Cataract Extraction: One Area of Infection Risk and Surveillance Focus

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As provision of healthcare continues to transition from acute care to ambulatory care, a growing number of specialty areas such as ophthalmology are in need of guidance relative to infection prevention and surveillance. Cataract extraction procedures are performed in the U.S. in excess of 2 million times each year.[1] Though rarely reported, adverse outcomes can be devastating; endophthalmitis is an inflammatory condition that can result in loss of vision and removal of the eye in severe cases.

A number of factors contribute to the risk of postcataract extraction infection including the use sterile instruments that are small, intricate, and difficult to clean. Additionally, many of the pre/post operative eye drops are manufactured only in multi-dose containers that can become contaminated if used for multiple patients. The potential for devastating adverse outcomes in combination with the high volume of cases performed makes this procedure a potentially popular outcome metric in an environment of increasing mandatory public reporting.

Infection Prevention in Cataract Extraction

Ambulatory surgery centers (ASCs) typically perform cataract extractions as part of their growing list of surgical procedures. General guidelines for infection prevention and control in healthcare settings are provided by multiple organizations including the Centers for Disease Control and Prevention (CDC) and APIC.[2,3] The following summary of best practices from one large integrated healthcare system is offered to supplement standard general prevention guidelines.

1. Eye prep:

- Use sterile, single patient-use povidone iodine solution for eyes instead of diluting multi-use iodine solution (not intended for use in eyes).[4]

- Instill povidone iodine prep prior to lidocaine gel to reduce contamination of the eye by potentially contaminated multi-dose lidocaine gel.

2. Instruments and equipment:

- Instruments that can not be cleaned with confidence should be disposable if possible. Disposable instruments should include small steel cannulas which lend themselves to the development of biofilms resistant to

autoclaving that can be a source of viable contamination.[5,6]

- Use a disposable lens enfolder or follow manufacturer recommendation for reprocessing, including use of an ultrasonic cleaner prior to sterilization.[7]

- Ensure that the inventory of eye trays is sufficient to permit terminal sterilization, rather than flash sterilization. If flash sterilization is unavoidable, the correct parameters must be used (i.e. sterilization in closed flashpack for no less than 10 minutes.)[8]

- Use of medical grade air to dry the instruments is ideal, and the air compressor must be part of a regular preventative maintenance program to ensure that air is filtered and free of oil.

- Deionized water should be used for final instrument rinse prior to sterilization.[9]

- Ensure that autoclave filters are installed (for models in which one is required).

3. Medication Safety:

- Single-dose containers of both injectable and topical medications should be used if available. Regardless, a practice of using a single container for a single patient should be employed to prevent cross contamination (including those medications containing preservatives). If use of multi-dose injectables for more than one patient is unavoidable, it's critical to scrub the top with an antiseptic (e.g. chlorhexidine or alcohol) for 10 seconds before accessing.[10]

4. Patient education:

- Give patients alcohol-based hand sanitizer postoperatively (op) in addition to written/verbal hand hygiene education.

- Include a phone number with 24-hour access in the patient discharge instructions. Consider scheduling cases Monday through Thursday to assure a next-day post-op appointment to reduce the risk of delayed diagnosis and treatment of infections that could result in permanent eye damage.

5. Environment:

- Clean all eye procedure rooms based on an operating room standard instead of a procedure room standard. Clean beds between cases using germicidal wipes and let air dry.

- Consider providing separate bathrooms in outpatient pre-op settings adjacent to gastrointestinal clinics.

Surveillance – Current Challenges

Recently consumer influenced legislation has been introduced mandating public reporting of certain infection rates. For facilities utilizing an electronic medical record (EMR), the potential for automating infection surveillance has the potential to reduce diversion of clinical resources.

Within one large integrated healthcare system, infection surveillance reports are being developed using the electronic medical record. The infection surveillance reports in development in the integrated healthcare system are based on triggers or clues to infection that are extractable from the electronic medical record. For a given population of patients, such as patients undergoing cataract extraction, the report is designed to identify the patients mostly likely to have developed a post-op surgical site infection (SSI) based on having one or more of these triggers or clues. Though validation is still underway, it appears that the most sensitive and specific triggers for detection of all types of SSIs are:

1. Antibiotic administered >48 hours post-op and < 30 days post-op

2. Infection diagnosis via ICD-9 code

3. Positive wound culture

This type of report has the potential for reducing the infection surveillance burden tremendously. The long-range goal might be to identify triggers that could provide a high degree of sensitivity, specificity, and positive predictive value; another goal is to eliminate most (if not all) of the activities involved with current traditional manual infection surveillance methods.

This automated approach is currently being considered in the integrated healthcare system only for surveillance associated with performance improvement and public reporting. For purposes of research, traditional manual surveillance (record review based on standard infection definitions) would likely be preferred.

Consensus building within the infection prevention community at large, which could potentially be led by professional organizations such as APIC, SHEA and CDC, could identify the best triggers for use in building automated surveillance reports. This in turn would support the generation of data that could reliably and accurately compare systems and hospitals.

As public reporting of healthcare-associated infections continues to be legislated, high-risk and high-volume procedures such as cataract extraction will likely be targeted as key outcome metrics. Electronic medical records and the automation of surveillance ensure that the infection preventionist’s time remains focused on infection prevention instead of case finding and report creation. As more and more hospitals and systems move to an EMR, the standardization of infection triggers by the infection prevention community would help ensure comparable infection data by hospitals using an EMR.

References

1. Owings MF, Kozak LJ. Ambulatory and inpatient procedures in the United States, 1996. Vital Health Stat 1998;13(139).

2. Mangram AJ, Horan TC, Pearson ML, Silver LC, Jarvis WR. Guideline for Prevention of Surgical Site Infection, 1999. Centers for Disease Control and Prevention (CDC) Hospital Infection Control Practices Advisory Committee. Am J Infect Control. 1999;27:97–132.

3. Siegel JD, Rhinehart E, Jackson M, Chiarello L, and the Healthcare Infection Control Practices Advisory Committee. "*Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings"* June 2007.

4. Isenberg SJ, Apt L, Yoshimuri R, Khwarg S. "Chemical preparation of the eye in ophthalmic surgery". *Arch Ophthalmol* 103:1340–1342.

5. Kenyon K. "Reusable and disposable surgical tools combine best of both worlds" *Ocular Surgery News Europe/Asia-Pacific Edition* November 1, 1999.

6. Rutala W et al. "Guideline for Disinfection and Sterilization in Healthcare Facilities" HICPAC Healthcare Infection Control Practices Advisory Committee 2008.

7. Mehran T, et al. Acute Endophthalmitis Following Cataract Surgery, A Systematic Review of the Literature. Arch Ophthalmol 2005;123:613-620.

8. Taurasi R. "Joint commission flash sterilization policy; polypropylene wrap shelf life" *Healthcare Purchasing News*. Sept 2009.

9. Helinger WC, et al. Recommended Practices for Cleaning and Sterilizing Intraocular Surgical Instruments. Special Report Prepared February 16, 2007, by the American Society of Cataract and Refractive Surgery Ad Hoc Task Force on Cleaning and Sterilization of Intraocular Instruments. http://www.ascrs.com/upload/asornspecialtaskforcereport.pdf

10. Dolan S et al. "APIC position paper: Safe injection, infusion, and medication vial practices in health care" *American Journal of Infection Control*. April 2010 Vol. 38 No. 3167-172.

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