

Episode 22: Postoperative Visual Loss

On this episode: Dr. Jed Wolpaw and Dr. Joe Hughes

What is postop visual loss (POVL)?

- Example:
 - After cardio pulmonary bypass, patient wakes up with unilateral visual loss caused by atheromata dislodged into central retinal artery.
- ~1990s
 - As spinal instrumentation became more complex and procedures became longer and bloodier, patients woke up with bilateral visual loss.
- 1999
 - In response, American Society of Anesthesiologists established a POVL registry.
- POVL Group
 - Analysis from the group by [Lee et al in 2006](#) on 93 spine surgery cases identified many factors associated with POVL, which was then followed up with a multicenter case-controlled study in [2012](#).

What leads to POVL?

- Central retinal artery occlusion (CRAO)
 - On cardiopulmonary bypass
 - Positioning of catheter can send showers of emboli stimulating inflammatory response
- Anterior ischemic optic neuropathy (AION)
 - Optic globe pressure → transmit pressure to optic disc where nerves enter
- Posterior ischemic optic neuropathy (PION)
 - Theory:
 - Everything crammed together → ↑ intraabdominal pressure → ↑ intrathoracic pressure → ↑ JVD → ↑ intraocular pressure → venous congestion/compartment syndrome
- Damage to occipital lobes
 - Central blindness
 - Stroke
 - Cardiac surgery → showering of clots (recall: why pH stat for peds)

What do studies show?

- Based on 2006 study (slightly different than reported in episode)
 - Of 93 spinal cases, 83 led to ION
 - 25 used Wilson frame (30%)
 - Wilson frame - ↑ venous back pressure → ↑ posterior optic neuropathy
 - 22 used Jackson spinal table (27%)
 - 16 used Mayfield pins (19%).
 - 60% PION
 - 20% AION

- The 10 CRAO cases, 3 used horseshoe headrests. Mayfield pins were not used in any of the CRAO cases.
 - Horseshoe
 - Fine for supine
 - Prone
 - Pressure on anterior chamber of eye
 - Hard to avoid both eyes
 - Avoid by using tongs, T cutout, pins
- Obesity
 - Overall ↑ intraabdominal pressure → transmitted to eye
 - Jackson table allows more spreading of weight
- Male
- Estrogen exerts protective effects
 - Hormonal effects on vasculature?
- Age > 50 years
- ↑ Blood loss
 - 82% of cases with 1 or more liters of estimated blood loss
 - Don't let hemoglobin fall quite as low as other case
 - 8-9 Hb, very dependent on patient/conditions
 - Send for Hb levels periodically
 - Utilize tromboelastogram (TEG)
 - Specifies clotting dysfunction
 - If TEG widens once clot starts to form, and narrows too soon, this suggests fibrinolysis → give anti-fibrinolytic (such as tranexamic acid (TXA))
 - > 6 hours duration for cases
 - 94% of cases
 - Segment these cases!
- MAP > 70
- Avoid pressors
 - Favor blood and colloids

Should we limit crystalloids to reduce swelling of face and risk of ION?

- Doesn't correlate as strongly with posterior eye
- Limited crystalloid and used more blood and colloids to oncotic pressure of vasculature to prevent extravasation around optic nerve

Cases

- Female in early 40s with no history of glaucoma underwent a gynecological procedure. She always had PONV so she received a scopolamine patch. Institutional guideline is to remove patch end of phase 2 but was missed. She took off the patch herself and developed acute close angle glaucoma. Her intraocular pressure was increased. Eye surgeons delayed in putting a hole so she suffered visual loss.
 - Similar [case report in 1997](#)
- Male in postoperative period reported diminished vision, found to be 20/80, with pressures of 190/100. Ultrasound revealed shrunken kidneys. Fundoscopic exam revealed flamed hemorrhage, cotton wool macular edema. Aggressively treated

Table 3. ASA POVL Registry: Surgical Characteristics in Spine Cases with ION (n = 83)

Surgical Variable	n (% of 83 cases)
Fusion/instrumentation	74 (89)
Previous spine surgery	32 (39)
Number of vertebral levels	
1	9 (11)
2	19 (23)
3	15 (18)
≥ 4	30 (36)
Unknown number of levels	10 (12)
Vertebral location	
Cervical/cervicothoracic	4 (5)
Thoracic/thoracolumbar	11 (13)
Lumbar	22 (27)
Lumbosacral/sacral	35 (42)
Thoracolumbosacral	5 (6)
Unknown location	6 (7)

ASA = American Society of Anesthesiologists; ION = ischemic optic neuropathy; POVL = Postoperative Visual Loss.

Following questions differ slightly than episode, literature reports vary

Most common cause of permanent POVL in adults after non-ocular surgery? Prone spine surgery?

- PION

Most common cause of retinal visual loss after non-ocular surgery?

- CRAO

What would you see on fundoscopic exam?

- Cherry red macula

Most cases of PION found in what kind of surgeries? AION? ([source](#))

- PION : spine surgery
- AION : cardiac surgery

Giant Cell Arteritis

- Arteritic ION
- Nonarteritic ION = AION, PION
- Treat with massive dose of methylprednisolone
- Look for
 - Vasculitic etiologies
 - Autoimmune process
 - Lab tests
 - Fundoscopic exam

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Notes by Brian Park.