Toxic Posterior Segment Syndrome Due to Reuse of Cannulated Tools

BY STEVE CHARLES, MD

T
oxic anterior segment syndrome (TASS) is an acute, postoperative, noninfectious inflammation that occurs after cataract surgery, corneal transplantation, and glaucoma surgery. The incidence has been estimated at 0.1% to 2.0%; it seems to be increasing worldwide and occurs in clusters (institutional outbreaks). It is the author’s contention that a similar phenomenon can occur after vitreoretinal surgery due to reuse of tools with lumens, which includes all scissors and forceps.

FIBRIN SYNDROME

TASS presents within a few hours after surgery with blurred vision (all patients), severe limbus-to-limbus corneal edema (surgical trauma produces localized edema), 4+ flare, hypopyon, fibrin, minimal conjunctival or episcleral hyperemia, and minimal to no pain (75% to 80% of patients with endophthalmitis have pain).

Vitreoretinal surgeons have reported a similar complication for decades but described it as fibrin syndrome or sterile endophthalmitis.

Fibrin syndrome has been reported after extensive cryo, cyclodestructive procedures, intense endolaser to prior detached retina with residual subretinal fluid, use of poor quality silicone oil, heavy silicone oil, iris manipulation or iris retractors especially in uveitis cases, retained lens material, implanting IOLs in uveitis cases, and in proliferative diabetic retinopathy cases with florid neovascularization.

Sterile endophthalmitis has been reported after injecting intravitreal triamcinolone acetonide (Kenalog, Bristol-Myers Squibb), hyaluronidase (Vitrase, Ista Pharmaceuticals, Inc.), and selected pharmacologic agents.

Long term complications of TASS include: glaucoma due to peripheral anterior synechiae and trabecular meshwork damage, chronic inflammation, cystoid macular edem, corneal endothelial damage, iris damage, fixed pupil, and iris transillumination defects.

CAUSES OF TOXIC ANTERIOR AND POSTERIOR SEGMENT SYNDROMES

Causes of TASS include surgical issues, drugs and devices, and process issues.

Surgical issues in TASS include: retained lens cortex, iris trauma, iris retractors, endocyclophotocoagulation, and ointment in the anterior chamber.

Device and drug factors in TASS include: Poor quality infusion solutions, intraocular lidocaine, intraocular epinephrine...
(pH, dose, preservative, stabilizing agents: bisulphites or metabisulphites), intraocular antibiotics (pH, concentration, dose), intraocular triamcinolone acetonide (active drug and preservative), and poor quality viscoelastics. Many of these issues are also applicable to vitreoretinal surgery.

Process issues that have been proven in TASS include contamination within steam sterilizer (filters, water chambers, and the inside of autoclave), denatured viscoelastics from resterilized cannulas, bacterial endotoxins from gram negative bacteria killed when cannulas are autoclaved, contamination of ultrasonic cleaner, water baths with enzymes or detergents, endotoxins from tap water, detergent or chemical residue on instruments, and incomplete cleaning of reusable cannulas. All of these process issues are also applicable to vitreoretinal surgery. It is important to point out that all scissors and forceps have lumens to permit axial movement of the actuator rod relative to the outer hollow shaft. These lumens are extremely difficult to clean and rinse, especially with 23- and 25-gauge instruments. The intraocular pressure is greater than atmospheric pressure, which forces protein and other biomaterials into the lumen.

**BENEFITS OF DISPOSABLE INSTRUMENTATION**

Small diameter 25- and 23-gauge scissors and forceps are easily damaged during cleaning and sterilization. Disposable scissors and forceps provide optimal gripping and cutting performance from beginning to end of every case. Disposable tools eliminate the risk of contamination from transmissible spongiform encephalopathy/bovine spongiform encephalopathy/prions, bioburden, hepatitis, HIV/AIDS, denatured proteins, and bacterial endotoxins. Disposable tools reduce per case cost because of elimination of cleanup, sterilization, packaging, storage, backup, and inventory costs including labor and materials.

In summary, fibrin syndrome after vitreoretinal surgery may be due to process issues associated with reuse of scissors, forceps, and cannulas: ie, toxic posterior segment syndrome.

---

**Steve Charles, MD, is Founder of the Charles Retina Institute in Memphis, TN, and is a Clinical Professor in the Department of Ophthalmology at the University of Tennessee College of Medicine. He is a Retina Today Editorial Board member and states that he is a consultant for Alcon Laboratories, Inc. Dr. Charles can be reached via e-mail: scharles@att.com.**

**Pravin U. Dugel, MD, is Managing Partner of Retinal Consultants of Arizona and Founding Member of the Spectra Eye Institute in Sun City, AZ. He is a Retina Today Editorial Board member. He can be reached at pdugel@gmail.com.**