pushed all the way into the eye. Some surgeons specially trainees find it intimidating having to insert the needle all the way in. However knowing the length the needle used and the length of the globe should eliminate such fear. Should the surgeon be not comfortable inserting the needle all the way in visual inspection of the tip of the needle is recommended prior to injecting any fluid into the eye.

Following injection visual inspection of the optic nerve head is recommended. Normally with other intravitreal injections vision testing by hand movement or counting fingers can suffice. However with steroid injections specially triamcinolone and the larger dose of 0.1 ml, it is recommended to inspect

the optic nerve head visually before concluding the injection. Should the optic nerve venous pulsations remain, anterior chamber paracentesis would be recommended.

It is now a common consensus among injectors not to give any antibiotic before or after intravitreal injections. There is no need either to cover the eye after the injection. Patients should be warned not to rub their eye in the first 15 minutes after injections as the eye is normally heavily anesthetized after this procedure and rubbing can cause a corneal abrasion that can be a nuisance for a few days after a simple procedure.

Conclusion:

Anti-endothelial vascular growth factor is a fairly new treatment method for a variety of eye conditions. Its increasing use should raise the alarm on the risks involved due to long term use. Those risks include visual loss due to long term inhibition as well as increased risk of systemic vascular incidents. Both of these risks need long time to manifest properly. Now after ten years use of this medicine in eye condition it seems a reasonable time to investigate those risks on multi-center based trials.

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