

Orbital Anatomy Review for Tracking the Needle Tip when Blocking a Patient on both an Anticoagulant and a Platelet Inhibitor

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Since Dr. Atkinson described the retrobulbar block in 1936, orbital regional block techniques have continued to undergo refinements that have led to improved patient safety and comfort. The technique of utilizing a parallel approach to orbital blocks has been around for more than 40 years. Gills and Loyd described the technique in, AM Intra-Ocular Implant Soc. J-VOL , Summer 1983, titled "A Technique of Retrobulbar Block with Paralysis of Orbicularis Oculi." Directing the needle tip away from the vital orbital structures is this technique's primary value. Secondly, the needle is inserted through the conjunctiva avoiding a skin puncture, reducing the potential for lid ecchymosis.

The needle is inserted with the bevel towards the globe infero-temporally, above the inferior orbital rim, approximately 3-5mm lateral to the lateral limbic margin of the globe, through the conjunctiva. The needle travels posteriorly, inferior to the globe. After passing the equatorial plane of the globe, the needle is redirected cephalad and advanced into the intra-conal compartment of the mid-orbit to a depth of approximately 25mm. The needle tip rests approximately 5mm posterior to the globe.

The needle remains parallel to the visual axis and lateral to the lateral limbic margin throughout the technique. Therein lies the difference from the Atkinson needle-based technique, which directs the needle tip towards the orbital apex. Anatomically, the needle tip rests in an area that has been described as a safe zone, relatively devoid of vital orbital structures. However, the eye should not look medial because it may place the optic nerve in line with the needle tip. In addition, a retrobulbar hemorrhage can still occur if the orbital veins in this area are traumatized. The general proximity of the vital orbital structures in relation to the pathway of the needle tip is illustrated below:

1. Structures MEDIAL to the needle tip pathway:

Nerves

CN II Optic

CN III Oculomotor

CN IV Trochlear

CN V Trigeminal

Ciliary Ganglion/Nerves

Muscles

Superior Rectus
Inferior Rectus
Medial Rectus
Superior Oblique
Inferior Oblique

Vasculature

Ophthalmic Artery
Central Retinal Artery
Ciliary Arteries
Superior Ophthalmic Vein
Central Retinal Vein
Venous Vortex Veins

2. Structures LATERAL to the needle tip pathway:

Nerves

CN VI Abducens

Muscles

Lateral Rectus

3. Structures SUPERIOR to the needle tip pathway:

Nerves

CN V Trigeminal/Lacrimal

Vasculature

Lacrimal Artery
Lacrimal Vein
Superior Ophthalmic Vein

4. The Globe's relationship to the needle tip pathway:

Superior: The globe is superior to the needle tip, from its insertion point, until after the needle tip passes the equatorial plane of globe and is re-directed cephalad into the intraconal space.

Posterior: The needle tip becomes posterior to the globe after passing the equatorial plane of the globe.

Medial: The posterior pole of the globe (macula) remains medial to the needle tip throughout the procedure. Along with the area inferior to the macula where posterior staphylomas may form.

As practitioners, we understand there is no anesthetic technique that is 100% safe. However, the parallel approach to orbital blocks incorporates a sound anatomical and technically safe approach for our needle tips to enter the intraconal space of the mid-orbit for the administration of the local anesthesia.

Recommend viewing at orbitalblocks.com

A Geometrical Method Applied to an Orbital Block

A Video Presentation Accepted by the American Academy of Ophthalmology Network One in 2013 demonstrating the anatomical structures in relation to the needle tip insertion.

References

Atkinson WS. Retrobulbar injection of anesthetic in the muscle cone. Arch Ophthalmol. 1936; 16:494

Gills J, Lloyd T. A technique of retrobulbar block with paralysis of orbicularis oculi. J Am Intraocul Implant Soc. 1983;9 :339-340.

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