

## Endophthalmitis - A risk not worth taking

*"Tears wet my eyes. I am a surgeon. I like solving things. But how do I solve this?" - Atul Gawande, in Being Mortal: Medicine and What Matters in the End*

This poignant quote can be extrapolated to reflect the immediate sense of helplessness of a cataract surgeon faced with unexpected endophthalmitis. If endophthalmitis is itself a devastating complication of cataract surgery, cluster endophthalmitis can potentially annihilate a surgeon's career (and life) and decimate the professional reputation of a hospital or an organization. The glaring spotlight of hostile publicity that the surgeon must face, knee-jerk punitive actions by the authorities in response to stirred emotions and public outrage, the threat of physical harm by an enraged mob, frenzied one-sided and opinionated trial by the media that follows, and the ignominy of being pronounced guilty even before a fair investigation, can cumulatively make it the most traumatic phase in the life of a cataract surgeon.

The overall incidence of postoperative endophthalmitis ranges from 0.02% to 0.26% worldwide<sup>[1]</sup> and 0.04% and 0.15% in India.<sup>[1]</sup> Cluster endophthalmitis, however, seems underreported. There are only a few reports of cluster endophthalmitis from India and there is no reliable national data on its incidence.<sup>[1]</sup>

Prevention of endophthalmitis has been a long-unfulfilled utopian goal. Some of the recent concepts in asepsis and the use of prophylactic intracameral antibiotics may have taken us a step ahead in our quest to minimize the risk of postoperative endophthalmitis.<sup>[2-4]</sup> While there are several organizational guidelines,<sup>[5-8]</sup> this issue of the Indian Journal of Ophthalmology brings out the All-India Ophthalmological Society national guidelines for the prevention and management of endophthalmitis.<sup>[9]</sup> This editorial will address some of the aspects of cluster endophthalmitis.

### What constitutes cluster endophthalmitis?

Cluster endophthalmitis is defined as "the occurrence of endophthalmitis much higher than the local incidence pattern of occurrence, or two or more cases of infection at a time, or the occurrence of repeated postoperative infection under similar circumstances - with the same surgeon, same staff, or in the same operating room".<sup>[10]</sup> Depending on the number of cases, a color-coded alert is made as follows: Green: one endophthalmitis in  $\geq 100$  cataract surgeries, or two in  $\geq 600$ ; Amber: one endophthalmitis in 75 cataract surgeries, or two in 300-500, or three in 700-800; and Red: two endophthalmitis in  $\leq 200$  cataract surgeries, or three in  $\leq 600$ , or four in  $\leq 800$ .<sup>[10]</sup> A green alert entails heightened vigilance, but an amber or a red alert may mandate temporary closure of operating rooms to investigate, identify and mitigate for the cause of the outbreak.

### What are the causes of cluster endophthalmitis?

The source of infection in cluster endophthalmitis is typically exogenous and multifactorial. It is important to know the potential sources of contamination to enable the institution of protocols to minimize the risk. In a recent meta-analysis,<sup>[3]</sup>

the following sources were identified - 1. Intraocular solutions (irrigating fluid, viscoelastic, trypan blue dye, cefuroxime diluted in the balanced salt solution, acetylcholine diluted in distilled water); 2. Contaminated operating room environment (air-conditioning system, construction work); 3. Phacoemulsification machine (phacoemulsification probe, internal tubing, connection between aspiration and irrigation tubes and drainage cassette); 4. Contaminated instruments (damaged diamond blade, residual contaminated viscoelastic on surgical instruments, contaminated cotton tip applicators); 5. Topical anesthesia drops; 6. Intraocular lens preservation solution; and 7. Autoclave solution. However, the sources of infection cannot always be identified. *Pseudomonas aeruginosa* (73.3%) or related species were the most common cause of cluster endophthalmitis as confirmed by culture and/or genotyping. Other organisms were *Burkholderia cepacia*, *Enterobacter amnigenus*, and *Klebsiella* species.<sup>[11]</sup> Although individual practices and low-volume surgical systems are not immune to smaller crops of cluster infections, high-volume surgical facilities, and surgical camps can potentially have a large-scale outbreak.

### Are we trivializing cataract surgery? Do we have to take the risk of mass surgeries?

Every surgery is sacrosanct and cataract surgery is not an exception. The technology has evolved to reach perfection, essential steps of the surgery have been rationalized, training level is high, the surgery itself is effortless, time taken is short, and the results, generally, are excellent - all these and a large volume surgical exposure feed to build an aura of confidence, often bordering on invincibility. High volume and rapid turnover in the setting of suboptimal preoperative evaluation and postoperative care, poor quality control of surgical supplies, and compromised operating theater protocols can brew trouble. It would be wise for the surgeon to exercise total control over the micro-and macroenvironment around the surgical pipeline or to delegate the responsibility to dedicated and well-trained professionals with oversight by the surgical team, maintain a checklist, have layered checks and balances, and apply strict protocols specifically in a high-volume situation. Some of the current guidelines envisage not more than 30 surgeries per surgeon and 60 surgeries overall in an operation theater per day.<sup>[6,9]</sup>

### Are surgical camps a disaster in the making?

The myth that cataract backlog cannot be reduced without community-based surgical camps has long been busted. If make-shift surgical camps continue to be organized in certain geographic locations, it is only to nurse the agenda of the organizers. The National Program for Control of Blindness (NPCB) norms for service delivery in eye camps clearly mandate that camps should be held under controlled conditions with due permissions and safety measures, always in a permanent operation theater setup.<sup>[6]</sup> There is an emphasis that technique, instruments, and drugs that are routinely used by the surgeon in the base hospital should be used in the camp setting as well, thus maintaining quality.<sup>[6]</sup> It is also mandated that all the drugs and solutions for intraocular use should be procured in advance from GMP-certified manufacturers, and the batch evaluated for contamination by microbiological tests, and fluids for intraocular use should be

autoclaved before use in the camp setting.<sup>[6]</sup> The guidelines are rather elaborate and extensive. Although some of these are dated and may need revision in the light of accumulated new evidence since the guidelines were first published, the organizers of the surgical camp and the surgical team must follow the mandates very carefully. Unless the guidelines are followed and meticulously documented, the surgeon will be left defenseless and vulnerable to punitive action in the unfortunate event of cluster endophthalmitis. It is the prerogative of the surgeon to insist that the organizers adhere to the mandated guidelines and refuse to operate under suboptimal conditions. Surgeons should guard themselves against becoming victims of unscrupulous organizers looking for mere cataract scavengers.

### The surgeon is NOT the captain of the ship or the scapegoat – It is all about collective responsibility!

The law generally considers the surgeon as the captain of the ship and vicariously responsible for the actions of the entire team, and even for contaminated surgical supplies. In an era of specialization, teamwork and shared professional responsibility where the hospital administration and/or surgical camp organizers have undeniable responsibility towards procurement, logistics, and support, and where each member of the team (sterilization technicians, nurses, physicians, anesthesiologists, etc) is a trained professional and is accountable for his/her own actions, it seems unfair to hold the surgeon responsible for lapses at other levels of care. Surgeons should have clear documentation of delegation of responsibilities and accountability at each level, which they can use in their defense.

### Slow and steady, safe and sensible

“The traditional camp approach has several variables that are difficult to standardize to deliver a uniformly safe and effective outcome. Operating cataracts in surgical camps and by visiting or trainee surgeons with suboptimal preoperative screening, inappropriate sterilization techniques, unreliable surgical supplies, poor follow-up, and tardy identification of complications can do more harm than good. Measures to strengthen the rural eye care delivery system by vertically integrated, comprehensive, volume-optimized, protocol-based, standardized, safe, cost-effective, sustainable, high-quality, and equitable hub-and-spokes model of hospital-based cataract surgery by a trained and skilled workforce in several parts of the country have met with spectacular success. While such innovative, cost-effective, and self-sustaining rural eye care delivery models are put on a pedestal and duly acclaimed by the rest of the world, we are unable to replicate these in several parts of the country where there is an actual need. The disparity is obvious and needs to be bridged by conscious and concerted efforts, slowly but steadily.”<sup>[11]</sup>

If not the Hippocratic precinct of medicine (*Primum non nocere* = first, do no harm), at least the basic instinct of self-preservation should preempt a sensible ophthalmologist from pursuing volume at the cost of safety.

*“Surgeons must be very careful  
When they take the knife!  
Underneath their fine incisions  
Stirs the Culprit – Life!”*

- Emily Dickinson

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## References

1. Lalitha P, Sengupta S, Ravindran RD, Sharma S, Joseph J, Ambiya V, *et al.* A literature review and update on the incidence and microbiology spectrum of post-cataract surgery endophthalmitis over past two decades in India. *Indian J Ophthalmol* 2017;65:673-7.
2. HariPriya A, Chang DF, Namburur S, Smita A, Ravindran RD. Efficacy of intracameral moxifloxacin endophthalmitis prophylaxis at Aravind Eye Hospital. *Ophthalmology* 2016;123:302-8.
3. Park J, Popovic MM, Balas M, El-Defrawy SR, Alaei R, Kertes PJ. Clinical features of endophthalmitis clusters after cataract surgery and practical recommendations to mitigate risk: A systematic review. *J Cataract Refract Surg* 2022;48:100-12.
4. Gower EW, Lindsley K, Tulenko SE, Nanji AA, Leyngold I, McDonnell PJ. Perioperative antibiotics for prevention of acute endophthalmitis after cataract surgery. *Cochrane Database Syst Rev* 2017;2:CD006364. doi: 10.1002/14651858.
5. ESCRS Guidelines for prevention and treatment of endophthalmitis following cataract surgery: Data, dilemmas and conclusions, 2013. Available from: <https://www.es CRS.org/downloads/Endophthalmitis-Guidelines.pdf>. [Last accessed on 2022 Jan 19].
6. National Program for Control of Blindness. Norms of service delivery in eye camps, 2019. Available from: <http://rajswasthya.nic.in/Norms%20of%20Service%20delivey%20in%20Eye%20Camps.pdf>. [Last accessed on 2022 Jan 19].
7. Reaching the unreached. Community-based eyecare outreach in developing nations, 2019. Available from: <https://aravind.org/wp-content/uploads/2019/05/How-to-organise-a-camp.pdf>. [Last accessed on 2022 Jan 19].
8. Ophthalmic Services Guidance. Managing an outbreak of postoperative endophthalmitis, 2016. Available from: <https://www.rcophth.ac.uk/wp-content/uploads/2020/09/Managing-an-outbreak-of-postoperative-endophthalmitis.pdf>. [Last accessed on 2022 Jan 19].
9. Verma L, Agarwal A, Dave VP, Honavar SG, and members of the Task Force, Majji AB, Lall A, *et al.* All India Ophthalmological Society (AIOS) Task Force guidelines to prevent intraocular infections and cluster outbreaks after cataract surgery. *Indian J Ophthalmol* 2022;70:362-8.
10. Das T. Management of cluster endophthalmitis does not stop at clinical care. *Indian J Ophthalmol* 2020;68:1249-51.
11. Honavar SG. Eliminating cataract blindness: Are we on target? *Indian J Ophthalmol* 2017;65:1271-2.

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Access this article online	
Quick Response Code:	Website: <a href="http://www.ijo.in">www.ijo.in</a>
	DOI: 10.4103/ijo.IJO_171_22

Cite this article as: Honavar SG. Endophthalmitis - A risk not worth taking. *Indian J Ophthalmol* 2022;70:355-6.