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MICROBIAL PROFILE AND ANTIBIOTIC SUSCEPTIBILITY TREND IN POSTOPERATIVE ENDOPHTHALMITIS

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Abstract:
Introduction: *Postoperative endophthalmitis is considered the most common form of endophthalmitis, and mostly occurs after cataract surgeries and intravitreal injections with reported incidence rates ranging from 0.012% to 1.3% and 0.016% to 0.053% respectively.* ***Objectives:*** *The main objective of the study is to analyse the microbial profile and antibiotic susceptibility trend in postoperative endophthalmitis.* ***Material and methods:*** *This descriptive study was conducted in Rawalpindi Medical University, Rawalpindi during January 2019 to October 2019. A case of endophthalmitis was diagnosed clinically as per the institute protocol. A detailed history of pain, vision loss, redness, duration of symptoms and their timeline from any ocular insult, any recent intraocular surgery, any trauma, any ocular surface infection, or presence of any non-ocular infective source in the body was noted.* ***Results:*** *The data was collected from 200 patients. Among the 41 gram-positive organisms identified, overall sensitivities noted were vancomycin 100%, gentamicin 91.5%, amikacin 100% ciprofloxacin 68%, chloramphenicol 100%, and tetracycline 84.6%. Among the 55 gramnegative organisms identified, overall sensitivities noted were ciprofloxacin 52.9%, ofloxacin 66.6%, ceftazidime 91.8%, amikacin 100%, tobramycin 100% imipenem 91.6%, gentamicin 81.2% and tetracycline 75%.* ***Conclusion:*** *It is concluded that Pseudomonas spp. and CoNS were the most frequently identified cause of endophthalmitis. Vancomycin and ceftazidime seemed to be excellent empirical antibiotics for treating postoperative endophthalmitis.*

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INTRODUCTION:

Postoperative endophthalmitis is considered the most common form of endophthalmitis, and mostly occurs after cataract surgeries and intravitreal injections with reported incidence rates ranging from 0.012% to 1.3% and 0.016% to 0.053% respectively. If untreated, or treated inappropriately, it can rapidly progress to blindness. Therefore, it is very important to promptly commence appropriate empirical intra-vitreal antibiotic treatment followed by targeted antibiotic therapy once the final microbiological culture and sensitivities are available through culture of intraocular fluids [1].

Moreover, it is also crucial to identify emerging causative bacterial strains resistant to routinely-used antibiotics, and to assess the microbial spectrum of newer antimicrobial therapies. There have been a few large-scale studies in Western literature on the types of infectious agents causing postoperative endophthalmitis [2]. However, from Pakistan, limited data is available on antimicrobial susceptibility of aetiological agents of postoperative endophthalmitis. Hence, there is a need to develop such guidelines and to identify most common antibiotics from antimicrobial susceptibility data for empirical therapy of postoperative endophthalmitis [3].

Infectious endophthalmitis following cataract surgery still is a devastating condition, despite major improvements in surgical techniques in the last decades. Most series report on an incidence rate ranging from 0.05 to 0.4% in different studies worldwide. Most cases are caused by microorganisms from the conjunctiva and the eyelid [4]. They might be secondary to surgery (postoperative endophthalmitis) or to trauma (posttraumatic endophthalmitis). Other microorganisms reach the eye through hematogenic spread (endogenous endophthalmitis) [5].

Objectives

The main objective of the study is to analyse the microbial profile and antibiotic susceptibility trend in postoperative endophthalmitis.

MATERIAL AND METHODS:

This descriptive study was conducted in Rawalpindi Medical University, Rawalpindi during January 2019 to October 2019. A case of endophthalmitis was diagnosed clinically as per the institute protocol. A detailed history of pain, vision loss, redness, duration of symptoms and their timeline from any ocular insult, any recent intraocular surgery, any trauma, any ocular surface infection, or presence of any non-ocular infective source in the body was noted. Meticulous documentation of visual acuity, anterior segment findings of any corneal edema or ulcer, anterior chamber cells, flare, hypopyon, fibrin membrane, and lens status were done by slit-lamp biomicroscopy. The grade of media clarity on indirect ophthalmoscopy and findings of vitritis, vitreous exudates, or any retinal exudates were recorded at presentation and on daily follow-ups. Confirmation and monitoring of vitreous membranes and exudates were done on consecutive ultrasound B-scans.

In all cases, vitreous specimen (0.2 ml) was procured on the day of presentation, and empirical treatment with intravitreal vancomycin (1mg in 0.1 ml) and ceftazidime (2.25 mg in 0.1 ml) was started along with topical and oral medications, as per our institutional protocol. The aspirated fluid was immediately plated on 5% sheep blood agar, chocolate agar, thioglycolate broth, brain heart infusion broth, and potato dextrose agar (HiMedia, India) as per the standard guidelines in the microbiology laboratory of our institute.

Statistical analysis

Overall, antibiotic sensitivities for gram-positive organisms and gram-negative organisms were calculated by finding the percentage of those organisms that were sensitive to each particular antibiotic. Data was analysed using SPSS 19. Frequencies and percentages were used to express the sensitivities of particular antibiotics for the organisms.

RESULTS:

The data was collected from 200 patients. Among the 41 gram-positive organisms identified, overall sensitivities noted were vancomycin 100%, gentamicin 91.5%, amikacin 100% ciprofloxacin 68%, chloramphenicol 100%, and tetracycline 84.6%. Among the 55 gramnegative organisms identified, overall sensitivities noted were ciprofloxacin 52.9%, ofloxacin 66.6%, ceftazidime 91.8%, amikacin 100%, tobramycin 100% imipenem 91.6%, gentamicin 81.2% and tetracycline 75%.

Table 01: Analysis of %ages of sensitivities of endophthalmitis causing organism

S#	Gram Positive Organism	Amikacin	Chloramphenicol	Gentamicin	Erythromycin	Ciprofloxacin	Tetracycline	Vancomycin	Ofloxacin
1	Coagulase negative staphylococcus	100	100	88.8	90	55.5	88.8	100	NT
2	Streptococcus species	NT	100	NT	100	NT	NT	100	54.5
3	Streptococcus group D	NT	100	NT	NT	NT	NT	100	100
4	Bacillus species	100	100	100	NT	100	100	100	66.6
5	Enterococcus species	NT	100	100	00	NT	00	100	NT
6	Corynebacterium species	100	100	NT	NT	100	100	100	NT
7	Staphylococcus aureus	100	100	NT	100	100	100	100	NT
	Gram Negative Organism	**Amikacin**	**Ceftazidime**	**Gentamicin**	**Tobramycin**	**Ciprofloxacin**	**Tetracycline**	**Levofloxacin**	**Imipenem**
1	Pseudomonas species	100	90	70	100	15	NT	NT	100
2	Pseudomonas aeruginosa	100	100	100	100	100	NT	NT	100
3	Enterobacter species	100	100	87.5	NT	15	37.5	NT	100
4	Acinetobacter species	100	75	100	100	100	75	NT	50
5	Stenotrophomonas maltophilia	NT	100	NT	NT	NT	NT	100	NT
6	E coli	100	NT	33	100	33	00	NT	100
7	Haemophilus influenzae	NT	NT	NT	NT	100	100	NT	NT

NT =Not tested

DISCUSSION:

The culture-positive rate is almost similar to rates in literature that range from 33.3% to 60%. For the successful management of endophthalmitis, implementation of empirical antibiotic therapy to cover the common organisms from data of microbial spectrum and its trend of susceptibility of different micro-organism causing endophthalmitis is very crucial. Studies have reported different microbiological spectrum of causative organisms and trend of susceptibility according to various clinical settings [6].

All gramnegativebacteria were largely susceptible to amikacin and ceftazidime in vitro, whereas all gram-positive bacteria were susceptible to vancomycin, amikacin and chloramphenicol. A retrospective analysis in India found a culture-positive rate of 34.6% from a total of 1,110 cases. Staphylococcus epidermis was the most common isolate followed by Pseudomonas spp [7].

Injudicious use, improper dosage, and lack of compliance to the full course of antibiotics can contribute to drug resistance. Fluoroquinolones are rampantly used in ophthalmology, as well as in all other fields of medicine to treat a wide variety of diseases. Apart from treating ophthalmic infections, they are routinely used for prophylaxis before surgeries or intravitreal injections and in the postoperative regimen [8]. Widespread and inappropriate use of antibiotics along with the cross-transfer of MDR among gram-negative organisms is the probable cause of the emergence of MDR. Critical analysis of indications for antibiotic use and selective reservation of certain drugs for severe infections is the need of the hour [9].

The importance of strict vigilance of antibiotic usage and area-wise periodic review of the microbiological profile with antibiotic sensitivity cannot be overstated. This data raises a question mark on the usage of ceftazidime or amikacin as the first choice for empirical gram-negative coverage in geographical areas of India with a high percentage of resistant Pseudomonas cases since irreversible ocular damage occurs before sensitivity reports are available. Role of other antibiotics as empirical therapy or as reserve drug needs to be considered [10].

CONCLUSION:

It is concluded that Pseudomonas spp. and CoNS were the most frequently identified cause of

endophthalmitis. Vancomycin and ceftazidime seemed to be excellent empirical antibiotics for treating postoperative endophthalmitis. Gram-negative organisms were significantly more sensitive to aminoglycosides, imipenem and ceftazidime compared to ciprofloxacin.

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