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### SPECTRUM OF MICROORGANISMS CAUSING ENDOPHTHALMITIS AND THEIR SENSITIVITY TO ANTIBIOTICS IN EASTERN INDIA

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**ABSTRACT:** Though there were various studies from northern and southern India on the spectrum of microorganisms causing endophthalmitis and their sensitivity to antibiotics, eastern India was lacking such study to share their experience. This study demonstrated low culture positivity (32.3 %), *Pseudomonas aeruginosa* as principal organism causing fulminant endophthalmitis and higher resistance of gram-negative as well as gram-positive bacteria to combination of vancomycin and third generation cephalosporin which are commonly advocated to cover these organisms.

**KEYWORDS:** Endophthalmitis, Gram-negative and gram-positive bacteria, Sensitivity to antibiotics.

**INTRODUCTION:** Endophthalmitis is inflammatory reactions of intra-ocular tissues or fluid which may result in ocular morbidity and severe loss of vision, frequently following intra-ocular surgery or trauma.

In India reported incidence of post cataract surgery endophthalmitis is 0.05 %.<sup>1</sup> Three important studies on postoperative endophthalmitis in south and north India reported the spectrum of aetiological agents.<sup>2,3,4</sup>

To determine the specific microbial etiology and antibacterial susceptibilities of bacterial pathogens responsible for the development of endophthalmitis, a consecutive analysis of 65 cases of post-operative and posttraumatic endophthalmitis were performed at a tertiary eye care center in Eastern India from November 2004 to July 2006.

**Materials and Methods:** The mean age was  $53.85 \pm 14.84$  years (Range 5–80 years) and 53.38 % patients were male. The median interval from the onset of symptoms to presentation at the hospital was 7.5 days (Range 1 to 90 days) and each patient received systemic and topical broad spectrum antibiotics. The diagnosis of endophthalmitis was based on the presence of cardinal symptoms of blurring of vision and mild to severe pain and important clinical signs of decreased visual acuity, media clarity, poor visualization of fundus and hypopyon.<sup>5</sup>

The aseptically collected vitreous biopsy and aqueous samples were directly and immediately inoculated onto the Sabouraud's dextrose agar, potato dextrose agar sheep blood agar, chocolate agar, non-nutrient and also in the thioglycolate and brain heart infusion broth. The rest of the material was subjected to Gram stain and 10 % KOH wet mounting preparation. Sabouraud's and potato dextrose agar slants were incubated at 25° to enhance the growth of fungi, and the remainder was incubated at 37 °C. Blood agar plates were incubated under aerobic and anaerobic conditions, and chocolate agar was incubated with 5 % CO<sub>2</sub>. Gram stain, Giemsa stain, and KOH with calcofluor white under fluorescence were done for microscopic evaluation of biopsy samples. A culture was considered positive when there was growth of the same organism on two or more media, confluent

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growth at the site of inoculation on one solid medium, or growth in one medium with consistent direct microscopy findings. The isolated bacteria and fungi were identified by standard methods.<sup>6</sup>

All the bacterial isolates were subjected to antibacterial sensitivity test by disc diffusion method of Kirby-Bauer following NCCL guideline.<sup>7</sup>

**RESULTS:** Out of 65 cases, smears were positive in 23 (35.38 %) eyes which included gram negative in 14, gram positive bacteria in 7 and fungi in 2 eyes. Only twenty one (32.3 %) eyes had positive microbial culture results and the isolates included gram negative bacteria in 13 (20 %), gram-positive bacteria in 6 (9.2 %), and fungi in 2 (3.1 %) eyes.

*Pseudomonas aeruginosa* was the sole bacteria found in 12 of 18 eyes which developed fulminant endophthalmitis within 48 hours whereas twenty five cases of acute endophthalmitis demonstrated *Staphylococcus aureus* in 5, *Corynebacterium* and *Moraxella* species in 1 eye each only.

Twenty two eyes developed chronic endophthalmitis after one month and demonstrated *Fusarium* species and *Aspergillus fumigatus* in 1 eye each. Among *P. aeruginosa* 76.9 % were sensitive to amikacin and ciprofloxacin and 61.5 % were sensitive to ceftazidime but 100 % were resistant to vancomycin.

Among *S. aureus* 80 % were sensitive to vancomycin and ciprofloxacin but 100 % were resistant to amikacin and ceftazidime. *C. species* showed 100 % sensitivity to vancomycin and ciprofloxacin whereas *M. species* showed resistance to all drugs except ciprofloxacin.

**DISCUSSION:** This study highlights that early developed fulminant endophthalmitis attended hospital early and got lesser amount of broad spectrum antibiotics.

A large series of post-operative endophthalmitis from south India reported gram-negative bacteria accounted for 41.7 % cases of post-operative endophthalmitis followed by gram-positive bacteria (37.6 %) and fungi (21.8 %) whereas similar study from north India demonstrated fungi in 21.8 % cases of post-operative endophthalmitis followed by bacteria in 9.5 % and polymicrobial infection in 6.5 % cases.<sup>2,3</sup>

The largest series on post-operative endophthalmitis cases from south central India reported high prevalence of gram-positive cocci (28.6 %) followed by gram-negative bacteria (15.0 %) and fungi (9.7 %).<sup>4</sup>

Those 2 studies highlighted the importance of fungal pathogens responsible for the development of post-operative endophthalmitis in good number of eyes. Post-operative and posttraumatic use of broad spectrum antibiotics in each patient both in topical and systemic routes before presentation at the tertiary eye care centre, might be the reason for low rate of culture-positivity in our study.

The antibiogram pattern of isolates brings focus on vancomycin resistance to one *S. aureus* and all *P. aeruginosa*. Relatively higher resistance to antibiotics for both gram positive and gram negative bacteria makes a serious concern. South Indian study also demonstrated high degree of resistance of gram-negative bacteria to gentamycin, amikacin and ceftazidime.<sup>2</sup>

This study concludes that very early onset of fulminant endophthalmitis is usually caused by *P. aeruginosa* and the combination of vancomycin and third generation cephalosporin might not be effective in number cases of bacterial endophthalmitis.

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