

Case Study

<https://doi.org/10.20546/ijcmas.2017.604.210>

Ocular Infection by Multidrug-Resistant *Acinetobacter baumannii* Causes Eyeball Evisceration-A Case Report

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ABSTRACT

Keywords

Acinetobacter baumannii,
Endophthalmitis,
Ocular infection,
Ocular evisceration.

Article Info

Accepted:
15 March 2017
Available Online:
10 April 2017

Acinetobacter baumannii is a bacterial species capable of provoking several clinical manifestations and possessing several mechanisms of antimicrobial resistance, besides adapting to adverse situations, thus enabling its permanence in health centers. The broad spectrum of infections caused by this species also includes eye infections, which may lead to a serious clinical outcome depending on the circumstances. Endophthalmitis is one of the most serious complications amongst ophthalmological infections, which can be caused by fungi and bacteria. Although not very frequent, cases of endophthalmitis caused by *A. baumannii* have been described in the literature, with differentiated clinical outcomes being observed. Our objective is to report a case of postoperative endophthalmitis caused by multi-drug resistant *A. baumannii*, identified as from vitreous humor collection and an antimicrobial susceptibility profile confirmed by automated testing. The worsened infection and failure to treat the microorganism via antibiotic therapy resulted in ocular globe evisceration of an immunocompetent 70-year-old male patient with no related clinical history on the 17th day after a surgery for cataract removal by phacoemulsification with implantation of intraocular lens (IOL).

Introduction

Acinetobacter baumannii has been worldwide recognized as a pathogen causing serious infections in humans, leading to great concern about its presence in hospital environments (Kamble, 2015). Hospitalized patients who have undergone invasive procedures or even in immunosuppressive conditions can easily be affected by this microorganism

(Patwardhan *et al.*, 2008). Although not very common, ocular infections, particularly endophthalmitis, caused by the *Acinetobacter* genus species (including the *A. baumannii*), have been frequently observed in the literature in recent years (Talreja *et al.*, 2014a). The aim of this report is to describe a case of eyeball evisceration associated with *A.*

baumannii infection with an antimicrobial resistance profile.

Case Report

A 70-year-old retired immunocompetent male patient from the community, with no correlated clinical history, was submitted to a cataract removal surgery by phacoemulsification and intraocular lens (IOL) implantation at the surgical center of an ophthalmologic clinic. On postoperative day (POD) 1, the patient had a +++ / 4+ corneal edema, formed anterior chamber (FAC), regular pupil, topical IOL, small hemorrhage area in the inferior iris and intraocular pressure (IOP) of 12mmHg. Since leaving the surgical center, the patient had already been using the standard prescription with Vigadexa® (Moxifloxacin Hydrochloride 5 mg/ml and Dexamethasone Disodium Phosphate 0.1 mg) every 4 hours, as well as Nevanac® (Nepafenac 1 mg/ml) every 12 hours. On day 5(POD), there was improvement of corneal ++ / 4+ edema, but there was an increase in intraocular pressure (20mmHg) with a secondary microcystic edema. Azorga® (Brinzolamide 10 mg/ml and Timolol Maleate 6.8 mg/ml) every 12 hours was then added. On day 9(POD), the patient returned reporting eye pain, redness and visual blurring. The examination showed 24 mmHg IOP, 1 mm hypopyon, besides an inflammatory irian membrane. When questioned about the correct use of eye drops, he reported having mistakenly applied an oral drops medication (Dipirone Drops).

Surgical removal of the inflammatory membrane and washing the anterior chamber with Vancomycin (50 mg/ml) and Amicacin (50 mg/ml) were indicated and performed on the same day. On day 11(POD), the patient evolved to worsening of the condition, with reappearance of hypopyon, ocular hypertension and inflammatory membrane,

despite the previous treatment. A B-mode ultrasound scanning was performed, revealing vitreous condensations suggestive of infectious endophthalmitis. On the same day, a posterior vitrectomy was performed with vitreous humor for culture and antibiogram being collected, and an intra-vitreous injection of Vancomycin (1mg/ 0.1 ml) and Amicacin (0.4mg/0.1ml) was given.

Ciprofloxacin 250mg every 12 hours was prescribed postoperatively. After 48 hours, the culture of the vitreous humor revealed the presence of the antibiotic resistant *A. baumannii* bacteria through automation identification in VITEK 2 compact AST 281, confirmed by molecular biology (Fig. 1) through species-specific primers that amplify a fragment of 208 base pairs of the internal transcribed spacer (ITS) of *A. baumannii* ribosomal DNA, by the DNA polymerase chain reaction (PCR) (Chen *et al.*, 2007). On day 15(POD), the patient developed lancinating pain, worsening of the ocular condition, loss of light perception, and no response to previous treatments. An ocular evisceration was then indicated and performed on day 17 (POD), with the implant of an acrylic prosthesis.

Results and Discussion

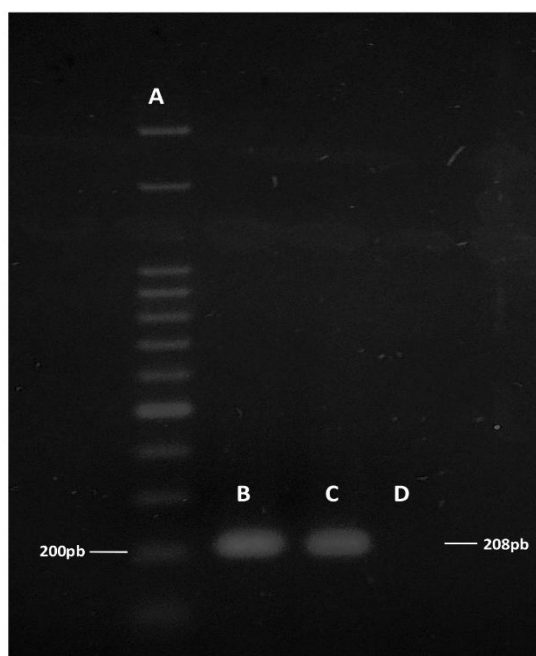
Acinetobacter spp are immobile Gram-negative coccobacilli, belonging to the group of glucose-non fermenting bacteria found in water, soil and animals. The genus has about 31 different species, some of which are commonly found as colonizers of human skin, having the *A. baumannii* undoubtedly as the most prominent species for having become an opportunistic pathogen responsible for a broad spectrum of nosocomial infections at a global level, including bacteremia, meningitis, urinary and respiratory infections (Dijkshoorn *et al.*, 2007).

Table.1 Antibiotic-susceptibility patterns of *A. baumannii* isolate from endophthalmitis after phacoemulsification surgery with intraocular lens implantation

| Antibiotics | Susceptibility result ^a |
|---------------------|------------------------------------|
| | MIC ($\mu\text{g.mL}^{-1}$) |
| Ampicilin | R(≥ 32) |
| Ampicilin/Sulbactam | S (≤ 2) |
| Cefuroxime | R(≥ 64) |
| CefuroximeAxetil | R(≥ 64) |
| Cefoxitin | R(≥ 64) |
| Ceftazidime | R(≥ 64) |
| Ceftriaxone | R(≥ 64) |
| Cefepime | R(≥ 64) |
| Imipenem | S(0,5) |
| Meropenem | S(0,5) |
| Amicacin | S(16) |
| Gentamicin | R(≥ 16) |
| Ciprofloxacin | R(≥ 4) |
| Tigecycline | R(≥ 8) |
| Colistin | S($< 0,5$) |

^a S, susceptible; R, resistant

Fig.1 PCR products of *A. Baumannii* amplified by specie-specific primers resolved by agarose gel electrophoresis/ (lane A) 100bp DNA size ladders; (lane B) *A. baumannii* positive control/CCBH23163/Oswaldo Cruz Foundation/FIOCRUZ (lane C) 208 bp amplified fragment of *A.baumannii* endophthalmitis isolate (lane D) negative control



Ocular infections caused by bacteria may occur and the increasing use of intravitreal injections in the treatment of retinal diseases may be a major factor in the incidence of such infections (Sadaka *et al.*, 2012). *Acinetobacter* spp have been recently related to serious cases of postoperative ophthalmological infections described in the literature (Roy *et al.*, 2013; Broniek *et al.*, 2014). Gopal *et al.*, (2000) described a case of endophthalmitis after cataract surgery with intraocular lens implantation caused by *Acinetobacter lwoffii*; years later, the same author described a series of endophthalmitis cases, where the etiologic agent involved was the *Acinetobacter calcoaceticus* (Gopal *et al.*, 2003). The clinical outcomes observed inpatients in the described cases varied, ranging from retinal detachments and proliferative vitreoretinopathy, as well as evisceration of the ocular globe (Gopal *et al.*, 2003). Endophthalmitis caused by *A. lwoffii* and *A. baumannii* occurring after cataract surgery was also described by Roy *et al.*, (2015) and Bitirgen *et al.*, (2013), respectively. The involvement of *A. baumannii* in cases of endogenous endophthalmitis and corneal post-transplant endophthalmitis have been reported also by Chen *et al.*, (2008).

A clinical profile and antibiotic susceptibility patterns of *A. baumannii* isolates involved in post-trauma endophthalmitis and cataract surgery have also been more frequently reported in the literature probably due to the increasing resistance observed in *Acinetobacter* spp (Roy *et al.*, 2013; Talreja *et al.*, 2014b). Favorable clinical outcomes with visual acuity recovery of patients under treatment with antibiotic therapy in endophthalmitis occurrences by *Acinetobacter* spp. after phacoemulsification surgery with intraocular lens implantation has been demonstrated (Roy *et al.*, 2015; Bitirgen *et al.*, 2013). On the other hand, endophthalmitis

caused by multidrug-resistant *A. baumannii* has been reported (Chen *et al.*, 2008). In this report, the isolate described presented sensitivity to carbapenems, but was resistant to other classes of antibiotics such as quinolone (ciprofloxacin), penicillin (ampicillin), cephalosporine (ceftriaxone, ceftazidime, cefepime, ceftiofur, cefuroxime, cefuroximeaxetil, aminoglycoside (gentamicin), and glycylicycline (tigecycline) confirmed by automated tests (Table 1).

It is indisputable that the great relevance of *A. baumannii* as one of the main pathogens of nosocomial infections is due to its great power in acquiring resistance to several antibiotics in use, limiting the therapeutic possibilities. The resistance of *A. baumannii* to carbapenems has been increasingly observed (Nath and Barkataki, 2016; Rivera *et al.*, 2016; Zalts *et al.*, 2016), and in this scenario, there are few therapeutic options to combat *Acinetobacter* species as the use of colistin, however, resistance has been documented (Gomes *et al.*, 2016).

In conclusion, in this report we describe a bacterial isolate confirmed as *A. baumannii* by molecular techniques, such as the causal agent of bacterial endophthalmitis after phacoemulsification surgery with intraocular lens implantation. The patient did not respond satisfactorily to the antibiotic therapy used, with evolution of the infectious condition. Since the bacterial isolate showed antibiotic multidrug-resistance, the patient was referred for ocular evisceration surgery.

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How to cite this article:

Guilherme Barreto de Oliveira Ribeiro, Marcela de Almeida Costa Marques, Jean Phellipe Marques do Nascimento, Eliege Maria dos Santos, Roseana de Almeida Cunha Bastos, Eurípedes Alves da Silva Filho. 2017. Ocular Infection by Multidrug-Resistant *Acinetobacter baumannii* Causes Eyeball Evisceration – A Case Report. *Int.J.Curr.Microbiol.App.Sci.* 6(4): 1753-1758. doi: <https://doi.org/10.20546/ijcmas.2017.604.210>