EJMO

DOI: 10.14744/ejmo.2017.16878
EJMO 2017;1(3):168–171

Case Report

The 20th *Comamonas Testosteroni* Bacteremia Case in the Literature from Turkey: Mortal and Polymicrobial A Case Report and Literature Review

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Abstract

Comamonas testosteroni, previously known as *Pseudomonas testosteroni*, is a gram-negative, aerobic, motile, pink-pigmented, oxidase-positive bacilli. It rarely infects humans and commonly lives in environments such as soil, water, plants, and animals; however, it also survives for a long time in hospital environments. *C. testosteroni* infections are often treated in humans, and thus, mortality is rare. To date, among 19 cases of *C. testosteroni* bacteremia in the literature, only four died owing to underlying diseases. Here we present a case of a 68-year-old male patient with underlying pulmonary malignancy who was positive for *C. testosteroni* and *Staphylococcus haemolyticus* in the blood culture and *Acinetobacter baumannii* in the tracheal aspirate culture. The patient died on the 16th day, despite appropriate treatments against etiological agents. The patient is the 20th bacteremia and fifth mortal case among 38 cases with *C. testosteroni* infection in the medical literature.

Keywords: Comamonas testosteroni, mortal, polymicrobial

Cite This Article: *Yasayancan N, Inonu Koseoglu H. The 20th Comamonas Testosteroni Bacteremia Case in the Literature from Turkey: Mortal and Polymicrobial A Case Report and Literature Review. EJMO. 2017; 1(3): 168-171*

Comamonas testosteroni, previously known as *Pseudomonas testosteroni*, is a gram-negative, aerobic, motile, pink-pigmented, oxidase-positive bacilli. This organism is called "testosteroni" because it can grow on media containing testosterone as the sole carbon source.[1]

C. testosteroni rarely infects humans and commonly lives in environments such as soil, water, plants, and animals; however, it also survives for a long time in hospital environments.[2] It can be detected in humans as a pathogen in the respiratory, abdominal, urinary, cardiac, and central nervous system. The organism became clinically important after 1987, when it was isolated as an etiological agent in cases with pneumonia, meningitis, endocarditis, and peritonitis.

Because *C. testosteroni* infections are often treated in humans, mortality is rare. To date, among 19 cases with *C. testosteroni* bacteremia in the literature, only four died owing to underlying diseases (Table 1).

Most of the reported cases were susceptible to aminoglycoside, fluoroquinolone, carbapenem, piperacillin–tazobactam, most cephalosporins, and trimethoprim sulfamethoxazole.[3]

Here we present a case of a patient with underlying pulmonary malignancy who was positive for *C. testosteroni* and *Staphylococcus haemolyticus* in the blood culture and Acinetobacter baumannii in the tracheal aspirate culture who subsequently died.

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Submitted Date: August 13, 2017 **Accepted Date:** September 19, 2017 **Available Online Date:** September 28, 2017

Case Report

A 68-year-old male patient underwent bronchoscopic biopsy after thoracic CT at another center revealed a pulmonary mass and surrenal metastasis. The pathology was reported to be pulmonary epidermoid carcinoma, and the patient with complaints of increased dyspnea, cough, and sputum was admitted to our emergency department.

According to physical examination results, the general condition was moderate poor, trachynic, and tachycardic. According to auscultation, respiratory sounds were rough, locally rhonchus. Personal history revealed no new diagnostic features, except pulmonary malignancy. According to the family history, the patient's two brothers had pulmonary malignancy. Habit: active smoking, 30 packets/year.

The laboratory test results were as follows: pH, 7.32; pCO_2, 44.8 mmHg; pO_2, 52.4 mmHg (all three arterial blood gas parameters); $SatO_2$, 81.7%; HCO_3, 22.1 mmol/l; CRP, 298 (0–5); WBC, 13.3 10^3/mL (neutrophil, 76%); hemoglobin, 9.2 g/dl; and procalcitonin, 4.31 (0–0.05).

According to PA chest radiograph, there were right fullness, right pleural effusion, and consolidation in the right lower lobe (Fig. 1). Non-contrast thoracic CT revealed mediastinal conglomerate lymph nodes, consolidation in the right lower lobe and bilateral upper lobes, pleural effusion at 2 cm on the right side (Fig. 2).

The patient was hospitalized to the intensive care unit owing to pulmonary malignancy, surrenal metastasis, hypoxic respiratory insufficiency, and postobstructive pneumonia. After all cultures were taken, piperacillin–tazobactam and ciprofloxacin i.v. treatments were initiated. During the treatments, the patient had subfebril fever, increased infection

Table 1. Presented cases

Author	Age/sex	Site of infection	Predisposing factors	Polymicrobial	Antibiotic treatment	Outcome
Atkinson[4]	31/F	Blood	None	No	Kanamycin tetracycline	Cured
Smith[7]	89/M	Blood	Environmental exposure	No	levofloxacin	Cured
Le Moal[14]	75/F	Blood	CVC breast cancer	No	Ceftazidime gentamicin	Cured
Cooper[15]	49/M	Blood	Infective endocarditis	No	Cefepime, gentamicin then ampicillin	Cured
Abraham[16]	54/F	Blood	Esophageal cancer with metastases to lung Chemotherapy, CVC	No	Cefepime then ciprofloxacin	Cured
Orsini[8]	80/F	Blood	Morbidly obese, diabetes mellitus	*Staphylococcus aureus*	Ceftriaxone then nafcillin then cefazolin doripenem	Cured
Barbaro[9]	4/M	Blood	None reported	None reported	None reported	Cured
Barbaro[9]	28/M	Blood	None reported	None reported	None reported	Cured
Barbaro[9]	Newborn/F	Blood	Prematurity	*a-Hemolytic Streptococcus*	Ampicillin amikacin	Died
Gül[6]	22/M	Blood	Perforated appendicitis	None reported	cefazolin	Cured
Nseir[13]	64/F	Blood	diabetes mellitus, end-stage kidney disease	No	Vancomycin rocephin then ciprofloxacin gentamycin	Died
Tsui[10]	54/M	Blood	Cellulite	No	Oxacillin then ciprofloxacin	Cured
Tsui[10]	73/M	Blood	Hepatocellular carcinoma	*Acinetobacter baumannii*	Cefmetazon gentamicin then levofloxacin	Cured
Farshad[17]	10/M	Blood	Medulloblastoma	No	Ciprofloxacin amikacin	Cured
Farshad[17]	19/F	Blood	Osteosarcoma	No	Vancomycin imipenem ciprofloxacin	Cured
Swain[12]	50/F	Blood	Chronic renal disease, gluteal abscess	No	Piperacillin–tazobactam then cefoperazone-sulbactam	Died
Opota[11]	33/M	Blood	Chronic hepatitis C, chronic alcoholism,	*Streptococcus parasanguis*, *Ralstonia pickettii*	Cefepime vancomycinthen moxifloxacin drugaddiction	Not reported
Katırcıoğlu[18]	83/M	Blood	Old age, SVD	No	Piperacillin–tazobactam, amikacin	Cured
Pekintürk[19]	62/M	Blood	Diabetes mellitus, SVD	No	died before the treatment	Died
Present case	68/M	Blood	Lung cancer, adrenal metastasis	*Acinetobacter baumannii* *Staphylococcus haemolyticus*	Piperacillin–tazobactam ciprofloxacin then cefepime teicoplanin then tigecycline colistin	Died

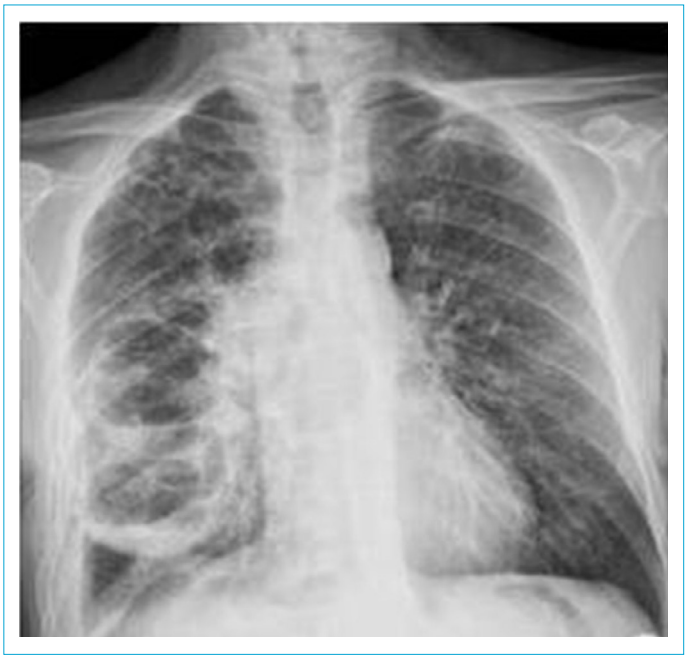

Figure 1. PA chest radiograph.

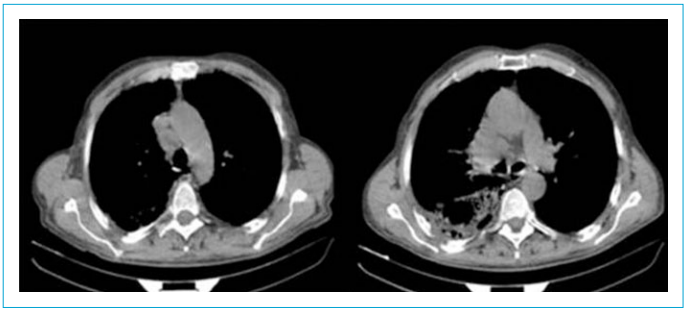

Figure 2. Non-contrast CT: Right paratracheal 25 × 33-mm conglomerate lymph node and diffuse consolidation with air bronchograms in the lower right lobe.

parameters, and increased radiological consolidation; *C. testosteroni* was detected in the first blood cultures during admission. According to an antibiogram, *C. testosteroni* was resistant to piperacillin–tazobactam, imipenem, meropenem, and gentamycin and susceptible to colistin, levofloxacin, tigecycline, and cefepime. The antibiotic treatment was changed to cefepime and teicoplanin.

On the seventh day of follow-up, *A. baumannii* was detected in the tracheal aspirate culture. According to an antibiogram, *A. baumannii* was resistant to piperacillin–tazobactam, meropenem, imipenem, cefepime, and ciprofloxacin and susceptible to colistin and tigecycline. The current antibiotic treatment was discontinued, and tigecycline and colistin were initiated. Finally, *S. haemolyticus* was detected in the blood culture after 4 days, and according to the antibiogram, it was resistant to gentamycin, methicillin, and ciprofloxacin and susceptible to vancomycin, linezolid, and teicoplanin. New left-sided infiltrations were identified in chest radiography (Fig. 3).

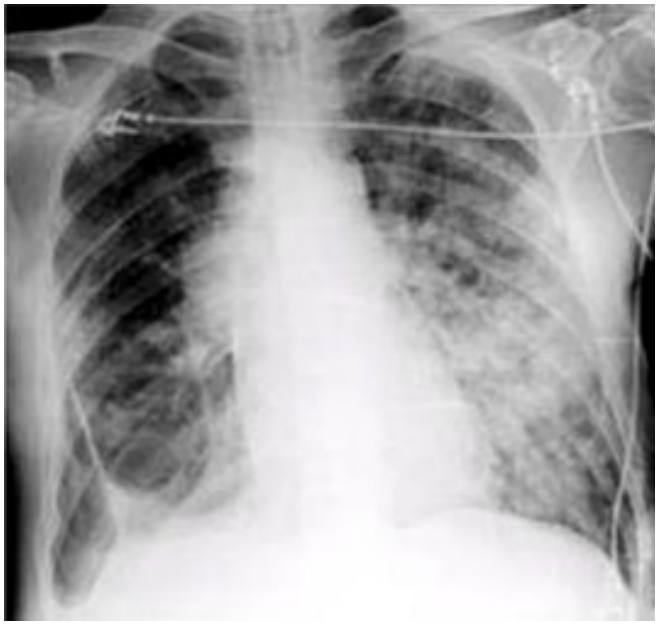

Figure 3. PA chest radiograph on the 16th day when patient died.

The patient died on the 16th day, despite appropriate treatments against etiological agents.

Discussion

C. testosteroni infection was first reported by Atkinson et al.[4] So far, *C. testosteroni* has been isolated as an infectious agent in blood and peritoneal fluid, as well as in cerebrospinal fluid, abdominal abscess, urine, cord, appendix, and different other tissues. The predisposing factors for *C. testosteroni* bacteremia were generally immunosuppressive conditions such as underlying malignancy, chronic liver disease, end-stage renal disease requiring hemodialysis, diabetes, and older age.

In the medical literature, our case is the 20th bacteremia one among 38 cases with *C. testosteroni* infection.

C. testosteroni infections rarely result in mortality and usually respond well to antibiotics. Most of the reported cases were susceptible to aminoglycosides, fluoroquinolones, carbapenems, piperacillin–tazobactam, most cephalosporins, and trimethoprim-sulfamethoxazole.[3] However, cases of *C. testosteroni* resistant to aminoglycosides and those resistant to aminoglycosides, carbapenems, and piperacillin–tazobactam have been reported in 2009 and 2015, respectively.[5]

In line with the literature, the antibiogram of our case re-

vealed that *C. testosteroni* was resistant to piperacillin–tazobactam (MIC, >128 µg/mL), imipenem (MIC, >16 µg/mL), meropenem (MIC, >16 µg/mL), and gentamycin (MIC, >16 µg/mL) and susceptible to colistin, levofloxacin, tigecycline, and cefepime.

All cases, except those reported by Gül[6] and Smith[7], received more than one antibiotic treatment. Two cases that received a single antibiotic were cured.

Only four cases were reported as polymicrobial by Orsini [8], Barbaro[9], Tsui[10], and Opota[11], and only Barbaro's newborn case with *Streptococcus-positive* culture died. In the case by Opota et al., *Streptococcus parasanguis* and *Ralstonia pickettii* were identified along with *C. testosteroni* bacteremia[11]. Orsini et al. reported that their case was the first bacteremia case with *C. testosteroni* and *S. aureus*[8]. In the literature, our case is the second case with both the organisms and is the first case to also have *A. baumannii* in the tracheal aspirate culture.

The patients of Swain[12], Barbaro[9], and Nseir[13] died, despite polyantibiotic therapy, which were the same as our case. We suggest that mortality was associated with underlying malignancy and a polymicrobial condition.

We present our case with this rare pathogen because it is essential for clinicians as it is the first mortal case with three pathogens. It should be noted that the microorganism may gain antibiotic resistance over years and the resistance profile may change. Further studies investigating the pathogenicity, virulence, and antibiotic resistance of bacteria are warranted.

Disclosures

Informed Consent: Written informed consent was obtained from the patient who participated in this study.

Peer-review: Externally peer-reviewed.

Conflict of Interest: None declared.

Authorship contributions: Concept – N.Y.; Design – N.Y.; Supervision – N.Y.; Materials – N.Y., H.I.K.; Data collection &/or processing – H.I.K.; Analysis and/or interpretation – N.Y.; Literature search – H.I.K.; Writing – N.Y.; Critical review – N.Y.

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