Intracameral Antibiotics After Cataract Surgery : A Short Review

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Endophthalmitis remains a rare but important cause of visual loss. In the current issue of ophthalmology , creuzotgarcher et al. report a retrospective series of 6371242 phacoemulsification surgeries in which the rate of endophthalmitis declined from 0.145% to 0.053% over 10 year period.

Prophylaxis strategies are important to reduce rates of endophthalmitis after cataract surgery, intravitreal injection and other procedures like intracameral use of antibiotics.

Research evidence of anti endophthalmitis benefits of intracameral antibiotics continues to accumulate. The use of intracameral antibiotics increased from 0.60% to 80.03% and investigators concluded that the intracameral antibiotics were responsible for these outcomes.

It was noted that incidence of postoperative endophthalmitis in the first world has dropped markedly over large 30 years to about 1 in 1500 cases even without intracameral antibiotics due to use of preoperative povidone iodine, a fourth generation flouroquinolone topically, proper wound construction, and intactness of the lens capsular bag at completion of surgery.

But in recent years a growing share of ophthalmologists have become convinced of the additional protective benefits of intracameral antibiotics.

Research

The European society of cataract and refractive surgeons (ESRCS)[1] performed a multicentre prospective RCT and reported that intracameral injection of cefuroxime was associated with an approximately fivefold reduction in endophthalmitis rates following phacoemulsification.

The concerns about the ERCRS study is the use of multiple different techniques and the use of topical levofloxacin, rather than fourth generation flouroquinolones.

Vancomycin has been used at centres for 20 years reported significantly reduced incidence of postoperative endophthalmitis after cataract surgery. An eleven year study was performed at North west England concuded that intracameral use of vancomycin at the end of cataract surgery markedly reduced rate of endophthalmitis[2]. The rate of endophthalmitis without intracameral vancomycin was 3 per 1000 as compare to 0.08 per 1000 with intracameral vancomycin.

A cohort study was conducted at Floridablanca, Colombia for a period of five years to evaluate post cataract endophthalmitis rate in relation to prophylactic intracameral moxifloxacin administration

showed marked decline in in the incidence of presumed infections. There was 0% rate of postoperative endophthalmitis in total of 1618 eyes who received intracameral moxifloxacin as compare to 1056 eyes , rate of endophthalmitis was 0.094%.

Another large study in India found a 0.02% endophthalmitis rate among 38160 eyes of charity patients who received intracameral moxifloxacin prophylaxis , which was one fourth the rate of 37777 eyes that did not receive intracameral moxifloxacin.[3]

Drugs	Vancomycin(10 yrs)		Cefuroxime(2 yrs)		Moxifloxacin(5 yrs)	
	Without	With	Without	With	Without	With
Cataract surgeries	3904	12702	2289	2826	1056	1618
Endophthalmitis cases	13	1	35	1	0.094%	0
Incidence	0.3%	0.008%	1.238%	0.044%	0.9	0%

Povidone iodine antisepsis is the only technique to reach category ll evidence in reducing endophthalmitis rates[4]. In contrast, intracameral antibotics are unproven and associated with increased costs as well as risks of overdoses, contaminants and increased bacterial resistance[5]. Overdoses of intracameral cefuroxime are associated with macular edema, retinal vascular leakage and uveitis[6], as well as endothelial toxicity and toxic anterior segment syndrome.

Concerns

Although 95% of postoperative intraocular infections have always been reported to be gram positive, with *Staphylococcus epidermidis* the most common, gram-negative infections tend to be devastating to the eye.[7]

A very small safety margin in ocular tissues makes aminoglycosides—long-standing favorites in medicine—poor candidates for prophylactic use. Only five agents are reasonable candidates for IC prophylaxis: the complex glycopeptidevancomycin; two cephalosporins, cefazolin and cefuroxime; and the fourth-generation fluoroquinolonesgatifloxacin and moxifloxacin. Within the cephalosporin class, cefuroxime has a broader spectrum than cefazolin. Because cefazolin has no particular comparative advantage, cefuroxime has become the favourite. Among the fourth-generation fluoroquinolones, gatifloxacin has been shown to cause dysglycemia when administered systemically, so the systemic product was withdrawn from global markets. The topical preparation of this drug, Zymar (Allergan), contains benzalkonium chloride, making it undesirable for intraocular injection. Moxifloxacin is easily available in a self-preserved and appropriately concentrated nonpreserved solution for our needs as Vigamox (Alcon) and preservative free intracameral moxifloxacin in prefilled syringes by Entod and Sunways pharmaceuticals etc, so it is the logical choice in this class. We are therefore left with three agents from which to choose: vancomycin, cefuroxime, and the moxifloxacin.

Cefuroxime has been approved by European regulators and is available for easy mixing for use in intracameral injections but MRS, penicillin resistant streptococcus pneumonia, and pseudomonas species

are resistant to cefuroxime and increased rate of endophthalmitic cases caused by resistant bacteria was reported in Europe.

In one report , 7 consecutive patients developed endophthalmitis caused by fusarium species after use of intracameral cefuroxime.

Vancomycin used at several surgery centres for many years, but a recent evidence has emerged that it can be associated with postoperative haemorrhagic occlusive retinal vasculitis(HORV).

Toxicity problems are also associated with non presevativemoxifloxacin in form of toxic anterior segment syndrome. So, none of them can be treated as ideal for intracameral prophylaxis.

The problem that have arisen from intracameral use of some antibiotics and concers over increasing antibiotic resistance led to urge moving away from antibiotic based endophthalmitis prophylaxis to antisepsis based endophthalmitis prophylaxismostly with povidone iodine.

References

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