Double Trouble: Post-surgical Strabismus

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What is strabismus?

• Misalignment of the eyes
• Strabismus ≠ Double
  – Can have double vision out of one eye
  – Some patients only use one eye at a time.

“DIPLOPIA”

Causes of Binocular Double Vision

• Infantile / Childhood onset
• Need for glasses
• Cranial nerve palsy
• Tendency for eye misalignment that decompensated
• Trauma
• Thyroid eye disease
• Loss or poor vision in one eye
• Post-surgical

Post-Surgical Strabismus

• Anesthesia
• Cataract surgery
• Refractive surgery
• Retina
• Glaucoma
Anesthesia
– Reported incidence of new onset diplopia after cataract surgery:
  • Retrobulbar anesthesia: 1%
  • Topical anesthesia: 0% – 0.2%


What is it about the block?
• Needle injury to muscle?
• Ischemia?
  – Injection in perimuscular space causing compression
• Neurogenic injury?
• Toxic effect of the meds?
  – Lidocaine
  – Marcaine
  – Hyaluronidase
  – Epinephrine

A 1.5 inch retrobulbar needle from the inferiortemporal approach can reach any extraocular muscle.
• Incidence:
  – Inferior rectus > Superior rectus > all others


Anesthetic Agent
• All anesthetic agents directly injected into muscle are myotoxic
  – Bupivacaine (Marcaine) is most and Procaine least
  – Hyaluronidase protective
  • Dispensive
• Initial paresis in in some followed by progressive segmental fibrosis.
  – Reversal of direction of diplopia.

Hyaluronidase
• Medication added to help spread the anesthetic
• In 2002 there was a shortage of Hyaluronidase throughout world
• In a single French hospital, 7205 cataract surgeries were performed under RB anesthesia between 2001-2003:
    • 3582 patients – no diplopia
  – 2002-2003 – No Wydase available
    • 3623 patients – 27 with diplopia (0.75%)


Bupivacaine to treat esotropia

Images pre (A) and post (B) injection of Bupivacaine


Cataract Surgery

• 1,600,000 cataract surgeries performed in US each year.
• Incidence of complications: 0.1% to 6.8%

• Risks:
  – Endophthalmitis
  – Retinal Detachment
  – Cystoid Macular Edema
  – Posteriorly dislocated lens material
  – Suprachoroidal hemorrhage
  – Increased intraocular pressure
  – Loss of eye
  – Diplopia


Cataract Surgery

1950’s - 1970’s

– Patients left aphakic (no lens implant)
– High power glasses magnify
  • Create difference in image size

1980’s to present

– IOL’s and Phaco
– Increased patient expectations
– Diplopia is discussed more often in literature

Why would patients in today’s age get double vision?

• Retrobulbar anesthesia

• Patients with previous eye misalignment

• Monovision

Monovision

Correct one eye to make distance sharp and the other eye to make near vision sharp.
– Contact lenses, cataract surgery, refractive surgery
– Benefit: No glasses needed
– Drawback: Double vision, decreased depth perception

• 70% of patients developed diplopia two years after monovision
• 50% recovered 4 months after discontinuing monovision.

**Refractive Surgery**

- What should be included in the pre-operative evaluation?
- Does strabismus preclude a patient from refractive surgery?
- Can some forms of strabismus be treated with refractive surgery?

**Pre-operative Evaluation**

- History of strabismus / diplopia
- BCVA
- Manifest Refraction
- If hyperopic check cycloplegic refraction
- Use a lensometer - make sure no prism
- Cross Cover
- Trial of contact lenses if not aiming for emmetropia

**Can refractive surgery correct an eye misalignment?**

- In a study of 16 hyperopic esotropes and 12 myopic exotropes.
  - Improved ocular alignment in all.
  - No patient experienced decompensation of strabismus or diplopia.
- Why?
  - The patients need for glasses is contributing to the eye misalignment.

**Treatment**

- If strabismus - have them evaluated by a strabismus specialist
- **Under-promise and over-deliver** ethos
- Clear documentation of discussion and awareness of all relevant issues is imperative

**Retinal Detachment**

- Diplopia is a well-known complication of scleral buckling for retinal detachment.
  - 3-20% for retrospective
  - 73% with transient diplopia in prospective.
- Why?
  - Scarring of eye muscles
  - Decreased vision post-operatively
  - Macular not in same position
  - Large change in glasses prescription – buckle and/or oil

**Type of Diplopia**

- Diplopia 0.5% - 20% after retinal detachment
  - Hypertropia – 58%
  - Horizontal deviation – 17%
  - Torsional – 46%
- More common in those with a scleral buckle.
Scleral Buckle

Treatment

• Time
• Prisms
• Blurring of second image
• Scleral buckle removal???
• Strabismus surgery


Removal of buckle has minimal improvement on strabismus.

Re-detachment rate of 4 – 33% for scleral buckle removal for various reasons.

Recommend minimizing tissue manipulation to perform strabismus surgery.


Glaucma

• Diplopia
  – Trabeculectomy
  – Glaucoma drainage device

Glaucoma Drainage Devices

Baerveldt

Molteno and Double Plate Molteno

Krupin

Ahmed

Molteno 3

Type of Implant

• Highest incidence with Baerveldt and Krupin glaucoma implant.
  – Largest plates.
  – Plates are tucked under rectus muscles

www.avclinic.com/ScleralBuckle.jpg

www.avclinic.com/ScleralBuckle.jpg

www.avclinic.com/ScleralBuckle.jpg
**Etiology**

- Space occupying effect from the plate.
- Ischemia, Necrosis or Muscle trauma.
- Poor vision causing sensory exotropia
- Scarring
  - Limits movement in the direction of action of the muscle.


**Surgical Treatment**

- Discussion between glaucoma and strabismus specialist.
- Treatment:
  - Complete removal scarring around implant.
  - Size reduction of the implant plate is helpful.
    - In one study of 7 patients, it did not interfere with IOP control.
  - Strabismus surgery on the contralateral eye if mild restriction.

**Diplopia after Eye Surgery**

- Not as uncommon as we would like
- Try and identify those patients at risk
- Modify surgical techniques to limit risk.

*Thanks and have a great evening!*