Case Report

An Unusual Case of Toxic Anterior Segment Syndrome: A Case Report

Stephane Zake

ABSTRACT

An uncommon but serious postoperative complication following ocular surgery, particularly cataract surgery, is the Toxic Anterior Segment Syndrome (TASS). Early onset inflammation and a variety of ocular symptoms, endangering patient's vision are its defining features. Topical antiseptics in general, talc in surgical gloves, topical eye drops, highly protein-containing Ocular Viscosurgical Devices (OVDs), OVD residues on instruments, inadequate phaco hand piece cleansing following surgery and prior to thermo-disinfection, and tap water are other common culprits. We describe a peculiar TASS situation that we faced in our setup and then how it was handled. The insight gained might be useful for ophthalmic surgeons.

Keywords: TASS, cataract surgery, postoperative complications, sterilization.

INTRODUCTION

Since 2013, we have had a private practice in Celle, Germany. Located in historical building, it is equipped with an operating theatre and consultation spaces, meeting all required hygienic criteria. We perform about 1000 anti-VEGF injections and 600 cataract procedures annually. The eyesight of our patients and the private practice as a whole were put in danger due to a number of Toxic Anterior Segment Syndrome (TASS) cases after otherwise uneventful cataract surgery.

CASE REPORT

The patients affected made note of impaired eyesight, some discomfort and infrequently pain. We observed an early onset on the first day after surgery with significant cellular reaction in the anterior chamber, hypopyon, some fibrin, and seldom vitreous spill over, the corneas remained clear.

We began giving the patients frequent check-ups, reassuring them the event to be of transient nature, cycloplegia, and intensifying local steroid therapy. Fortunately, all eyes recovered and the expected improvement of eyesight cloud be achieved in all cases.

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COI: The author has disclosed no conflict of interest.

As not every patient on the day's OT list experienced a TASS reaction, we first hoped for a unique event. Following recurring cases, a structural issue was obvious.

To single out the cause our strategy was the following: First, analysis of the surgical and sterilisation processes with no alterations were permitted, only the most experienced staff members and one surgeon would do sterilisation and surgery. The osmosis unit, thermo-disinfector, and steriliser underwent maintenance and functioning tests.

Second, a list of all foreign substances that might come into touch with the eye was made, along with a numbering of cataract sets and patients to connect incidences.

Third, we conducted literature research on TASS and got in contact with colleagues at nearby hospitals, private clinics, operation theatre (OT) & suppliers to rule out the possibility of an external reason. No incidents were reported elsewhere, so we stated the problem to be a local one.

The most common causes of TASS are topical antiseptics, talc on surgical gloves, topical eye drops, Ophthalmic Viscosurgical Device (OVDs) containing a high amount of protein (sodium hyaluronate of biological origin), OVD residues on the instruments, insufficient handpiece flushing after surgery and prior to thermo-disinfection, enzymatic detergent remnants

following instrument cleaning, endotoxin-contaminated irrigation fluids, ultrasound baths, steam from sterilisers, and tap water.[1-3]

Having ruled out other sources our search finally focused on Endotoxins. They were searched for in irrigating solutions, in OVDs, on intraocular lenses and in fluids in the thermo-disinfector and sterilizer. Endotoxins were discovered in the sump of the thermo-disinfector finally.

To find the source of contamination, water taps for probing at key locations were installed. Thereby the origin of the endotoxins could be located in the biofilm covering the real estate´s water pipe system (Figure 1).

Despite the installation of a pore size 0.2 microns, positively charged¸ membrane filtering system for the deionized water, TASS incidents reoccurred. Understanding the cleansing process and water supply of the thermo-disinfector, we realized that deionized as well as normal tab water, now known to be endotoxin contaminated, is being used. A second identical filtering system for the tap water was added.

Nonetheless, after a few weeks, there were recurrent TASS cases. The fact that we found endotoxins in the deionized, filtered, water let us to the conclusion, that the 0.2 microns, positively charged membrane filtering system had a saturation point and could release formerly bound endotoxins. Therefore, we switched to filtering with uncharged membranes having pores 0.04 microns in size. Additionally, a new water pipe connecting our OT directly to the public water system was installed. No more TASS cases occurred.

DISCUSSION

The immune system is stimulated by endotoxins, pyrogenic agents. Large molecules called lipopolysaccharides (LPS) are found in gram-negative bacteria's outer membrane. These are either secreted as bacterial outer membrane vesicles or released when the bacterial cell wall is destroyed. They are small enough to get through bacterial filters, strongly negatively charged, and cling to surfaces. The Endotoxin Unit (EU) or I nternational Unit (IU) terms the endotoxin activity relative to the activity contained in 0.2 ng of the U.S. Ref. Standard Lot EC-2.[4] The FDA advises an endotoxin limit of 0.2 EU/mlor 0.2 EU/device.[4] It should be noted that an OVD containing as little as 0.02 EU might cause ocular inflammation in the rabbit eye.[5]

Our experience with TASS, lead us to the following:

*Use of synthetic OVDs with a protein content of less than 0.5 percent,

*Extra-corporal phaco (3-second phaco before and after surgery in BSS),

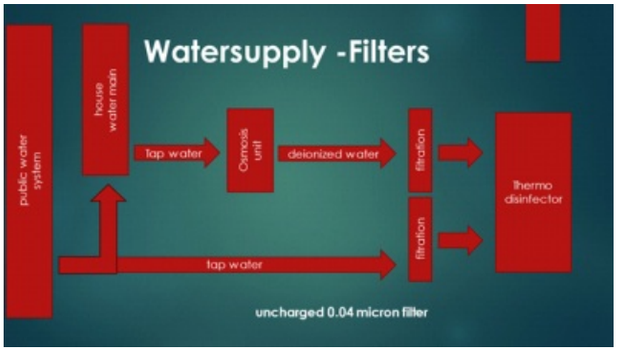
*Single-use irrigation/aspiration cannulas,

*A filtration system (Figure 2) with a 0.04-m pore size for the deionized and tap water,

*Replacement of filters every 6 months. And, if possible, piped tap water from the public water system directly to the operating room.

Figure 1: Aspect of an "aged" water tubing

Figure 2: Filtration of the water used in our OT.



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