Toxic Anterior Segment Syndrome After Cataract Surgery --- Maine, 2006

Toxic anterior segment syndrome (TASS), an acute, noninfectious inflammation of the anterior segment of the eye, is a complication of anterior segment eye surgery; cataract extraction is the most common form of this type of surgery. Various contaminants, usually from surgical equipment or supplies, have been implicated as causes of TASS (1). The syndrome typically develops within 24 hours after surgery and is characterized by corneal edema and accumulation of white cells in the anterior chamber of the eye. Although most cases of TASS can be treated successfully with topical steroids, topical nonsteroidal antiinflammatory agents, or both, the inflammatory response associated with TASS can cause serious damage to intraocular tissues, resulting in vision loss. In October 2006, the Maine Department of Health and Human Services (MDHHS) received a report of a cluster of TASS cases among outpatients who had undergone cataract surgery at a hospital in Maine. MDHHS and CDC investigated the cluster and worked with the treating ophthalmologist and the hospital to prevent additional cases. This report describes the results of that investigation and the subsequent prevention measures implemented. Although the specific cause of the outbreak was not identified, no additional cases were reported after two series of changes were made to the materials and equipment used for surgery. Prevention of TASS requires careful attention to solutions, medications, and ophthalmic devices and to cleaning and sterilization of surgical equipment because of the numerous potential causes of the condition (1).

On October 11, 2006, an ophthalmologist at a 25-bed community hospital in Maine noted that eight of 10 patients on whom he had performed outpatient cataract surgery that day had an unusual degree of inflammation and decreased visual acuity. On October 12, the hospital's infection-control practitioner reported the cases to MDHHS, which began an investigation. The patients' clinical symptoms and subsequent response to topical steroids and topical nonsteroidal antiinflammatory medications were consistent with TASS. The eight patients included five women and three men with a median age of 78.5 years (range: 68--90 years). Cataract extractions were performed on the left eye of five patients and on the right eye of three patients. Intraocular lenses were inserted in all patients after phacoemulsification* of the cataract.

The ophthalmologist was board certified, had been practicing for 20 years, and was the only ophthalmologist at the hospital. He performed surgeries on one day each week (Wednesdays) and did not perform surgeries at other facilities. He had not previously had patients with TASS and reported that he had not made any changes in his surgical technique either before or after the outbreak.

Based on factors reported in previous outbreaks of TASS (1), beginning October 12, the following steps were taken to prevent additional cases: 1) the epinephrine used during surgery was changed to a preservative-free formulation because only preservative-free epinephrine should be used during cataract surgery (1); 2) the solution for the ultrasonic bath used to clean...
surgical instruments was changed twice a day rather than once a day; 3) medications with lot numbers different from those used on October 11 were obtained for subsequent surgeries; 4) staffing for the operation room was changed to include personnel who had assisted the treating ophthalmologist with a greater number of surgeries; 5) the autoclave used to sterilize ophthalmic equipment was checked by a manufacturer's representative and determined to be functioning normally; 6) a topical iodine antiseptic was switched to single-use containers; and 7) a new tip for the phacoemulsification device was used for each patient. (Phacoemulsification tips had been sterilized previously for reuse up to a total of seven times, a practice that was compliant with the manufacturer's recommendations.)

After these steps were taken, the ophthalmologist performed phacoemulsification cataract surgery on four patients on October 18. Per hospital procedure, the patients were informed of the potential risks of the surgery, and informed consent was obtained; patients also were notified of the TASS cases from the previous week. All four patients had TASS after surgery. The patients included three women and one man with a median age of 68 years (range: 55--76 years).

Cataract surgeries were suspended until November 8. In addition to the steps already taken, the following actions were taken before surgeries resumed: 1) new (rather than reprocessed) cannulas (used for irrigation and aspiration during surgery) were used for each procedure; 2) a new lot of balanced salt solution (used to irrigate the surgical site) was obtained from the same manufacturer; 3) equipment removed from the ultrasonic cleaning bath was rinsed with sterile, distilled water rather than tap water; 4) use of an enzymatic cleaner in the ultrasonic bath was discontinued; and 5) a rapid test (Pyrosate™, Associates of Cape Cod, Inc., East Falmouth, Massachusetts) for the presence of endotoxin in the solution from the ultrasonic bath was performed and was positive on October 20.

No patients (n = 222) who underwent cataract surgery during November 8, 2006--June 22, 2007, had TASS after surgery. For patients who underwent surgery on October 11 or October 18, corrected vision in the affected eye after resolution of TASS was 20/20 for three patients, 20/25 for four patients, 20/30 for three patients, and 20/40 for two patients, typical of what is expected after cataract extraction (2). The two patients with 20/40 had preexisting ocular comorbidities; one had mild macular degeneration, and the other had a preexisting corneal scar.

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Editorial Note:

Cataract extraction is one of the most common surgeries in the United States, with approximately 2 million procedures performed each year (3). The incidence of TASS is unknown, although cases have been reported in the medical literature more frequently in recent years. A nationwide outbreak in 2005 was attributed to a commercially distributed irrigating solution contaminated with endotoxin (4). The outbreak of TASS documented in this report was the first to be reported
to MDHHS. Although TASS is not a reportable condition in Maine, the health department expects to be notified of any outbreaks of unusual disease.

TASS has numerous causes, and most cases are attributed to 1) contaminants on surgical instruments, resulting from improper or insufficient cleaning; 2) products introduced into the eye during surgery, such as irrigating solutions or ophthalmic medications; or 3) other substances that enter the eye during or after surgery, such as topical ointments or talc from surgical gloves (5). Although certain outbreaks have been associated with specific causes (6--8), the majority of outbreaks are resolved after comprehensive assessments of potential causes result in numerous changes to solutions, medications, and methods for reusing surgical equipment, as was the case in the outbreak described in this report. In this outbreak, although a rapid endotoxin test of the solution in the ultrasonic bath was positive, whether endotoxin was the specific cause of the outbreak is unknown because numerous other changes were made in solutions, medications, and cleaning protocols, all of which might have contributed to resolution of the outbreak. Prevention of TASS primarily depends on using appropriate protocols for cleaning and sterilizing surgical equipment and paying careful attention to all solutions, medications, and ophthalmic devices used during anterior segment surgery (5). The American Society for Cataract and Refractive Surgery (ASCRS) recently published a guideline to prevent single-facility outbreaks of TASS (5). This best-practice guideline provides procedures for cleaning and sterilizing intraocular equipment, including reused and reprocessed equipment, used during cataract surgery.

TASS outbreaks should be reported to state and local health departments. Assistance with investigating outbreaks can be obtained from CDC's Division of Healthcare Quality Promotion at telephone, 800-893-0485. In addition, ASCRS supports the Intermountain Ocular Research Center at the University of Utah to assist physicians and surgical centers with TASS prevention and treatment; assistance can be obtained from the center at telephone, 801-581-6586, or by e-mail, nick.mamalis@hsc.utah.edu. Assistance also can be obtained from the Emory University Eye Center at telephone, 404-778-5853, or by e-mail, ophthfe@emory.edu. TASS outbreaks that are caused by a specific product should be reported to the Food and Drug Administration's MedWatch Program: at telephone, (800) FDA-1088; website, http://www.fda.gov/medwatch/report.htm.

Acknowledgments

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References


* During phacoemulsification, a small incision is made on the side of the cornea. A probe (i.e., phacoemulsification device) is inserted into the eye that emits ultrasonic waves, which break up the lens so that it can be removed by suction and an intraocular lens can be implanted. This technique requires a very small incision and results in rapid healing. Additional information is available from the National Institutes of Health, National Eye Institute, at http://www.nei.nih.gov/health/cataract/cataract_facts.asp.

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