“Cathy” works as a private RN scrub for a group of ophthalmic surgeons. As a certified Family Nurse Practitioner, her duties include pre-operative assessments and postoperative follow-up of patients in the office as well as serving in the scrub role intraoperatively. Many of the patients are elderly, and cataract extractions are the most frequently performed surgeries.

Cathy’s surgeons utilize the services of a nearby free-standing ambulatory surgery center for their patients. By block scheduling two rooms simultaneously, one surgeon is able to perform 10 cataract extractions in a day. The ambulatory surgery staff enjoys the fast pace and efficiency allowed by doing so many of the same type of case in one day. The surgery center owns 5 sets of ophthalmic instrument trays, and the SPD crew prides themselves on being able to process and sterilize trays in time for later cases without having to “flash” the sets.

While doing postoperative checks one day after surgery, Cathy is alarmed to discover the final 3 patients from the previous day’s surgery with the same symptoms of diffuse limbus-to-limbus corneal edema and an unreactive pupil in the operative eye. Interestingly enough, the patients complain of minimal eye pain. She notifies the surgeon, who collects vitreous fluid for gram and culture stains. The patients are placed on prednisolone acetate ophthalmic drops 1%, one drop in the affected eye every 60 minutes and asked to return to the office later that day. Thankfully they have all responded to treatment and the inflammation is much improved. The gram and culture stains are negative.

What is your diagnosis for Cathy’s patients? What are Cathy’s next steps in preventing a recurrence of the problem? Provide the evidence-based rationale for your answers.

Response:

Bull’s eye! Our alert readers correctly identified this condition as Toxic Anterior Segment Syndrome, or TASS. TASS is a response to a non-infectious foreign substance introduced into the anterior segment of the eye, most frequently during cataract extractions. Outbreaks in late 2005 and in Feb. 2006 resulted in the initiation of a task force to investigate the problem and to recommend actions to prevent future recurrences. For those of you who thought this might be some sort of infectious process, you weren’t far off. TASS differentiates itself from infectious endophthalmitis in several key ways:

- In TASS, the cultures and gram stains are always negative.
- The onset of symptoms is usually more rapid, 12-24 hours postop for TASS as opposed to 3-7 days for infectious endophthalmitis.
- Severe pain and edema specific to the area of trauma are considered diagnostic for infectious endophthalmitis. TASS has a hallmark diffuse limbus-to-limbus corneal edema and mild, if any, pain.
- In TASS the pupil can become fixed and dilated (an ominous sign), while it remains reactive in infectious endophthalmitis.
- Hypopyon (pus) is present in both TASS and infectious endophthalmitis, but in TASS it may be out of proportion to the amount of inflammation present.
- Intraocular pressure may rise suddenly with TASS, leading to secondary glaucoma. (Johnston, 2006; Sabbaugh, 2007).
Depending on the type and severity of the reaction and response to treatment, patients may recover with no adverse effects. However, permanent vision loss may occur in more severe cases. Additional surgery may be required such as trabeculectomy or placement of a tube shunt (Shabbaugh).

Cathy has her work cut out for her, as there as many possible causes for TASS, and some of them are fairly obscure. Most cases are attributed to contaminants on surgical instruments from improper cleaning, products introduced into the eye during surgery, e.g. irrigation fluids or medications, and other substances that enter the eye during or after surgery (CDC, 2007). Since facilities tend to make multiple practice changes to address the problem, it can be difficult to pinpoint a single cause of an outbreak.

The first, and one of the most important, steps is to notify the ambulatory surgery center, which can then activate its risk management and infection prevention teams to start an investigation. A good place to start is to look at any recent changes to equipment, supplies, solutions, medications, sterilization practices, operative technique, or procedures that could affect anything that goes into the eye. A conversation with the purchasing department may uncover introduction of a new product that corresponds with the outbreak.

Next stop: Sterile Processing Department (SPD). Practices related to cleaning, disinfecting, and sterilization of eye instruments should be closely scrutinized and updated as needed. Eye instruments tend to be delicate and lumens are very small, making it difficult to clean them. However, it is not difficult to grasp the fact that any material not removed from handpieces has the potential to be flushed into the next patient’s eye. Every step in the instrument cleaning and sterilization process should be inspected, from how frequently the water is changed in the ultrasonic washer to when the autoclave is cleaned. Water used multiple times in ultrasonic baths may harbor Gram-negative organisms whose endotoxins are not inactivated during the sterilization process (Giarrizzo-Willson, 2006). The use of enzymes and detergents, common in the processing of instruments in other surgical specialties, should be viewed as another possible source of TASS. Make sure a written policy is in place based on current best practices that describes how instruments are handled prior to and after each case. Quality monitoring practices related to sterilization should be documented and readily accessible as part of an ongoing quality improvement process. SPD staff should have validated competencies in their files specifically related to processing ophthalmic instruments.

The current custom of scheduling a full day of surgical procedures and having limited numbers of instrument trays encourages the practice of immediate use sterilization, which may further compromise safe sterilization practices. In this case, the solution is to either purchase more instrument trays or allow more time for turnover between surgeries.

Next, look at intraoperative practices. As an alert reader pointed out, ophthalmic viscosurgical device solution that is allowed to dry on an instrument is very difficult to remove during cleaning; in fact, it absorbs detergent which is then deposited into the eye during the next procedure. Cathy may want to review the practices of the scrub team to make sure that instruments are kept moist and clean and that lumens are flushed frequently during the procedure. Devices labeled for single use should not be reused. Cathy may want to suggest to her surgeons that they switch to single-use instruments for those items that are especially difficult to clean. She should also make sure that any medications used are preservative-free.
Pay attention to recalls. This gives documenting lot numbers a whole new meaning. When the FDA or a manufacturer recalls a product, it makes it much easier to track patient exposure when this information is documented on the patient record. “Paying it forward”, where adverse events are linked to a specific product, is how these agencies get their information in the first place, so make sure to notify the appropriate authorities of suspected cases of TASS. These include state and local health departments, the CDC, and the FDA (Medwatch). Additional resources include the American Society of Cataract and Refractive Surgery, Emory University Eye Center of Atlanta, the Intermountain Ocular Research Center at the University of Utah, and the American Society of Ophtalmic Registered Nurses. Contact information for each of these institutions is located at the end of this discussion.

Postoperative instructions to patients should include contacting their surgeon immediately for any changes in vision, redness, or pain in the operative eye. Immediate treatment is key to a successful outcome. The postoperative eye patch should not be placed too tightly over the operative eye, as cases of the antibiotic ointment being forced through the incision into the anterior segment of the eye have been documented (Connor, 2006).

Cathy and her surgeons may want to provide an in-service to the surgery center staff as part of the improvement process. Collaboration with all members of the surgical team and support services to develop a surveillance system for detecting TASS will aid in both addressing the current problem and reducing the risk to future patients.

References and Resources


American Society for Cataract and Refractive Surgery TASS Task Force. (2012). Retrieved Sept. 5, 2012 from http://ascrs.org/ascrs-tass-task-force Provides information on risk factors and an excellent document related to recommended practices for cleaning and sterilizing intraocular instruments. There is also an on-line form for reporting cases to the FDA.


Intermountain Ocular Research Center, University of Utah. Retrieved Sept. 5, 2012 from http://medicine.utah.edu/ophthalmology/research/primary/mamalis_werner.php Resources and reporting mechanisms for TASS. Dr. Nick Mamalis is the point person for reporting suspected TASS outbreaks. He may be reached at (801) 581-2352 or at nick.mamalis@hsc.utah.edu