RECURRENT CHRONIC CONJUNCTIVITIS DUE TO RAOULTELLA ORNITHINOLYTICA: A RARE CASE REPORT

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Abstract

Aim This brief report of a rare case of conjunctivitis caused by Raoultella ornithinolythica provides a description of possibly the first documented case of this eye infection in Bulgaria.

Materials and Methods Atypical case of an 81-years old patient with a history of chronic purulent conjunctivitis, non-responsive of topical treatment, was presented in our clinic. The laboratory result of conjunctival swab was R. ornithinolythica positive.

Results This organism causes a non-specific purulent conjunctivitis that seems to have a benign, but chronic course and tends not to be responsive to a topical antibiotic treatment. Systemic treatment with amoxicillin and clavulanic acid was effective.

Conclusions The possibility of atypical organisms must be considered when managing chronic infective conjunctivitis. Conjunctival swabs should be obtained and topical treatment switched when initial empirical therapy fails. If necessary, systemic therapy should be considered.

***Key words**: conjunctivitis, atypic microorganisms, rare case*

Introduction

Conjunctivitis is the most common cause of red eye. It is an often encountered condition in emergency eye hospitals and outpatient care, as it can cause redness, severe discomfort, discharge, epiphora and even decrease in visual acuity (1, 2). Viral infection (Adenovirus) is the most common cause of conjunctivitis, followed by bacteria as a second causative agent. Of the latter, the Gram-positive microorganisms are encountered most frequently. Topical antibiotics, to which the organism is sensitive, are usually very efficacious in eradicating the infection with minor side effects or consequences, if any. Although topical therapy is usually prescribed empirically, it is useful to identify the causative organism with its antibiotic sensitivity in order to assign specific therapy (1, 2). In order to prevent the disease, the awareness of medical specialists is essential, especially in terms of prophylaxis (3-5).

Raoultella spp. are member of Enterobacteriaceae family, opportunistic bacteria. Three species belong to this genus- Raoultella ornithinolytica, Raoultella planticola and Raoultella terrigena. R. ornithinolytica lives in an aerophilic environment and is a gram-negative bacterium. This species is rarely identified in humans, it is an opportunistic pathogen, isolated in soil and water (6-8).

This brief report of a rare case of conjunctivitis caused by Raoultella ornithinolythica provides a description of possibly the first documented case of this eye infection in Bulgaria.

Matherials and methods

An 81-year-old woman presented to the clinic complaining of both eyes being red, with yellowish discharge, gritty and watery for 2 years, with episodes of temporary improvement and exacerbation. She stays mostly indoors in a clean environment and reports no contact with animals, she gave no history of water or soil contamination of the eyes. Patient had been taking chloramphenicol eyedrops four times a day as well as Tobramycin four times a day as prescribed by

her general practitioner for the previous 1 year without permanent relief. She felt that her symptoms had improved but not completely abated since this therapy. Biomicroscopy revealed bilateral mild conjunctival injection, scanty secretion and blepharitis. There were no other positive findings. There were no visual complaints and indeed visual acuity was good as measured at 6/ 7.5 Snellen's right and 6/6 Snellen's left. Any deficit was attributed to early lens changes.

Conjunctival swabs were taken for bacteria. There was no clinical indication to test for Adenovirus or Herpes simplex. The bacterial swab was positive for R. ornithinolytica, sensitive to Ciprofloxacin, Gentamicin, Levofloxacin and Moxifloxacin and resistant to Doxycycline (from topically available antibiotics). No other co-cultured bacteria were detected (Fig.1).

After 8 days patient failed to respond satisfactorily to levofloxacin collyr (given 5 times daily). The secretion had decreased but not disappeared, and so had the conjunctival injection. She was switched to 0.3% ciprofloxacin drops (5 times daily) and gentamicin ointment tds with resolution of symptoms after 2 weeks; the antibiotic drops were continued for 3 weeks in total and the patient remained asymptomatic for a month. She came to the clinic again with same complaints and signs, and we decided to start systemic therapy with amoxycillin and clavulanic acid 2g daily per os, for 14 days. Therapy was effective and patient did not have any symptoms or signs in the 6-month period of monitoring. She was prescribed hypromellose 0.3 % and Ozodrop 3 times daily for long-term use.

Results and discussion

This case report describes a bilateral bacterial conjunctivitis caused by the environmental pathogen R. ornithinolytica. To our knowledge, this is the first report of an ocular infection with this species in Bulgaria. It is all the more unusual in that there was no soil or water contamination involved in our patient and the bacterium is known to inhabit such environments. This indicates that our knowledge of this pathogen is still incomplete.

Conjunctivitis per se is most commonly caused by adenoviral infection. The most common causes of acute bacterial conjunctivitis are S. aureus, Streptococcus pneumoniae and Haemophilus influenzae. Hyperacute conjunctivitis is caused by Neisseria gonorrhoeae and Neisseria meningitides but is very rare. Chronic infections, i.e., lasting more than 3 weeks are usually attributable to S. aureus, Moraxella lacunata or Gram-negative enteric flora (1, 2).

Raoultella ornithinolytica is an encapsulated Gram-negative, oxidase-negative, catalase-positive, aerobic, non-motile rod that belongs to the Enterobacteriaceae family. This bacterium was initially classified in the genus Klebsiella as Klebsiella ornithinolytica, until the creation of the genus Raoultella in 2001. R. ornithinolytica is usually found in water environments and soil, and due to its ability to convert histidine to histamine, it has been associated with histamine poisoning in humans. R. ornithinolytica is an emerging entity in human infections, with several reports of virulent infections in comorbid at-risk patients.

The incidence of human disease associated with R. ornithinolytica is low with few previously reported cases of clinical infections requiring treatment. The low prevalence of R. ornithinolytica related infections in the literature might be explained by the challenges and difficulty to properly identify this species with conventional biochemical and phenotypic tests (1,2).

In literature there are only two cases of external otitis sustained by Raoultella ornithinolytica but not discussed in detail and in patients immunocompromised and hospitalized for other pathologies (9). The first documented case of Raoultella conjunctivitis was reported in 2014 by Zuberbuhler et al. (10). In 2016 another four cases are published by Vassao et al. (12). In both reports, Raoultella planticola was the isolated pathogen. Seng and co-authors isolate R. ornithinolythica in conjunctival swab of a newborn for the first time in 2016 and defines the case as hospital acquired infection (11). According to author, this microorganism is a virulent pathogen of community-acquired infections that has become an emerging hospital-acquired infection, particularly after invasive procedures, in newborn or elderly people, with solid and malignant tumors and immune deficiency.

Thereby, the case we describe is, to our knowledge, the first conjunctival infection in an immunocompetent host. Thanks to the culture we found an unexpected bacterium and, basing on the sensitivity test, we were able to give the most proper therapy. This therapy consisted both of a local therapy (Ciproxloxacin eye drops and Gentamicin eye ointment) and of a systemic one (Augmentin), that is what we use and suggest in chronic reccurent cases to eradicate the infection and avoid complications. We recommend also conjunctival toilette and eyelid hygiene before starting and during the treatment, to provide a higher efficacy of the local drops.

Raoultella species is becoming a more clinically relevant organisms. There are many ways in which this infection can manifest clinically depending on the host's comorbidities, from a fulminant sepsis to a brief self-limited illness. Because of its ubiquity in the environment and its colonization of the human microbiome it has the potential to cause serious illness. (11-13, 16). There are several publications of Raoultella planticola infections in human from recent years (12-15).

R. ornithinolytica increases virulence by its ability to develop multi-drug-resistance that can cause severe complications especially in immunocompromised host. The bacterium is responsible of sepsis, peritonitis, arthritis, urinary tract and throat infection (14-16). Case of a HIV positive patient with a lung abscess caused by Raoultella ornithinolytica and treated with 4-week course of intravenous cefazolin is published in 2022 by Hinchcliffe et al. In 2023 Hassan and co-authors reported Raoultella ornithinolytica for the first time as an enteropathogen in ulcerative colitis flare (18). These bacteria are not only multi drug resistant but also ozone- resistant. According to Azuma et al. Raoultella ornithinolytica is isolated even after an 80-min exposure to ozone, in comparison to Escherichia coli and Klebsiella species, which are markedly susceptible to 20-min ozone exposure. Authors suggest that these ozone-resistant bacteria might play a pivotal role as antimicrobial resistance reservoirs in the environment (19).

Conclusions

The possibility of atypical organisms must be considered when managing chronic infective conjunctivitis. Conjunctival swabs should be obtained and topical treatment switched when initial empirical therapy fails. If necessary, systemic therapy should be considered.

R. ornithinolytica is considered a newly emerging life-threatening pathogen world-wide. It should be kept in mind that it can be the etiologic agent especially in immunocompromised and elderly patients. One of the most important issues is the multidrug resistant profile of these bacteria. For localized infections, ten to fourteen days of treatment with tigecycline, amoxicillin–clavulanic acid, levofloxacin, and cefmetazole are recommended in the literature. However, all of these drugs may fail in some cases and systemic treatment must be considered. Systemic therapy prevents spreading of the infection while topic therapy heals local district. Further studies have to be done to understand the entity of the diffusion of the bacteria and to avoid the development of multi-drug resistance.

Raoultella ornithinolytica must be taken into consideration as an emergent cause of human infection, also in case of conjunctivitis. Infection can be severe and can occur both in immunocompromised or immunocompetent host. Culture and sensitivity is mandatory to choose the proper therapy and avoid potential severe complications.

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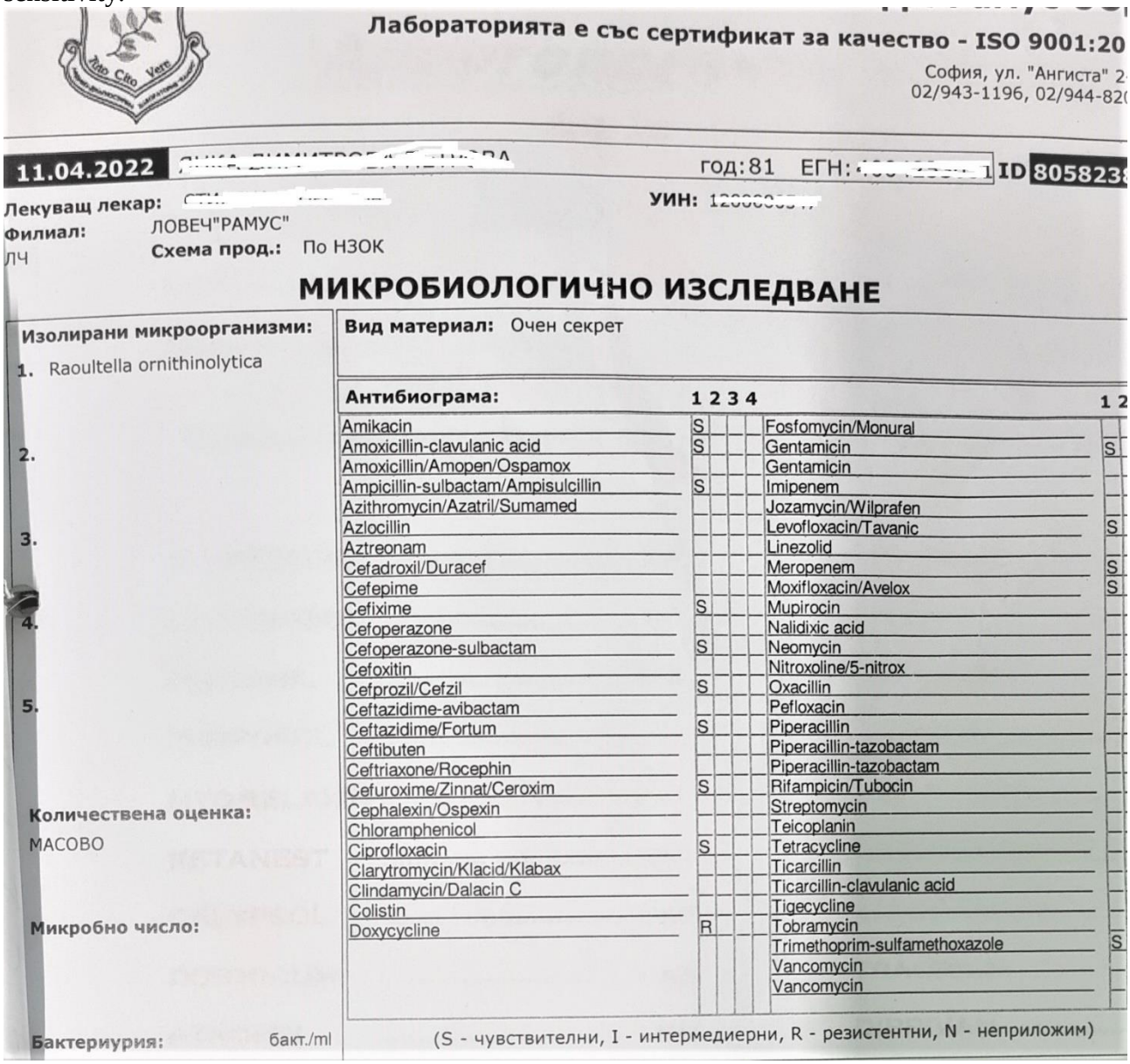
Figure legends

Figure 1. Isolated microorganism from conjunctival swab: Raoultella ornithinolytica. Antibiotic sensitivity.



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11.04.2022 [redacted] год:81 ЕГН: [redacted] ID 805823

Лекуващ лекар: [redacted] УИН: [redacted]

Филиал: ЛОВЕЧ"РАМУС"

ЛЧ Схема прод.: По НЗОК

МИКРОБИОЛОГИЧНО ИЗСЛЕДВАНЕ

Изолирани микроорганизми:

1. Raoultella ornithinolytica
2.
3.
4.
5.

Количествена оценка: МАСОВО

Микробно число:

Бактериурия: бакт./ml

Вид материал: Очен секрет

Антибиограма:	1	2	3	4
Amikacin	S			
Amoxicillin-clavulanic acid	S			
Amoxicillin/Amopen/Ospamox				
Ampicillin-sulbactam/Ampisulcillin	S			
Azithromycin/Azatril/Sumamed				
Azlocillin				
Aztreonam				
Cefadroxil/Duracef				
Cefepime				
Cefixime	S			
Cefoperazone				
Cefoperazone-sulbactam	S			
Cefoxitin				
Cefprozil/Cefzil	S			
Ceftazidime-avibactam				
Ceftazidime/Fortum	S			
Ceftibuten				
Ceftriaxone/Rocephin				
Cefuroxime/Zinnat/Ceroxim	S			
Cephalexin/Ospexin				
Chloramphenicol				
Ciprofloxacin	S			
Clarytromycin/Klacid/Klabax				
Clindamycin/Dalacin C				
Colistin				
Doxycycline	R			

Антибиограма:	1	2
Fosfomycin/Monural		
Gentamicin	S	
Gentamicin		
Imipenem		
Jozamycin/Wilprafen		
Levofloxacin/Tavanic	S	
Linezolid		
Meropenem	S	
Moxifloxacin/Avelox	S	
Mupirocin		
Nalidixic acid		
Neomycin		
Nitroxoline/5-nitrox		
Oxacillin		
Pefloxacin		
Piperacillin		
Piperacillin-tazobactam		
Piperacillin-tazobactam		
Rifampicin/Tubocin		
Streptomycin		
Teicoplanin		
Tetracycline		
Ticarcillin		
Ticarcillin-clavulanic acid		
Tigecycline		
Tobramycin		
Trimethoprim-sulfamethoxazole	S	
Vancomycin		
Vancomycin		

(S - чувствителни, I - интермедиерни, R - резистентни, N - неприложим)