

First report of acute postoperative endophthalmitis caused by *Rothia mucilaginosa* after phacoemulsification

Pablo Álvarez-Ramos,¹
 Amparo Del Moral-Ariza,¹
 José M. Alonso-Maroto,¹
 Pilar Marín-Casanova,²
 José M. Calandria-Amigueti,¹
 Manuel Rodríguez-Iglesias,²
 Enrique Rodríguez de la Rúa^{1,3}

¹Ophthalmology Unit, University Hospital Puerta del Mar, Cádiz; ²Microbiology Unit, University Hospital Puerta del Mar, Cádiz; ³Ophthalmology Unit, University Hospitals Virgen Macarena y Virgen del Rocío, Sevilla, Spain

Abstract

We aimed at reporting the first case of rapidly progressive acute postoperative endophthalmitis after phacoemulsification cataract surgery in an immunocompetent patient caused by *Rothia mucilaginosa*. An immunocompetent patient manifested endophthalmitis signs 48 hours after an uncomplicated cataract surgery by phacoemulsification. A bacteria of the family *Micrococcaceae* was cultured in the vitreous biopsy, namely *R. mucilaginosa*. The patient did not show a favorable clinical response after vitrectomy and systemic, intravitreal, and topical fortified antibiotics. The patient's eye was very painful, and consequently, it deemed necessary to perform an evisceration. *R. mucilaginosa* may be an aggressive etiologic agent for postoperative endophthalmitis. Although the isolated *R. mucilaginosa* was susceptible to empirical treatment, it was impossible to control the infection with standard treatment, probably due to its ability to create a biofilm around the intraocular lens.

Introduction

Cataract surgery is one of the most common eye operations performed worldwide. Although cataract surgery is highly effective and relatively safe, owing to the enormous numbers, even uncommon surgical complications could be potentially harmful for many patients.¹ Endophthalmitis is one of the most serious complications of cataract surgery, affecting around 0.1% of the cases, and often resulting in severe visual impairment.²

This complication often occurs sporadically, and in such situations, the common source of infection may be due to the conjunctival flora of the patient. The major pathogens are coagulase-negative staphylococci (70%), *Staphylococcus aureus* (10%), streptococci (9%), other Gram-positive cocci, including enterococci and mixed bacteria (5%), and Gram-negative bacilli (6%). The fact that Gram-positive bacteria cause >95% of the cases reflect the usual pathogenesis, *i.e.* contamination of the aqueous humor with skin bacteria flora during surgery.¹ However, unusual germs causing the infection are sometimes isolated and should be suspected in cases with a non-typical evolution.

Case Report

A 65 year-old female patient was urgently admitted to a hospital emergency room 48 hours after a cataract surgery, referring to red eye and vision decrease in the operated eye. Visual acuity on the initial exam was *hands movement* in the right eye and 20/40 in the left eye. A hydrophobic acrylic aspheric intraocular lens was used. Ophthalmological examinations showed conjunctival injection in the right eye, hypopyon, 3+ cells in anterior chamber and severe vitritis with no fundus view. Acute post-cataract endophthalmitis was suspected. She was hospitalized and 23G pars plana vitrectomy was immediately performed and a vitreous biopsy was taken for culture. Additionally, she was treated with topical ocular applications of fortified tobramycin (15 mg/mL) and ceftazidime (50 mg/mL) every hour and with intravitreal injections of vancomycin (1 mg/0.1 mL) and ceftazidime (2 mg/0.1 mL) after the vitrectomy and 2 and 4 days after operation. Intravenous antibiotics (1 g of vancomycin) were also administered twice a day, 500 mg ceftazidime/12 hours, as well as the administration of systemic corticosteroid after 24 hours (oral prednisone 1 mg/kg/day). Because of the bad evolution after 36 hours, systemic treatment was then empirically changed to linezolid 600 mg and moxifloxacin 400 mg, twice a day.

Vitreous was cultured in blood agar, chocolate agar (incubated 48h in microaerophilic conditions) and thioglycollate broth; and was isolated in an all media pure culture of Gram-positive cocci, forming white colonies and catalase positive, which was identified by the Microbiology Laboratory as *Rothia mucilaginosa* through matrix-assisted laser desorption/ionization-time of flight (MALDI-TOF, Bruker Daltonics, Bruker Corporation, Billerica, MA, USA). Direct Gram stain was negative. Antimicrobial sensitivity test was done by the Kirby-Bauer method, being sus-

Correspondence: Enrique Rodríguez de la Rúa, UGC Oftalmología, Hospital Universitario Virgen Macarena, AV/Fedriani sn, 41010 Sevilla, Spain. Tel.: +34.606.461164. E-mail: quiquerua@hotmail.com

Key words: *Rothia mucilaginosa*; endophthalmitis; phacoemulsification; cataract; biofilm; intraocular lens.

Acknowledgements: the Universitario Virgen Macarena Hospital is a clinical associated center of the Network: RETICS RD12/0034 Enfermedades Oculares. "Prevención, detección precoz y tratamiento de la patología ocular prevalente degenerativa y crónica". Oftared. Instituto de Salud Carlos III. Spain.

Contributions: PAV obtained the data, performed a literature review, and drafted the manuscript; JAM, AMA, JCA and ERR managed the case and revised the manuscript critically; MRI and PMC performed the microbiological analysis and critically revised the article.

Conflict of interest: the authors declare no potential conflict of interest.

Received for publication: 24 November 2015.
 Revision received: 12 January 2016.
 Accepted for publication: 25 January 2016.

This work is licensed under a Creative Commons Attribution-NonCommercial 4.0 International License (CC BY-NC 4.0).

©Copyright P. Álvarez-Ramos et al., 2016
 Licensee PAGEPress, Italy
 Infectious Disease Reports 2016; 8:6320
 doi:10.4081/idr.2016.6320

ceptible to all antibiotics tested (penicillins, cephalosporins, fluoroquinolones, erythromycin, clindamycin, and tetracycline).

Although this organism was susceptible to the empirical antibiotics used, a bad clinical response was observed with increasing hypopyon. During the next days, pain, conjunctival injection, hypopyon and anterior chamber reaction worsened and a large vitreous abscess was observed. The patient had no light perception in the eye, which was very painful. Evisceration was consequently performed.

Discussion

R. mucilaginosa, formerly called *Stomatococcus mucilaginosus*, is part of the normal flora of the upper respiratory tract and oral cavity. It was reclassified into a new genus belonging to the family *Micrococcaceae* in 2000,³ based on 16S rRNA sequencing. Gram staining reveals non-spore-forming, encapsu-

lated Gram-positive cocci that can appear in pairs, tetrads, or irregular clusters. It is a facultative anaerobic bacterium, which grows well on most nonselective media and in standard blood culture systems. On sheep blood and chocolate agar, the bacterium forms clear to gray/white, non-hemolytic, mucoid or sticky colonies, which adhere to the agar surface. It can be difficult to distinguish it from coagulase-negative staphylococci, micrococci, and streptococci based on the catalase test result. Its inability to grow in 6.5% sodium chloride and its ability to hydrolyze gelatin and esculin distinguish it from species of *Staphylococcus*, *Micrococcus*, and *Enterococcus* genera.⁴ Identification from automatic methods should correlate with phenotypic identification; otherwise, genetic sequencing may be required to identify this organism. It is an infrequent pathogen, mostly affecting immunocompromised hosts. Recently, infections in immunocompetent hosts have been described in various organ systems, including patients with pneumonia,^{5,6} bacteremia,⁷ and septic arthritis.⁸ Endocarditis is the most commonly reported clinical entity caused by this microorganism.⁹ It has been reported in two cases of eye infection, a postoperative endophthalmitis in a 91-year-old male and a keratitis in vitamin A deficiency.^{10,11} Evisceration was performed in both cases. The known risk factors for this infection are immunosuppression, parenteral drugs, alcoholism, diabetes, neoplastic and valvular disease, but our patient did not present any of these. None of the reported patients with ocular infections caused by *R mucilaginosa* had these risk factors, so it is possible that in-ocular infections could be irrelevant.

In this sense, the source of the infection in our case remains unknown. As mentioned, *R. mucilaginosa* is part of the normal flora of the upper respiratory tract and oral cavity but has not been isolated in normal conjunctival flora. In our opinion self-contamination of the

patient could be the origin of the infection, but contamination of eye drops used in the perioperative period with *R. mucilaginosa* is also a possibility. Unfortunately, a search of *R. mucilaginosa* in the eye drops was not performed when the patient was admitted in the hospital. It would have been of interest to demonstrate the origin of the contamination. However, it was reported that *R. mucilaginosa* is able to colonize a foreign body as a vascular catheter.⁹ The organism's ability to produce a biofilm, similar to other Gram-positive bacteria, is believed to be a key pathogenic mechanism. The physical protective layer provided by the biofilm presumably facilitates adhesion of the organisms to devices and renders them relatively refractory to medical therapy. Antibiotic therapy alone is usually ineffective without surgical removal of the infected device. This could better support the failure of antibiotic treatment.

Conclusions

To our knowledge, this is the second case report of *R. mucilaginosa* endophthalmitis after a cataract surgery and the first after phacoemulsification. It is increasingly recognized as an emerging opportunistic pathogen associated with eye infections and it may be difficult to identify. Physicians should be aware of this organism when treating nonresponding patients infected with Gram-positive bacteria in ocular infections.

References

- Durand ML. Endophthalmitis. Clin Microbiol Infect 2013;19:227-34.
- Cao H, Zhang L, Li L, Lo S. Risk factors for acute endophthalmitis following cataract surgery: a systematic review and meta-analysis. PLoS One 2013;8:e71731.
- Collins MD, Hutson RA, Båverud V, Falsen E. Characterization of a Rothia-like organism from a mouse: description of Rothia nasimurium sp. nov. and reclassification of Stomatococcus mucilaginosus as Rothia mucilaginosa comb. nov. Int J Syst Evol Microbiol 2000;50:1247-51.
- Ruoff KL. Miscellaneous catalase-negative, gram-positive cocci: emerging opportunists. J Clin Microbiol 2002;40:1129-33.
- Ramos JM, Mateo I, Rosillo EM, et al. Infection due to Rothia mucilaginosa. A respiratory pathogen? Enferm Infecc Microbiol Clin 2014;32:306-9.
- Baeza Martínez C, Zamora Molina L, García Sevilla R, et al. Rothia mucilaginosa Pneumonia in an immunocompetent patient. Arch Bronconeumol 2014;50:493-5.
- Ramanan P, Barreto JN, Osmon DR, Tosh PK. Rothia bacteremia: a 10-year experience at Mayo Clinic, Rochester, Minnesota. J Clin Microbiol 2014;52:3184-9.
- Kaasch AJ, Saxler G, Seifert H. Septic arthritis due to Rothia mucilaginosa. Infection 2011;39:81-2.
- Bruminhent J, Tokarczyk MJ, Jungkind D, DeSimone JA. Rothia mucilaginosa prosthetic valve endocarditis: a case of prosthetic valve endocarditis. J Clin Microbiol 2013;51:1629-32.
- Tan R, White V, Servais G, Bryce EA. Postoperative endophthalmitis caused by Stomatococcus mucilaginosus. Clin Infect Dis 1994;18:492-3.
- Mattern RM, Ding J. Keratitis with Kocuria palustris and Rothia mucilaginosa in vitamin A deficiency. Case Rep Ophthalmol 2014;5:72-7.