

TASS: Are you cleaning your OR instruments correctly?

by Pascale Rinfret, RN, BScN

We have all heard of TASS during the last year. TASS stands for Toxic Anterior Segment Syndrome, a postoperative, sterile, non-infectious, intraocular inflammation following anterior segment surgeries (cataract surgery, trabeculectomies). It usually occurs within 12 to 48 hours of surgery and results in toxic damage to the intraocular tissues, leading to visual loss. Your patient may have had surgery at 800 this morning and calls you in the afternoon to complain of decreased vision.

The signs and symptoms range from blurred vision or decreased visual acuity, mild to moderate eye pain or no pain, eye redness/conjunctival injection, limbus to limbus corneal edema, possible hypopyon (pus in the anterior chamber), intense anterior chamber segment inflammation (fibrin, white blood cells in the anterior chamber), corneal damage (loss of endothelium), fixed dilated pupil or irregular pupil and elevated intraocular pressure - possible secondary glaucoma.

The members of the American Society of Cataract and Refractive Surgery (ASCRS) as well as the members of the Canadian Ophthalmic Society (COS) have been quite worried about this syndrome which causes similar symptoms as endophthalmitis. It is sometimes mistaken for it. The big difference is that the posterior segment is not involved in TASS, compared to an infectious vitreous body in endophthalmitis.

The ASCRS gave a grant to Dr Nick Mamalis (in Utah) to investigate TASS. He teamed up with Dr Henry Edelhauser, PhD. From February to May 2006, a questionnaire was sent to several Ophthalmology surgical centres in the US to collect data on TASS. The results were amazing: over 100 surgical centres reported outbreaks of TASS! The preliminary report was published in June 2006 and several potential causes of TASS were identified.³

One may ask: Is TASS new? The acronym was actually used for the first time in the literature in 1992, but several cases of “toxic reactions” post cataract surgeries have been reported over the last 25 years: Sterile Endophthalmitis or Non-infectious Endophthalmitis, Toxic Endothelium Corneal Diseases (TECD), Toxic Endothelium Cell Destruction Syndrome (TECDS) and Postoperative Anterior Segment Inflammation.

The list is long when one wants to identify the cause of TASS but it is invariably associated with a substance that enters the eye during anterior segment surgery, whether accidentally or as part of the surgery.

1. Substances that accidentally enter the eye during or after surgery:

- Topical antiseptic¹
- Topical lidocaine jelly, anesthetic agents¹
- Powder from gloves¹
- Particles from tray, lint from drapes
- Air contaminants
- Plain water on instruments
- Preservatives in solutions/ medications used¹⁸
- Topical ointment (an eye patch that is too tight may cause the wound to suck the antibiotic back inside the eye)^{13,22}

2. Substances that are introduced as part of the OR procedure:

- Improper irrigation solutions (BSS):
 - Inappropriate pH (< 6.5 - > 8.5), chemical composition or osmolality¹⁸

- Addition of medications/ antibiotics (the use of vancomycin is still controversial)
- Toxic preservatives in BSS (benzalkonium chloride - 1000 corneas damaged in India)²¹
- Contaminated BSS:
 - During manufacturing process
 - During addition of epinephrine (e.g. sulfites) or antibiotics
 - Out-dated BSS (contamination with glue that leeches inside the bag²¹)
- Mitomycin-C
- Contaminants on IOL
 - Manufacturer debris
 - Residual polishing compounds (e.g. Memorylens^{13,17})
 - During manipulation: powder from gloves

3. Irritants from surgical instruments due to improper cleaning/sterilization:

- Dry blood and debris left on instruments
- Tissue and dry visco-elastics found in re-used phaco tips, irrigation/aspiration tips and cannulated instruments - flushed into the next patient's eye^{7,11,12}
- Irritants from deterioration of instruments due to re-processing: re-usable equipment and re-used single use device (SUD)^{7,11,12}
- Residue of detergent on instruments not properly rinsed¹⁷
- Coliforms and metals left on/in instruments (tap water used instead of distilled, sterile water)
- Endotoxins: gram-negative bacteria lodged inside the improperly irrigated cannulated instruments die during sterilization but release endotoxins that are flushed into the next patient's eye (e.g. contaminated ultrasonic cleaning solution with Klebsiella pneumoniae bacteria¹⁴)
- Oxidized metal deposits/residues on instruments from Plasma Gas Sterilization System⁸
- Ethylene oxide gas residue on instruments from using E.O. Sterilization Method

The ASCRS joined the **American Society of Ophthalmic Registered Nurses (ASORN)** to put together a task force with the goal to develop guidelines for the prevention of TASS outbreaks, related to poor management of instruments between surgeries. The members were surgeons, nurses and scientists. Three Registered Nurses that I had the pleasure to meet were part of the team: Sue Clouser, well known for her role in investigating two TASS outbreaks in Texas^{6,7}, Barbara Ann Harmer^{10,11,12} renowned for her consulting work in Surgical Centres and Julie Burlew, author of "Care and Handling of Ophthalmic Microsurgical Instruments, first and second edition". The team came up with this Special ASCRS/ASORN Report: "**Recommended Practices for Cleaning and Sterilizing Intraocular Surgical Instruments**".¹

I have presented below several points of this report. You can access it on line via www.asorn.org (under Clinical Alerts) or ask one of your ophthalmologists to access it via the ASCRS website. For those of you who have attended one of the few classes this author has presented on TASS, it will be a good review.

- "Instruments should be kept moist until the cleaning process begins to prevent drying of debris and OVD (ophthalmic viscosurgical devices)" (p.2). Decontamination starts during the procedure or immediately after. Flush and/or immerse cannulas in sterile water in the OR immediately following use. Do not re-use the water.
- Remove water from any instrument the surgeon intends to use again. Plain sterile water is toxic to the cornea! Flood instrument with saline water/BSS to remove the water before handling it back (Burlew, 2002, pp. 8, 15).
- Do not soak instruments in saline after use.
- Wipe instruments with dampened lint-free cloth to remove tissue, blood and saline.
- **Always follow manufacturers' instructions for cleaning, rinsing and sterilizing instruments.**
 - If manufacturers' instructions are not provided, request them by writing.
 - If there are none, your item may be a single-use device (SUD). **Do not re-use SUD.**^{10,11,12}

- Rinse the instruments to remove all cleaning agents as well as debris loosened during the cleaning process.
- Irrigate cannulated instruments and handpieces with correct amount of sterile or distilled water. Sterile distilled or sterile de-ionized water is often required for the **final** rinsing (p.3).
- Instruments with lumens should be dried with forced air after irrigation (p. 3).
- If using detergent, with/without ultrasonic cleaner:
 - Calculate correct concentration. Evaporation may render the concentration too concentrated.⁶
 - Correct type of water according to the manufacturer's directions for use (tap vs. distilled vs. sterile)
- If using ultrasonic cleaner:
 - Remove gross soil prior to placing in the cleaner.
 - Ensure instruments can go into the ultrasonic cleaner as per the manufacturers' instructions.
 - Do not mix ophthalmic and non-ophthalmic instruments
 - Empty, wash and dry ultrasonic cleaner after each use or daily.
- Transport instruments in closed container to the decontamination department.
- Manual cleaning: use a new brush or clean the brush between uses with high-level disinfectant or sterilize it. Discard syringes used to irrigate (p.3).
- All of this is to say: **Anything that will be sterilized must be cleaned thoroughly first.** Dirt can not be sterilized. Look out for stains and do not use stained instruments.
- Use disposable simcoes if possible or change the tubing after each case.
- Allow enough time to complete all the steps of cleaning and sterilization after **each** case.

You should have enough instruments to avoid using flash sterilization. If you have 14 cataract surgeries in a day, you should have 14 cataract trays. Speak to your management in order to increase your number of trays and discuss your concerns for patient safety. A lawsuit for vision loss is more expensive than buying extra trays. If you don't have enough trays, ensure that the trays used in the morning will be completely re-sterilized for your afternoon patients; they should also have terminally sterilized instruments. **Flash Sterilization is for emergencies only.** If you do use emergency flash sterilization, keep a **log book** with the names of the instruments flashed and data on the patient. The bottom line is this: **The standards of care must be the same for all patients throughout the day.**

Certain provinces do not legislate on the re-use of phaco tips; some institutions re-use them 10 to 20 times. It is almost impossible to calculate the number of re-uses (unless you flash them all the time – I hope not!). Whatever your practice is in this area, it is not recommended to re-use phaco tips.

I forget who said this, but remember it if you have to investigate a TASS outbreak:

“Just because something is sterile, it does not mean it's not toxic”!

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