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Infective Endocarditis Caused by *Klebsiella Oxytoca* in a Patient with Hemodialysis: A CARE-Compliant Case Report and Review of the Literature

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Abstract

The rarity of endocarditis due to *Klebsiella* species limits its recognition. We report the case of a 63-year-old man, known to have a tight calcified aortic stenosis presenting with acute heart failure associated with high fever. *Klebsiella oxytoca* endocarditis was diagnosed based on three sets of positive blood cultures together with fluttering vegetation (11 mm × 14 mm) on the middle segment of the anterior leaflet of the mitral valve. After 6 weeks of intravenous ceftriaxone and gentamicin bi-therapy, the patient had completely recovered. This case illustrates how sporadic this condition is, for which early assessment and proper treatment are crucial to enhance the short outcomes.

Keywords: Case report, Infective endocarditis, *Klebsiella oxytoca*

Introduction

Gram-negative bacilli other than the *HACEK* group are responsible for only about 1.8% of infective endocarditis (IE) [1,2]. Of these, more than half are due to *Escherichia coli* or *Pseudomonas aeruginosa*, while only 10% are due to *Klebsiella species* [1,2]. *Klebsiella oxytoca* endocarditis is scarce. We described a clinical case of *K. oxytoca* endocarditis, the clinical status, and the outcome during the entire course of therapy.

Observation

A 63-year-old man, known to have a tight calcified aortic stenosis, was presented to our department with dyspnea with a 2-day fever at 39 °C. The patient was a former heavy smoker and suffered from dyslipidemia and high blood pressure. He had no history of drug use, chronic catheter nor intra-

cardiac device use. Noteworthy, medical history consisted of a vascular stenting of the left iliac artery, amputation of the lower left limb following critical ischemia, and end-stage renal disease (ESRD) at the hemodialysis stage. On admission, his blood pressure was 110/66 mmHg, heart rate, 110 beats/minute, respiratory rate of 22 breaths/minute, body temperature at 36.7 ° C. The cardiovascular examination showed a sharp systolic murmur at the aortic area with a perceived aortic B2 and a diastolic murmur at the mitral area. Pleuropulmonary auscultation showed basithoracic crackles. The remainder of the examination did not indicate splenomegaly, hepatomegaly, Janway erythema, false osier paronychia, or Roth's spots. His electrocardiogram was recorded as sinus tachycardia at 100 bpm, with left ventricular hypertrophy and secondary repolarization disorders (negative T waves on the apico lateral territory), with no conduction disorders. His chest X-ray showed cardiomegaly with pulmonary edema. Trans-thoracic ultrasound with trans-esophageal echocardiography

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Fig. 1. Trans-esophageal echocardiography showing vegetation on the auricular slope of the large mitral valve measuring 11/14 mm.

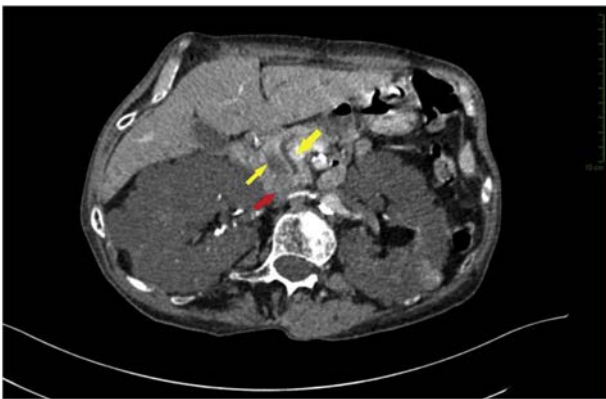


Fig. 2. An axial CT image showing a lesion of the pancreatic head with double-duct sign.

supplement found a paradoxical low flow/low gradient severe aortic stenosis (1 cm² area, the mean gradient at 29 mmHg and maximum velocity at 3 m/s), associated with moderate mitral stenosis (surface at 2.2 cm², the average gradient at 3mmhg), with 11/14 mm mobile vegetation at the expense on the middle segment of the anterior leaflet (Fig. 1).

The laboratory investigations revealed an elevated C-reactive protein of 309 mg/L, a first-hour sedimentation rate (ESR) at 19 mm and three blood cultures were positive for *Klebsiella oxytoca*. The strain was sensitive to ceftriaxone and gentamicin. It was resistant to amoxicillin. The patient was initially treated empirically with intra-venous ceftriaxone (2 g/j) and gentamicin adapted to the renal function (80 mg/j), for 6 weeks. On complete imaging workup, a CT scan with contrast did not detect any other septic or embolic location. Of note, abdominal CT showed a common bile duct dilatation with a 178 mm lesion on the head of the pancreas “most likely cystic in nature” (Fig. 2). The fundoscopy examination was normal. Regarding the

microbiological and radiological features, we assumed that IE was related to the biliary infection or the constant manipulation of the arteriovenous fistula; ruling out other port of entry (urinary, oral and pulmonary). Initial clinical stabilization after having an emergency hemodialysis session and an empiric antibiotic adapted to the germ with a progressive decrease in CRP to 50 mg/L and the follow-up echocardiogram was identical. Initial antibiotic therapy was maintained with a good clinical, biological and echocardiographic course (apyrexia with CRP rebound at 22 mg/L and regression of the size of the vegetation). He underwent another transthoracic echocardiogram 4 weeks after his discharge from the hospital and revealed a decrease in the vegetation size. His new set of blood cultures was negative. Unfortunately, the patient was lost to follow-up.

Discussion

Klebsiella oxytoca endocarditis is extremely rare. Only 10 other cases have been reported in the literature (Table 1) [3–12]. They are usually found in immunocompromised patients, with a biliary, urinary, cutaneous, and sometimes peritoneal portal [5], and associated with high morbidity and mortality compared to other gram-negative bacillus endocarditis [13]. A prospective study conducted in 2007 by Morpeth et al. reported that inter-hospital mortality was 24% in patients with non-HACEK gram-negative organisms compared to 17% in endocarditis infection caused by other organisms [2]. In comparison, with *Klebsiella pneumoniae* endocarditis, *Klebsiella oxytoca* responds better to antibiotic treatment alone [3,5,7,11]. The diagnosis of infectious endocarditis is based on the modified Duke criteria [14,15]. In our patient, we have retained the diagnosis in the presence of two major criteria (3 positive blood cultures and vegetation on the mitral valve) and three minor criteria (predisposition to severe aortic stenosis and chronic hemodialysis), fever at 39 °C, and inflammatory syndrome).

Medical treatment of *Klebsiella oxytoca* endocarditis requires aggressive antibiotic therapy for usually 6 weeks [5]. Third-generation cephalosporins and aminoglycosides are often used in combination [5]. In our case, antibiotic therapy was maintained for 6 weeks with good clinical, biological and echocardiographic response. The mortality rate associated with *Klebsiella oxytoca* endocarditis has not been established, however, out of 10 published cases, there were three reported deaths [7,9,10]. This case highlights that physicians should search for

Table 1. Previously reported cases of infective endocarditis due to *Klebsiella oxytoca*.

Author/Year	Age/ gender	Presentation	Mode of entry	Treatments
Watanakunakorn, 1985 [3]	87 M	UTI, bacteremia, IE After	transurethral resection of the prostate	Cefazolin, Tobramycin
Repiso et al. 2001 [4]	33 M	Bacteremia, IE (BP PV)	Intravenous drug user	Cefotaxime, Gentamicin
Chen et al. 2006 [5]	71 F	Bacteremia, IE (MV)	Community acquired, unknown mode of entry	Cefazolin
de Escalante et al. 2007 [6]	75 M	Bacteremia, IE (AV)	Following AAA repair	Imipenem, Gentamicin
López et al. 2009 [7]	58 M	Bacteremia, IE (MV; TV)	Hemodialysis through a permanent right jugular catheter.	Vancomycin Gentamicin
Duggal et al. 2012 [8]	66 M	Bacteremia, IE (BP AV)	unknown mode of Community acquired, entry	Ceftriaxone, Gentamicin
Geisenberger et al. 2015 [9]	38 M	Right-sided subdural hematoma, sepsis, death, autopsy, IE (AV)	Intravenous drug user	None
S.Ullah et al. 2016 [10]	76 M	Bacteremia, septic embolism, IE (AV)	acute cholangitis and cholecystitis	Vancomycin And Zosyn
Ashref et al. 2016 [11]	24 M	Bacteremia, IE (MV)	Intravenous drug user	Vancomycin And Meropenem
Hauser et al. 2017 [12]	37 M	Bacteremia, IE (AV)	Intravenous drug user	Vancomycin ceftriaxone and levofloxacin
Our case	63 M	Bacteremia, IE (MV)	Hemodialysis through an AVF or biliary infection	Ceftriaxone, Gentamicin

AbbreviationsAAA: abdominal aortic aneurysm; AV: aortic valve; BP: bio prosthetic; IE: infective endocarditis; MV: mitral valve; PV: pulmonary valve; TV: tricuspid valve; AVF: arteriovenous fistula, UTI: urinary tract infection.

Klebsiella oxytoca within the patients presenting endocarditis infection especially if they present an immunodeficiency status. Even if it is a rare subspecies that can cause endocarditis, it is usually associated with a poor outcome. An early assessment and the use of appropriate intravenous antibiotics may be effective for the complete resolution of the infection in these patients.

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Author Contribution

EL OUAFI NOHA: Conception, Supervision, Analysis and/or interpretation, Critical review.

AISSAOUI HANANE: Conception, Fundings, Materials, Data collection and/or processing, Analysis and/or interpretation, Literature review, Writer, critical review.

HDIDOU YOUSSEF: Design, Data collection and/or processing, Analysis and/or interpretation, Literature review, Writer, Critical review.

BOUGRINE RAMIA: Materials, Critical review.

NABILA ISMAILI: Critical review.

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