Original Article

Antibiotic sensitivity pattern on cluster endophthalmitis caused by Gram negative organism

Thapa M, Gautam P, Joshi SN, Khanal S

Department of ophthalmology, Maharajgunj Medical Campus, Institute of Medicine, Maharajgunj

Corresponding Author: Dr. MadhuThapa, Lecture, Department of ophthalmology, Maharajgunj Medical Campus

Email: Dr_madhut@yahoo.com

Abstract

Introduction: Endophthalmitis is a rare but devastating complication of intraocular surgery occurring in 0.07%-0.3% of total surgeries. With the introduction of Phacoemulsification through corneal incision, incidence of endophthalmitis has increased in recent days. Outcome of endophthalmitis is worse when it is caused by gram negative organisms.

Methods: Hospital based prospective study of cluster endophthalmitis following cataract surgery done on a single day. Surgeries were performed at B P Koirala Lions Centre of Ophthalmic Studies, IOM, Kathmandu, Nepal

Results: 8 cases of acute endophthalmitis following cataract surgery were included in the series. Out of them 8, 87.5% (7) had isolates in the both anterior chamber and vitreous tap. All patients had infection due to e-coli. 4 cases had mixed growth of E.coli and Staph. aureus in vitreous and anterior chamber both.3 patients had growth of E.coli only in both vitreous and anterior chamber. And 1 patient had growth of E.coli in vitreous only. All the patients complaint of severe pain after few hours of surgery. Visual acuity in 6 patients was CFCF and 1patient was hand movement (HM), 1 patient had perception of light only. Intravitreal injection of vancomycin (1mg/0.1ml) and Amikacin (0.4mg/0.1 ml) and Dexamethsone (0.4mg/0.1ml) was given in all cases after AC and Vitreous tap on the first day. On 2ndday all patients underwent vitrectomy and intra vitreal injection repeated in half dose. Out of 8 cases, 3 (37.5%) developed RD. 1 (12.5%) had to undergo evisceration. 1(12.5%) patients developed cornel opacity. 3(37.7%) patients has good visual recovery visual acuityof 6/6 -6/36.

Conclusion: Even after aggressive treatment acute postoperative endophthalmitis due to gram negative bacteria has a bad prognosis.

Key words: endophthalmitis, gram negative organisms, E-coli

Introduction

Endophthalmitis is a rare but devastating complication of intraocular surgery occurring in 0.07%-0.3% of total surgeries.[1–4] Incidences of endophthalmitis following phacoemulsification surgery has increased in recent days due to corneal incision. [5] Gram positive bacteria are the most common cause of endophthalmitis[6] but if it occurs due to gram negative organisms the result will be sight threatening as well as eye threatening.[1,7–9] Hence, the study was conducted to determine the degree of antibiotic sensitivity on endophthalmitis caused by gram negative organisms in B P Koirala Lions Centre of Ophthalmic Studies, Institute of Medicine, Kathmandu, Nepal.

Methods

This is prospective case series of cluster endophthalmitis following cataract surgery which occurred in a single day. Surgery was done by 2 different surgeons. Total of 8 cases of cataract surgery out of 12 cases which underwent surgery on the same day were included in the study. Rest of the 3 cases had extraocular surgery. Detail clinical evaluations were done in all case. Out of 8 cases 1 had undergone Small incision cataract surgery (SICS) with posterior chamber IOL and rest 7 had undergone phacoemulsification. Injection Vancomycin was used in the Infusion bottle in all cases. Periocular skin preparation was done three times with Povidone 5% solution and disposable drapes were used in all cases. Any risk factors, types of surgery were reevaluated by studying the record files of patients. All cases were managed as per protocol of EndophthalmitisVitrectomy Study. Ultrasonography (USG) of eyes were carried out in all cases to evaluate the vitreous involvement. Under aseptic condition Anterior Chamber tap and Vitreous tap were carried out. Intra vitrealinjection of vancomycin (1mg/0.1ml), Amikacin (0.4Mg/mg), Dexamethasone (0.4mg/0.1ml) were given. Topical Moxifloxcin (3%) given 1hrly, topical Predacetate 1% hrly, topical atropine 1% TID and topical Timolol (0.5%)BID.Tab Ciprofloxacin 750mg two times a day were prescribed along with Tab Flexon (Ibuprofen and paracetamol) 1tab three times a day and Cap Omeprazole(40mg) once a day. Cases were re-evaluated the next day. No clinical improvement was noted and all patients underwent core vitrectomy and repeat intra vitreal injection in half does on the second day. Same medications were continued, all cases were admitted, daily progression was recorded and culture reports were followed and medication changed according to culture sensitivity reports. All patients were followed up for 5 months. But 3 patients followed up to more than a year.

Results

Out of 8 cases, 7 had undergone Phacoemulsification and 1 had undergone SICS+ PCIOL.There were 5 males and 3 females between the age range of 63 to 90 years (Mean age of 77yrs). Among them 3 were hypertensive, 1 was diabetic,1 had Rheumatoid Arthritis and 1 had depressive illness. All patients had good ocular hygiene and lacrimal drainage system was patent. All patients received prophylactic topical antibiotic for 3 to 5 days before the surgery in both the eyes.

On the first postoperative day all patients presented with intense ocular pain.They also complaint of redness and swelling of the operated eyes.Visual acuity at presentation was CFCF in 6 patients and HM with projection of light in 1 patient. 1 patient just had perception of light.

Corneal infiltrate was seen in 1 case who had undergone SICS. The rest of 7 cases had hazy cornea with Descemans folds. Anterior chamber reaction was intense with Hypopyon ranging from 0.5 to 2.5mm. On USG, vitreous deposits were seen in all cases, with mild reaction in 2 cases, moderate reaction in 5 cases and sever reaction in 1 case. No RD or choroidaldetachment were noted in any of the cases on the first day.

Under aseptic condition all patients underwent anterior chamber and vitreous tap for staining and culture. After Intravitreal injections ofVancomycin, Amikacin, Dexamethasone and topical and oral medications started. Cases were re-evaluated the next day but there were no signs of improvement like improvement in visual acuity, decrease in hypopyon, decrese in vitreous exudate were noted. So, all patients underwent core vitrectomy and intravitreal injection repeated in half dose.

After 72 hrs when culture reports were available. 4 patients had mixed growth of E.coli and Staph aureus in anterior chamber and vitreous Samples. 3 patients had E.coli in both anterior chamber and vitreous samples, one had E.coli in vitreous sample only but no growth in aqueous. But organisms showed resistance to Vancomycin and Amikacin. Drugs like Ceftazidime, Ciprofloxacin, Levofloxacin, Gentamycin were sensitive. So topical antibiotics were changed to levofloxacin and Intra vitrealceftazidime was given.

As a final outcome 3 patients (37.5%) developed RD, 2 within 2weeks of surgery, 1 after 4 weeks of surgery with visual acuity of PR to HM.1 patients (12.5%) had to undergo evisceration due to corneal melting and thick exudate in AC and persistent pain. One patient (12.5%) developed corneal opacity.3 patients (37.5%) had good visual recovery ranging from 6/12 to 6/24.

Table 1: Showing the patients pre op and post op details.

Patient	Age	Sex	Laterality	PreOP VA	Type of cat	Final VA	Complications
1	73	F	Rt	6/36	pscc2cc2	6/12	
2	88	M	Lf	6/60	ns3	HM	RD
3	55	M	Rt	6/60	ns2,pscc	6/60	RD
4	64	M	Lf	6/12	pscc3	4/60	RD
5	67	F	Rt	5/60	ns2,cc2	6/24	
6	91	M	Rt	pl/pr	ns3,pscc3	NPL	Eviseration
7	63	F	Lf	6/18	ns3	6/24p	
8	60	M	Lf	3/60	ns3 pscc	CFCF	corneal opacity

Table 2: Isolates in Anterior Chamber (AC) and Vitreous Chamber (VC).

Patient	Isolates in AC tap	Isolates in Vitreous tap
1	-	E.coli
2	Staph. aureus+E.coli	Staph. aureus+E.coli
3	E.coli	E.coli
4	Staph. aureus+E.coli	Staph. aureus+E.coli
5	Staph. aureus+E.coli	Staph. aureus+E.coli
6	E.coli	E.coli
7	Staph. aureus+E.coli	Staph aureus+E.coli
8	E.coli	E.coli

Table 3: Shows the sensitivity report of positive vitreous culture.

Drugs	Pt No1	Pt No 2	Pt No 3	Pt No 4	Pt No 5	Pt No 6	Pt No 7	Pt No 8
Amicacin	R	R	R	R	R	R	R	R
Cefazolin	S	S	R	R	R	R	R	S
Ceftazidime	S	S	S	S	S	S	S	S
Cefixime	R	R	R	R	R	S	R	R
Chloramphenicol	R	R	R	R	R	R	R	R
Ciprofloxacin	S	S	S	S	S	S	S	S
Levofloxacin	S	S	S	S	S	S	S	S
Gentamycin	S	S	S	S	S	S	S	S
Norfloxacin	S	S	S	S	S	S	S	S
Ofloxcin	R	PS	R	R	R	PS	R	PS
Tobramycin	PS	R	R	PS	R	R	R	R
Vancomycin	R	R	R	R	R	R	R	R

Discussion

Postoperative endophthalmitis is the severe inflammation of interior of eye caused by introduction of microorganism following intraocular surgery, trauma or hematological spread from distant sites. Literatures have suggested that clear corneal incision has increased incidence of postoperative infection.[5] Despite the aggressive management bacterial endophthalmitis may result in loss of vision or sometimes the eye itself. Incidence of endophthalmitis ranges from 0.07%-0.3% of total surgery.[1–4]Incidence has increased in recent days because of more phacoemulsification performed (0.3%) through corneal incision. Among Gram positive organisms, Stahp.aureus is the common isolates in older literature.[6] Recent report suggest that Strept. epidermidis is common causative agent.[10] Gram negative organisms are seen to be a rare cause of endophthalmitis.[1,9]Most frequently seen organisms among gram negatives are pseudomonas spices and enterobacteria(70%).

In majority of cases the bacteria are isolated or derived from normal commensals of comjuctival sac.[11] But sometimes out breaks can occur due to contaminated irrigating fluid, unsterile equipments and drugs used intracamerally during surgery, infection among operating team and environmental air.[12,13] In Indian scenario there have been many reports of gram negative organisms causing post operative infections.[14]

A study done by AR Anand showed that out of 170 cases, 41-7% had gram negative infection, 37-6% gram positive, 21.8%had fungal infection. Among Gram negatives, P. aeruginosa 17.1% other Pseudomonas sp 8.8%, nonfermenters 10.8% and others 5.8%. Among them 55.5% were sensitive to Gentamycin, 47% sensitive to Cefotaxime, 86.1% Amikacine, 73.2% Ciprofloxacine, 62.5% Ceftazidme.[15] Since Gram negative organisms and fungi are not common flora of conjunctiva but source should be elsewhere. Inadequate maintenance of sterilization can be the cause of infection in these cases.[15] In our study also we found negative organism (E. coli) in all cases.

High incidence of gram negative bacteria and fungus are seen in postoperative endophthalmitis in recent days.[16]

Among the gram positive, S.aureus is the common isolates in older literature.[6] E-feacialliscytolysin and aggregation subs E.faecialis is the causative agent in 4-8% of endophthalmitis cases and is isolated most frequently from infected blebs following glaucoma surgery. Vancomycin resistance in E- faecialis ocular is isolates has yet to be reported.[17] Case of endogenous endophthalmitis has been described which presented with endocarditis, where the poor prognosis of E. coli has been discussed[7,18] Gram negative endophthalmitis has poor visual outcome (71%) as compared to gram positive. Multi drugs resistance was also seen in gram negative organism, 78.6% as compared to 21.45 of gram positive bacteria.

45% gram negative resistant to cefatazidim,54-5% resistant to Amikacin, 33-35 % to both.[19]

Out of 44.4% culture positive cases, 85.8% had bacterial growth and 14.2% fungus. Gram negative bacillus was seen in 75% in fulminant cases in postoperative endophthalmitis followed by Staphylococcus sp (68.6%) streptococcous sp. (75%) similar to our study. Sensitivity was highest with Gatifloxacin (97.7%) followed by Ciprofloxacin in 95.9% and Ofloxacin in 95.1%[20]

In our study also we found thatVancomycin and Amikacin was resistance in all cases. Ceftaxidime, Ciprofloxacin, Levofloxacin and Gentamycin were found to be sensitive.

Conclusion

Postoperative endophthalmitis is a devastating complication of intraocular surgeries. Literatures have shown that endophthalmistis caused by gram negative organism have very bad prognosis. Similarly in our study also 50% of patient lost their vision (37.5% RD and 12.5% corneal opacity), 12.5% of patient lost the eye and only 37.5%% of patient recover useful vision.

Conflict of interest: None declared

References

1. Fisch A, Prazuck T, Gerbaud L, Coscas G, Lafaix C, et al. Epidemiology of infective endophthalmitis in France. Lancet [Internet]. 1991; 338(8779):1373–6.
2. Kattan HM, Flynn HW, Pflugfelder SC, Robertson C, Forster RK. Nosocomial endophthalmitis survey. Current incidence of infection after intraocular surgery. Ophthalmology. 1991; 98(2):227–38.
3. Mamalis N, Kearsley L, Brinton E. Postoperative endophthalmitis. Curr Opin Ophthalmol [Internet]. 2002 Feb; 13(1):14–8.

4. Das T, Dogra MR, Gopal L, Jalali S, Kumar A, Malpani A, et al. Postsurgical endophthalmitis: diagnosis and management. Indian J Ophthalmol ; 1995 Sep; 43(3):103–16.

5. Taban M, Behrens A, Newcomb RL, Nobe MY, Saedi G, Sweet PM, et al. Acute endophthalmitis following cataract surgery: a systematic review of the literature. Arch Ophthalmol. 2005 May; 123(5):613–20. 9

6. Allen H, Mangiaracine A. Bacterial endophthalmitis after cataract extraction: II. Incidence in 36,000 consecutive operations with special reference to preoperative topical antibiotics. Arch Ophthal 1974 ,91; 3-7

7. Shammas HF. Endogenous E. coli endophthalmitis.Surv Ophthalmol1977 Mar; 21(5):429–35.

8. Kehdi EE, Watson SL, Francis IC, Chong R, Bank A, Coroneo MT, et al. Spectrum of clear corneal incision cataract wound infection. J Cataract Refract Surg. 2005; 31(9):1702–6.

9. Shrader S, Band J. The clinical spectrum of endophthalmitis: incidence, predisposing factors, and features influencing outcome. J Infect dis. 1990; 162:115-20

10. Rowsey JJ, Newsom DL, Sexton DJ, Harms WK. Endophthalmitis. Ophthalmology [Internet]. 1982 Sep; 89(9):1055–66.

11. Speaker M, Milch F, Shah M. Role of external bacterial flora in the pathogenesis of acute postoperative endophthalmitis. Ophthalmology [Internet]. 1991; 98;639-49

12. Hughes D, Hill R. Infectious endophthalmitis after cataract surgery. Br J Ophthalmol.1994; 78;227-32

13. Egger SF, Huber-Spitzy V, Scholda C, Schneider B, Grabner G. Bacterial contamination during extracapsular cataract extraction. Prospective study on 200 consecutive patients. Ophthalmologica. 1994; 208(2):77–81.

14. Gupta A, Gupta V, Dogra M. Spectrum and clinical profile of post cataract surgery endophthalmitis in North India. IJO.2003; 51(2):139-145

15. Anand A, Therese K, Madhavan H. Spectrum of aetiological agents of postoperative endophthalmitis and antibiotic susceptibility of bacterial isolates. IJO.2000; 48(2):123-8

16. Kunimoto DY, Das T, Sharma S, Jalali S, Majji AB, Gopinathan U, et al. Microbiologic spectrum and susceptibility of isolates: Part I. Postoperative endophthalmitis. Am J Ophthalmol [Internet]. 1999 Aug [cited 2016 Sep 24]; 128(2):240–2.

17. Huycke M, Sahm D, Gilmore M. Multiple-drug resistant enterococci: the nature of the problem and an agenda for the future. Emerg Infect Dis. 1998; 4;239-249

18. Park SB, Searl SS, Aquavella J V, Erdey RA. Endogenous endophthalmitis caused by Escherichia coli. Ann Ophthalmol [Internet]. 1993 Mar [cited 2016 Sep 24]; 25(3):95–9.

19. Pathengay A, Moreker MR, Puthussery R, Ambatipudi S, Jalali S, Majji AB, et al. Clinical and microbiologic review of culture-proven endophthalmitis caused by multidrug-resistant bacteria in patients seen at a tertiary eye care center in southern india. Retina [Internet]. 2011 Oct [cited 2016 Sep 24]; 31(9):1806–11

20. R.Ramakrisnanan, M J Bharati, C Shiva Kumar, S Mittal et al.Microbiological profile of culture-proven cases of exogenous and endogenous endophthalmitis: a 10-year retrospective study. Eye, 2009; 23(4):945-956