

Case Report

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Case report: Klebsiella oxytoca aortitis

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Abstract

Background: Aortitis is the inflammation of the aorta wall secondary to infectious and non-infectious etiologies. It is a rare but potentially life-threatening condition.

Case Presentation: A 86-year-old diabetic male patient, treated by metformin, was admitted to the Intensive Care Unit (ICU) for septic-cardiogenic shock, acute kidney injury, severe hyperkalemia and lactic acidosis. He was administered systemic antibiotics with cefotaxime and aminoglycosides, fluid resuscitation, vasopressor therapy and hemodialysis. A transthoracic echocardiography showed a pericardial effusion with cardiac tamponade. Pericardial drainage was performed in emergency at the bedside resulting in hemodynamic improvement. A chest angio-CT scan showed a false aneurysm of the horizontal aorta and a periaortic collection containing bubbles with peripheral enhancement. Cardiovascular surgery and endovascular aortic stenting were not carried out because of the patient's frailty, advanced age and patient's will for end-of-life care. Pericardial fluid culture yielded wild type Klebsiella oxytoca. Systemic antibiotics were continued.

Conclusion: We reported a septic-cardiogenic shock associated with cardiac tamponade and infected aortitis with mycotic aneurysm due to klebsiella Oxytoca. The CT imaging and cultures are the cornerstone of diagnosis. Antibiotic therapy and surgery are crucial and must be discussed to improve the very poor prognostic of the patients.

Keywords: Aortitis; Klebsiella; Intensive care; Case report.

Introduction

Aortitis is the inflammation of the aorta wall secondary to infectious and non-infectious etiologies. It is a rare but potentially life-threatening condition, but its actual incidence may be underestimated. Infectious aortitis may be localized to isolated aortic segments but may involve the entire length of the vessel. It is more common among older patients with preexisting comorbidity, clinical presentation is often unspecific depending on the site of the infection, sepsis severity, aneurysm evolution and rupture. Early diagnosis and prompt management is mandatory to prevent fatal outcome. We present the case of an el-

derly patient admitted to the hospital with a septic and cardiogenic shock associated with cardiac tamponade, and infected aortitis with mycotic aneurysm with documented infection with Klebsiella oxytoca. To our knowledge, such a clinical presentation has been previously reported but not with K. Oxytoca pericarditis associated with infectious aortitis.

Case presentation

A 86 years old patient with history of diabetes mellitus type II, benign hypertrophy of prostate, treated with metformin, visited the general practitioner for asthenia, lethargy and anorexia

of few days duration without fever, associated with hypotension 90/60 mmHg. Azithromycin was prescribed by GP for possible bronchitis with bacterial superinfection. Blood laboratory tests revealed a leukocytosis (14 G), elevated serum values of proBNP 1875 µg/l and of troponin 22 ng/l, and other laboratory data were unremarkable. Two days later, the patient was referred to the emergency department because of a systolic blood pressure of 60 mmHg. At hospital admission, physical examination showed hypotension: 70/45 mmHg, hypothermia (35.6°C); heart rate was 75 bpm; respiratory rate, 27 /min; coma Glasgow scale, 15. He presented mottling of the knees, cold extremities, jugular turgescence, muffled heart sounds; but a bilateral and symmetrical vesicular murmur. The electrocardiogram was in sinus rhythm with ST elevation in lateral leads V4-V5-V6 and lead II. The transthoracic echocardiography showed a pericardial effusion of 18 mm without signs of tamponade. Blood results showed severe lactic acidosis, hyperkalemia and acute kidney injury (Table 1). Crystalloids were given and the patient transferred to the intensive care unit. Upon admission, fluid resuscitation was continued, cefotaxime, spiramycin, gentamycin, vasopressors administered, and amiodarone begun for new onset atrial fibrillation. A hemodialysis session was started. Because of worsening of the shock, transthoracic echocardiography was performed and displayed large pericardial effusion, right ventricular collapse, and paradoxical septum motion. Bedside echo-guided paracentesis was performed in emergency; 250 cc of pericardial purulent fluid were removed resulting in a significant hemodynamic improvement. A pericardial drain was left in place. The sinus rhythm was restored. Next day, a chest angio-CT scan was performed and showed a bulky false aneurysm of horizontal aorta (25 mm) (Figure 1a), and a periaortic collection, measuring 65 mm, containing bubbles with peripheral enhancement (Figure 1b). Cardiovascular surgery and endovascular aortic stenting were not carried out because of the patient's frailty, elderly age, and expressed wishes. Pericardial fluid, but also urinary cultures yielded wild type *K. oxytoca*. Spiramycine and gentamycin were stopped, and antibiotics switched to cefotaxime and ofloxacin. A week after, the patient was transferred to the infectious disease department, and three weeks later home discharged in accordance with his end-of-life decisions. Antimicrobial therapy was changed for sulfamethoxazole/trimethoprim and ofloxacin based on antibiogram susceptibilities. He ultimately died at home 7 days later.

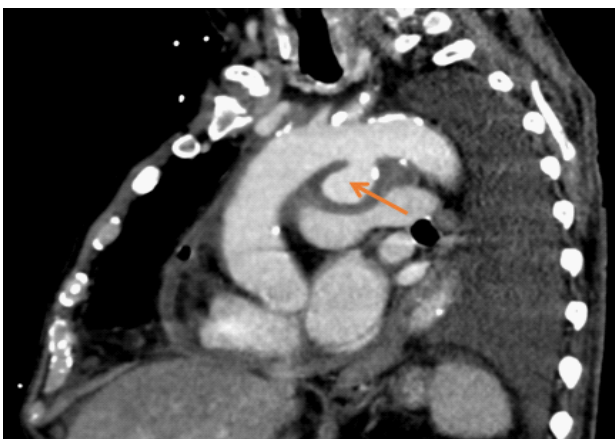


Figure 1a: Angio-CT, sagittal oblique view showing a false aneurysm (mycotic aneurysm) located at the horizontal aorta with eccentric development (red arrow).

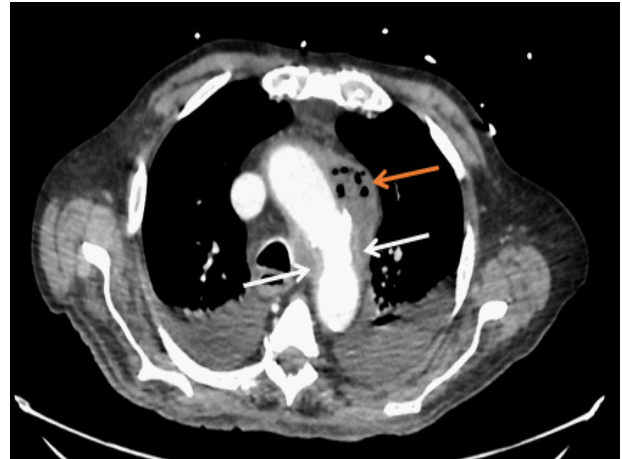


Figure 1b: Angio-CT showing periaortic collection (white arrows) with bubbles (red arrow).

Table 1: Main laboratory features on emergency department admission.

Lab	Value	Reference range
WBC	15.8	4.00-10.00 giga/L
Hb	9.9	13.0-16.5 g/dl
Ht	29.7	36.2-49.0 %
MCV	76.5	79.0-97.7 fl
Platelets	161	150-400 giga/L
INR	2.7	
PTT	36	Seconds
Fibrinogen	6.7	2.0-4.0 g/l
DDimer	3991	<500 ng/mL (FEU)
Sodium	126	136-145 mmol/L
Potassium	5.3	3.5-5.1 mmol/L
Chloride	90	98-107 mmol/L
Bicarbonate	11	21-32 mmol/L
Anion gap	30	12-16 mmol/L
Phosphorus	3.32	0.81-1.58 mmol/L
Creatininemia	287	µmol/L
CRP	281	<3 mg/L
Procalcitonin	3.53	Severe bacterial infection, sepsis:>2 µg/L
SGOT/SGPT	7131/3263	15-37/ 16-61 U/L
Lactate	11.6	<1.3 mmol/L
Pro-BNP	1875	ng/l
Troponin	22	µg/l

WBC: White Blood Cell; Hb: Hemoglobin; Ht: Hematocrit; MCV: Mean corpuscular Volume; INR: International Normalized Ratio; PTT: Partial thromboplastin Time.

Discussion

We reported the first case of infective aortitis with pericarditis due to *K. oxytoca*.

There are many bacteria implicated in infective aortitis. The most prevalent are gram positive cocci including *Staphylococcus* and *Streptococcus*. Aortitis secondary to *Enterococcus* species are most of the time diagnose in the setting of endocarditis. *Salmonella*-associated aortitis is also commonly seen in individuals with *Salmonella enterica* serotype Typhi infection, particularly in endemic regions [1]. Less frequently, other gram-negative

bacteria, such as *Escherichia coli*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa* can also cause infective aortitis, often observed in individuals with risk factors like intravenous drug use or indwelling catheters. Cases of infective aortitis due to *P. aeruginosa* were commonly reported in hospitalized patients, post cardiothoracic surgery, immunocompromised patients, and donor derived infection with heart transplant.

Our patient exhibited positive cultures in pericardial fluid and urine returned positive for *K. oxytoca*, making the first reported case of infected aortitis due to *K. oxytoca*.

K. Oxytoca, a member of the Enterobacteriaceae family, is known for causing a wide range of infections in humans, with the respiratory and urinary tracts being the most common sites of infection [2].

K. Oxytoca is far less prevalent than *K. pneumoniae* and represent less than 5% of the isolate of *Klebsiella* genus. [3]. *K. Oxytoca* is an ubiquitous, facultatively anaerobic, Gram-negative bacillus, routinely distinguished from *K. pneumoniae* by its production of indole. In humans, *K. Oxytoca* colonizes mucosa membranes, particularly the gastrointestinal tract. *K. Oxytoca* produces naturally chromosomal β -lactamases, which confer resistance to penicillins. It can acquire several types of resistance, including production of Extended-Spectrum β -Lactamases (ESBLs), AmpC lactamases, *Klebsiella Pneumoniae Carbapenemase* (KPC) and aminoglycosides-modifying enzymes. *K. oxytoca* can therefore be challenging to treat [4].

K. Oxytoca is associated with virulent factors including tilivaline and kleboxymycin, that play roles as cytotoxins.

K. Oxytoca is a human commensal but also an opportunistic pathogen causing various infections [4]. They can occur in immunocompromised and debilitated ICU patients. Many of them are polymicrobial, hospital-associated and several neonatal and Intensive Care Unit (ICU) outbreaks have been reported [5]. *K. Oxytoca* has been reported a causative organism of antibiotic-associated hemorrhagic colitis [6,8], and more recently, to cause a wide spectrum of severe diseases such as pneumonia, urinary tract infection, soft tissue infection, and septicemia [9]. For instance, *K. Oxytoca* have been reported as an organism causing pleural infection [10], sepsis with myocardial failure leading to driving to extracorporeal membrane oxygenation [11], liver abscess [12] and acute infectious purpura fulminans [13].

In our patient *K. oxytoca* aortitis was due to a wild strain.

While bacteria are commonly linked to infective aortitis, fungal and atypical bacterial species can also contribute. Antibiotic therapy choice depends on the identified pathogen and its susceptibility. Timely diagnosis and appropriate treatment are crucial to prevent complications and improve patient outcomes.

Various risk factors, such as intravenous drug use, aortic surgery, structural anomalies, and immunocompromised status, increase the likelihood of infective aortitis [14]. In our case, an elderly patient with insulin-dependent diabetes and untreated urinary tract infection developed septicemia and aortitis.

We did a literature review for myopericarditis associated aortitis, and found that the majority of the reported cases are due to systematic inflammatory diseases (non-infectious etiology) except for few cases reported, we mention two of them, the first was the case of 42 year old patient with history of untreated HIV, advanced liver cirrhosis due to chronic hepatitis C infection diagnosed with purulent pericarditis and false aneurysm

of ascending aorta with positive blood cultures for methicillin susceptible *Staphylococcus aureus*. The patient underwent a surgical replacement of ascending aorta with antibiotics coverage for 6 weeks post-op and was discharged home [15].

The second case was a 79 year old woman on chemotherapy for lung cancer presented with abdominal pain and diarrhea with positive blood cultures positive for *Campylobacter fetus*. Positron emission tomography was performed and revealed focal hypermetabolism of aortic arch and left ventricle bases with unremarkable echocardiography and cardiac enzymes. The patient underwent surgical repair for rapidly growing aortic aneurysm and antibiotics for 6 weeks, with follow up positron emission tomography scan after 5 months showing no signs of active infection [16].

Management options for infective aortitis include endovascular repair and open surgical procedures, depending on infection extent, complications, patient health, and physician expertise. Endovascular repair offers a less invasive option for select cases, while open surgery is often necessary for extensive infections. In our patient, due to a high surgical risk, a decision was made to transition to comfort care after discussion with the patient and family.

Conclusion

We present a case of aortitis attributed to *K. Oxytoca*. *K. Oxytoca* is an emerging virulent pathogen often encountered in Intensive Care Unit (ICU) patients, exhibiting various acquired mechanisms of resistance that can complicate its treatment. Aortitis may manifest with nonspecific clinical symptoms and poses a life-threatening condition. Immediate diagnostic work-up, including laboratory investigations, cultures, and, notably, CT imaging, is essential for diagnosing, localizing, and assessing the characteristics of aneurysms, as well as monitoring treatment efficacy.

Once infectious aortitis is identified, prompt initiation of antibiotic therapy and consideration of surgical intervention are crucial. Despite early diagnosis and intervention, the mortality rate remains elevated. Interdisciplinary collaboration plays a pivotal role in the early detection and personalized selection of treatment modalities, providing valuable insights into the patient's prognosis.

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