Intraocular lens biofilm formation supported by scanning electron microscopy imaging

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Endophthalmitis is a dreaded intraocular infection which is caused by various organisms.[1,2] Biofilms are important in all the prostheses including intraocular lens (IOL).[3-5] We present a case of bacterial endophthalmitis nonresponding to conventional treatment and had IOL explanation which revealed *Staphylococcus epidermidis* infection and part of the IOL showed similar morphological organism in scanning electron microscopy (SEM).

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A 55-year-old male who had uneventful cataract surgery with IOL implantation in the left eye (OS) presented with recurrent uveitis. Intraocular inflammation was treated on local steroid and cycloplegics by ophthalmologist for the last 8 months. On examination, his vision was 20/200 in the OS with minimal hypopyon and pan uveitis. A thick plaque on posterior surface of IOL was seen. B-scan ultrasound showed vitreous echoes without any retinal detachment. Provisional diagnosis of sequestrated endophthalmitis was made. Anterior chamber tap showed *Eubacterium* genome positivity in polymerase chain reaction and later IOL was explanted after proper consent. One half of the explanted IOL was studied in house ocular pathology and microbiology laboratory under compound microscope (Gram stain and bacterial culture revealed *Staphylococcus epidermidis*) and subsequently other half was submitted for SEM. Compound microscopy of the IOL showed pigmented melanocytic migration in a whorl-like pattern on the anterior surface of the IOL [Fig. 1]. SEM revealed a layer of biofilm of cocci in clusters [Figs. 2 and 3]. Energy-dispersive X-ray spectroscopy (EDX) showed biological component of carbon and oxygen as elements.

Bacteria often attach to surfaces and form dense aggregations called biofilm or bacterial mats.[1,3-5] These films can be of few micrometers in thickness and in depth and may contain multiple species of bacteria, protists, and archaea.[2-5] Bacteria living in biofilms display a complex arrangement of cells and extracellular components, forming secondary structures such as microcolonies through which there are networks of channels forms enabling better diffusion of nutrients.[3-5]

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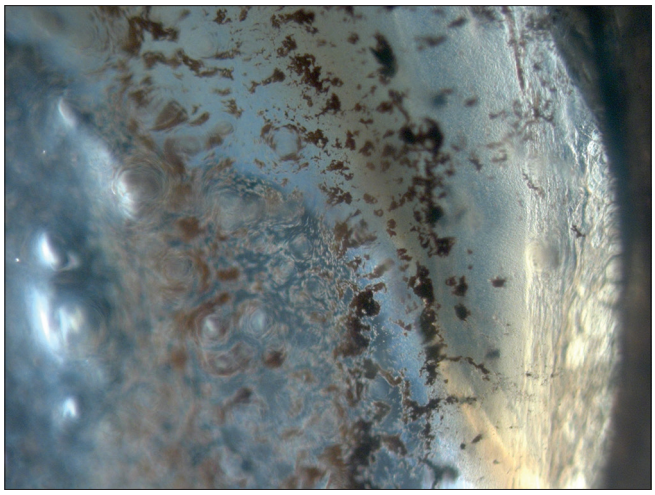

Figure 1: Surface of the optic of explanted intraocular lens (IOL) without any staining with pigment cells' proliferations (×400)

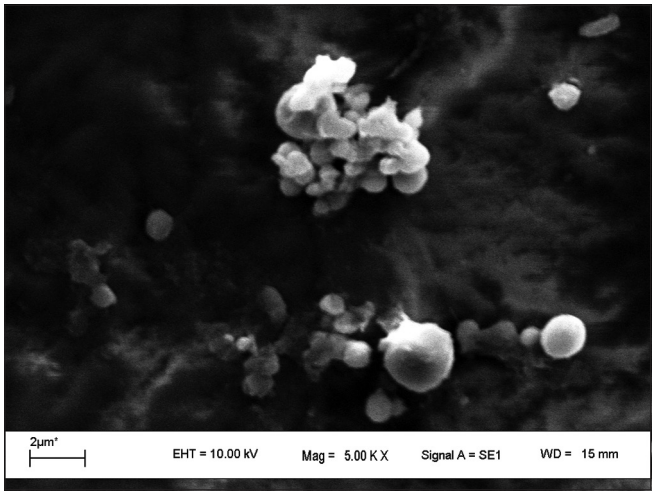

Figure 3: Magnified view of the cocci in group on IOL surface (×5000)

Biofilms are important in endophthalmitis as the structures are seen in chronic bacterial infections in implanted IOL devices and bacteria present within biofilms are much harder to kill than individual isolated bacteria.[3-5] Normal conjunctival and adnexal flora may be the cause of nidus in those biofilms on IOL in sequestrated endophthalmitis.

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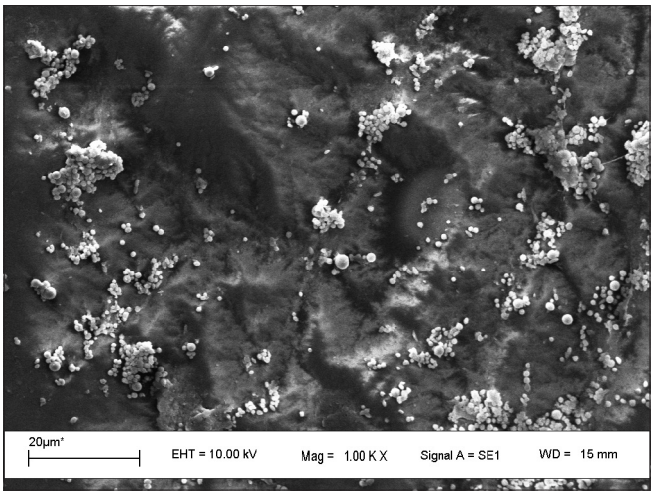

Figure 2: Scanning electron microscopy image showing grape-like cocci in clusters forming a biofilms on the surface of IOL (×1000)

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient has/have given his consent for his images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity.

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Conflicts of interest

There are no conflicts of interest.

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