Perioperative Prophylaxis for Endophthalmitis after Cataract Surgery in Iran

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Abstract

Purpose: To describe prophylactic patterns employed against endophthalmitis after cataract surgery in Iran.

Methods: This cross-sectional study included 486 ophthalmologists filling in a self-administered questionnaire during the 20th Annual Congress of the Iranian Society of Ophthalmology in December 2010, Tehran, working in both private and academic medical centers. Prophylactic measures used preoperatively, intraoperatively and postoperatively and self-reported rates of endophthalmitis were assessed as the main outcome measurements.

Results: In the preoperative phase, 75.5% of surgeons used povidone-iodine in the conjunctival sac and 71.4% of them did not use antibiotics. The rate of intraoperative prophylaxis was 61.9% either in the form of intracameral antibiotics or subconjunctival injection (mostly cephazolin or gentamicin). Only 7.8% of participants used intracameral cephalosporins. Postoperative antibiotics [mostly chloramphenicol (57%) and ciprofloxacin (28%)] were used by 94.2% of surgeons. On average, ten years of practice were required to observe one case of endophthalmitis.

Conclusion: The surgeons in present setting used various prophylactic regimens against endophthalmitis after cataract surgery. Setting a local and evidence-based clinical practice guideline seems necessary.

Keywords: Antibiotic Prophylaxis; Cataract Extraction; Endophthalmitis

INTRODUCTION

Postoperative endophthalmitis (POE), although rare, is one of the most serious complications of intraocular surgery due to severe visual morbidity and negative impacts on vision-related quality of life.[1] Surgeons have tried to develop methods to reduce this complication through studying its pathogenesis. The ocular surface flora has been shown to be the main source of infection.[1] Therefore, it is not surprising that various prophylaxis regimens have been proposed aiming to reduce the bacterial load of the ocular surface and external tissues.

Prophylaxis for POE has been an area of much debate and controversy in ophthalmology.[3,4] The reason is that there are not adequate prospective studies evaluating the effect of different prophylactic measures for POE as it is a rare condition. Although the protocols and guidelines dominate medical practice, major authorities leave the details of antibiotic prophylaxis to the surgeon’s discretion.[5] However, there have been major changes in this trend owing to recommendations of the European Society of Cataract and Refractive Surgeons (ESCRS).[6]

In the present study, we aim to describe the patterns of prophylactic measures practiced by ophthalmologists...
in Iran for the first time in the aftermath of recent trend shifts in practice.

METHODS

This cross-sectional survey was conducted during the 20th Annual Congress of the Iranian Society of Ophthalmology (IrSO) held in December 2010, Tehran, Iran. The study was approved by the Ethics Committee of Shahid Beheshti University of Medical Sciences and adhered to the tenets of the Declaration of Helsinki. Informed consent was obtained from all participants.

The study included 486 ophthalmologists out of 1,500 IrSO members who attended the meeting. Three research assistants providing an introduction asked the surgeons to fill in a self-administered questionnaire. To preserve anonymity, the names were entered in a separate database and checked with an up-to-date list provided by the IrSO in order to prevent redundancy and also to insure that a wide range of ophthalmologists from all around the country, working in both private and academic medical centers, entered the study.

The questionnaire was prepared according to a comprehensive literature review and consultation with four experienced ophthalmologists and included questions regarding the demographics and practice patterns of the surgeons, prophylactic measures used preoperatively, intraoperatively and postoperatively, and the rate of endophthalmitis. Preoperative measures included the methods of antisepsis and antibiotic prophylaxis. Intraoperative measures regarded the use of intracameral antibiotics or antibiotics at the end of surgery. Postoperative prophylaxis included time duration and use of antibiotics and/or anti-inflammatory agents.

We calculated the number of practice years required to observe one case of endophthalmitis by dividing the number of endophthalmitis cases stated by all participants by their total practice years.

RESULTS

The questionnaires were filled in by 486 out of 500 surgeons who were asked to attend the study (response rate = 97.2%) including 395 male (81.3%) and 91 female (18.7%) subjects. The characteristics of the study participants are detailed in Table 1.

Preoperative Prophylaxis

The majority of surgeons (75.5%) used 5% povidone-iodine in the conjunctival sac. Most surgeons (347 (71.4%)) did not administer preoperative antibiotics and among those who did [139 (28.6%)], the most commonly used antibiotic was topical chloramphenicol drops [58 out of 139 surgeons (42%)]. Approximately an equal percentage of surgeons administered preoperative antibiotics 3 days (44%) or 1 day (39%) before the procedure.

Intraoperative Prophylaxis

A large number of surgeons (61.9%) used a method of intraoperative prophylaxis; either intracameral antibiotics [104 out of 486 participants (21.4%)] or subconjunctival injections [225 out of 486 surgeons (46.3%)]. The distribution of intracameral antibiotics used either directly or in the irrigation bottle is shown in Figure 1.

Postoperative Prophylaxis

Only a minority of surgeons [28 (5.8%)] did not use postoperative antibiotics. In the majority who administered a postoperative antibiotic, 222 ophthalmologists (48%) continued the treatment for one week or less. Overall, 443 surgeons (91.2%) reported the type of postoperative antibiotics they used and the most common types were chloramphenicol (57%), ciprofloxacin (28%), gentamicin (5%), and sulfacetamide eye drops (3%).

We used logistic regression analysis to demonstrate the relationship between certain characteristics of the participants and the use of antisepptic, intraoperative and postoperative antibiotics. Significant associations were only observed between the number of cataract surgeries and the use of subconjunctival antibiotics and also between years of practice (less than 10 years vs. more than 21 years) and the use of postoperative antibiotics [Table 2].

As the final question, participants were asked “How many POE cases have you ever had during your career?” and a sum of 605 cases of POE were reported by 219 out of 486 surgeons (45.1%); more details are presented in Table 3.
although statistically significant (Spearman’s rho = 0.12, P value = 0.011); similarly the relationship between the number of cataract surgeries per week and POE was also weak (Spearman’s rho = 0.19, P value < 0.001). In our survey, ten years of practice were required on average to observe one case of endophthalmitis.

**DISCUSSION**

The first and only recommended prophylactic measure which effectively reduces the rate of POE is povidone-iodine antisepsis of the conjunctival sac.[7,8] In our study, 75.5% of surgeons used povidone-iodine 5% in the conjunctival sac which is lower than rates employed by ophthalmologists practicing in Canada,[9] Australia and New Zealand[10] and the United Kingdom;[11] in these countries, more than 90% of surgeons used povidone-iodine antisepsis for both the conjunctiva and skin.

In the current survey, only 7.8% of participants used intracameral cephalosporins (either by direct injection or as infusion). Other recent studies in this field have also reported that intracameral cephalosporin is not commonly used as a prophylactic method for POE. This is in contrast with findings and recommendations of the ESCRS study showing a fivefold reduction in the incidence of POE by using intracameral cefuroxime.[6] In a survey on the members of the American Society of Cataract and Refractive Surgery (ASCRS), only 6% reported that they inject intracameral cefuroxime.[12] In the United Kingdom, 10% of consultant ophthalmologists reported that they used a bolus injection of intracameral cefuroxime or vancomycin during cataract surgery.[11] In another study on 95 Yemeni ophthalmologists, no one reported the use of intracameral antibiotics.[13]

In our study, in surgeons who used intracameral chemoprophylaxis the most common administered antibiotic was vancomycin (12%). This pattern resembles the practices being performed in the United States,[12] Canada[9] and Germany.[14]

Approximately half of our respondents injected subconjunctival antibiotics at the conclusion of surgery. This figure has been 66.5% and 77% in UK surveys in 1999 and 2003, respectively;[11] 44% in studies performed in Australia and New Zealand[10] and 100% in the Yemen survey.[13] Conversely, in surveys conducted by the American Academy of Ophthalmology[12] and in Canada,[9] the rate of this prophylactic technique was 11% and 13, respectively. Some studies have reported a

![Figure 1. Distribution of intracameral antibiotics used by surgeons.](image)

**Table 2. Relationship between participant characteristics and prophylaxis patterns for POE**

| Area          | Antisepsis | Intracameral antibiotic | Subconjunctival antibiotic | Postoperative antibiotic |
|---------------|------------|-------------------------|-----------------------------|--------------------------|
| Capital city  | 1.1 (0.7, 1.8) | 1 (0.6, 1.6) | 0.8 (0.5, 1.2) | 1.5 (0.6, 4) |
| Other cities  | Reference | Reference | Reference | Reference |
| Degree        | Fellowship trained | 0.8 (0.5, 1.4) | 0.7 (0.4, 1.3) | 0.8 (0.5, 1.3) | 0.7 (0.3, 2.1) |
|                | General ophthalmologists | Reference | Reference | Reference |
| Workplace     | Academic | Reference | Reference | Reference |
|                | Non-academic | 1.2 (0.7, 2.1) | 1 (0.6, 1.7) | 1.1 (0.7, 1.7) | 0.9 (0.3, 2.6) |
| Number of cataract surgeries per week | <7 | 0.8 (0.5, 1.2) | 0.8 (0.5, 1.3) | 1.5 (1, 2.2)* | 0.7 (0.3, 1.8) |
| Number of cataract surgeries per week | 7 and more | Reference | Reference | Reference |
| Duration of practice (year) | ≤10 | 1.4 (0.8, 2.6) | 0.7 (0.4, 1.4) | 0.8 (0.5, 1.5) | 4.3 (1.3, 14.3)* |
|                | 10-20 | 1.3 (0.7, 2.4) | 0.7 (0.4, 1.4) | 0.8 (0.5, 1.4) | 2.5 (0.9, 7) |
|                | >21 | Reference | Reference | Reference |

Data presented in table is OR with its 95% CI; *P<0.05; POE, postoperative endophthalmitis; Ref, reference group; OR, odds ratio; CI, confidence interval
considerably reduced risk of POE with subconjunctival antibiotics,\cite{10,13} however a multivariate analysis on 340,633 cataract procedures in which periocular antibiotics were injected showed a non-significant trend toward prevention of POE after cataract surgery.\cite{14}

The rate of endophthalmitis is estimated to be one to 7 cases per 1,000 cataract surgeries.\cite{10,12,14,16,17} We could not directly compare these rates with the results of our study because our method for estimating the rate of POE was different; however, a low rate of one case of endophthalmitis per ten years of practice shows that in our setting, POE is an extremely rare disorder. Meanwhile, as the surgeons self-estimated the rate of POE in their practice, these results should be interpreted with caution.

REFERENCES

1. Clark A, Ng JQ, Morlet N, Tropiano E, Mahendran P, Spilsbury K, et al. Quality of life after postoperative endophthalmitis. Clin Experiment Ophthalmol 2008;36:526-531.
2. Speaker MG, Milch FA, Shah MK, Eisner W, Kreiswirth BN. Role of external bacterial flora in the pathogenesis of acute postoperative endophthalmitis. Ophthalmology 1991;98:639-649.
3. Liesegang TJ. Use of antimicrobials to prevent postoperative infection in patients with cataracts. Curr Opin Ophthalmol 2001;12:68-74.
4. McGhee CN, Ormonde S. Endophthalmitis after contemporary cataract surgery: Defining incidence and risk factors. Clin Experiment Ophthalmol 2003;31:176-178.
5. Semmens JB, Li J, Morlet N, Ng J; teamEPSWA. Trends in cataract surgery and postoperative endophthalmitis in Western Australia (1980-1998): The Endophthalmitis Population Study of Western Australia. Clin Experiment Ophthalmol 2003;31:213-219.
6. Seal DV, Barry P, Gettinby G, Lees F, Peterson M, Revie CW, et al. ESCRs study of prophylaxis of postoperative endophthalmitis after cataract surgery: Case for a European multicenter study. J Cataract Refract Surg 2006;32:396-406.
7. Speaker MG, Menikoff JA. Prophylaxis of endophthalmitis with topical povidone-iodine. Ophthalmology 1991;98:1769-1775.
8. Ciulla TA, Starr MB, Masket S. Bacterial endophthalmitis prophylaxis for cataract surgery: An evidence-based update. Ophthalmology 2002;109:13-24.
9. Hammoudi DS, Abdolell M, Wong DT. Patterns of perioperative prophylaxis for cataract surgery in Canada. Can J Ophthalmol 2007;42:681-688.
10. Rosha DS, Ng JQ, Morlet N, Boekelaar M, Wilson S, Hendrie D, et al. Cataract surgery practice and endophthalmitis prevention by Australian and New Zealand ophthalmologists. Clin Experiment Ophthalmol 2006;34:535-544.
11. Gupta MS, McKee HD, Stewart OG. Perioperative prophylaxis for cataract surgery: Survey of ophthalmologists in the north of England. J Cataract Refract Surg 2004;30:2021-2022.
12. Chang DF, Braga-Mele R, Mamalis N, Masket S, Miller KM, Nichamin LD, et al. Prophylaxis of postoperative endophthalmitis after cataract surgery: Results of the 2007 ASCRS member survey. J Cataract Refract Surg 2007;33:1801-1805.
13. Bamashmus MA, Al-Akily SA, Saleh MF. Prophylactic measures used for the prevention of postoperative endophthalmitis after cataract surgery. A survey of routine practice in Yemen. Saudi Med J 2010;31:293-298.
14. Schmitz S, Dick HB, Krummenauer F, Pfeiffer N. Endophthalmitis in cataract surgery: Results of a German survey. Ophthalmology 1999;106:1869-1877.
15. Lertsuimkul S, Myers PC, O’Rourke MT, Chandra J. Endophthalmitis in the western Sydney region: A case-control study. Clin Experiment Ophthalmol 2001;29:400-405.
16. Räen M, Sandvik GF, Drolsum L. Endophthalmitis following cataract surgery: The role of prophylactic postoperative chloramphenicol eye drops. Acta Ophthalmol 2013;91:118-122.
17. Lloyd JC, Braga-Mele R. Incidence of postoperative endophthalmitis in a high-volume cataract surgeoncentre in Canada. Can J Ophthalmol 2009;44:288-292.

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