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Sphingobacterium thalpophilum infection in a patient with Necrotizing Pancreatitis: A Case Report

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Abstract

Sphingobacterium Thalophilum is a very rare, aerobic, gram-negative bacilli which was isolated from a blood sample of a 36 years old male with necrotizing pancreatitis and DVT. The patient was treated with three different types of antibiotics: Meropenem, Metronidazole and Tigecycline as dictated by the antibiotic sensitivity testing. Unfortunately, the patient's condition deteriorated and had to be admitted to the ICU and transferred to a tertiary care unit. *S. thalpophilum* while uncommon to be isolated from human specimens; infections with this microorganism can be fatal according to literature. There are very few reports of infection with *S. thalpophilum* worldwide and this is the first reported case in the United Arab Emirates.

Keywords: *Sphingobacterium thalpophilum*, Necrotizing pancreatitis, Bacteremia, DVT, UAE

1. Introduction

Sphingobacterium thalpophilum previously known as *Flavobacterium thalpophilum* is a bacteria which belongs to the genus *Sphingobacterium*. It is a gram negative, nonmotile, rod shaped bacteria [1]. The main characteristic of this genus is the high content of sphingophospholipids present in their cell membrane. There have been 15 species identified in this genus so far, including *S. anhuiense*, *S. antarcticus*, *S. bambusae*, *S. canadense*, *S. composti*, *S. daejeonense*, *S. faecium*, *S. heparinum*, *S. kitahiroshimense*, *S. multivorum*, *S. piscium*, *S. shayense*, *S.*

siyangense, *S. spiritivorum*, and *S. thalpophilum* [2, 3]. Although they can be commonly found in the environment [4]; there are only very few reports worldwide of isolating the bacteria from human clinical specimens. *S. multivorum* and *S. spiritivorum* were mainly reported to be associated with cases of bacteremia and respiratory tract infections [5, 6]. However, to our knowledge, infection with *S. thalpophilum* is much less frequently established in human hosts. We report here a case of a 36 year old previously healthy male who presented with necrotizing pancreatitis along with bacteremia caused by *S. thalpophilum*.

2. Case presentation

A 36 year old morbidly obese man with a past medical history of acute pancreatitis, acute kidney injury, left pleural effusion, pancreatic pseudocyst, acute lung injury and multiple organ failure was admitted to the hospital with a complaint of pain and swelling in his right lower extremity of acute onset. The patient has had severe pain in his left lower extremity 6 days prior to admission which then became swollen after 4 days. On further questioning, the patient denied any history of trauma, shortness of breath, or chest pain. However, he has done a procedure recently to drain a pancreatic pseudocyst whereas mobilization was ensured post operatively.

Physical examination on the day of admission revealed normal vital signs. The patient was alert and oriented to person, place, and time, was not in distress, and was not dyspneic. His chest was clear with bilateral air entry. Abdominal exam was not significant at that time. The left leg was swollen in comparison to the right, painful to touch, but there was no redness and peripheral pulses were intact.

An initial complete blood cell count showed the following results: hemoglobin 11.0 g/dL; white blood cell counts (WBC) 15.20 K/mm³ (neutrophils, 77.8%); platelet counts 698.00 K/mm³; coagulation profile: PT 17.80, PTT 42.7, INR 1.59 and D-dimer 8.24.

Ultrasound venous duplex of the left lower limb revealed that the femoral vein and left popliteal vein were occluded by an echogenic thrombus, they were non-compressible, and showed no flow on color doppler. The patient was diagnosed with left deep venous thrombosis (DVT) and was admitted and treated with Enoxaparin 100 mg SC. The patient has also received empiric antibiotic therapy with Meropenem 1000 mg IV.

After admission, the patient started to complain of abdominal pain and vomiting, became distressed, and was tachycardic. On physical examination, breath sound decreased bilaterally. The abdomen was distended, tense with generalized tenderness and bowel sounds were not audible. The patient's lab results were deteriorating as WBC increased to 29.33 K/mm³ and CRP to 291.0. An ultrasound of the abdomen showed pelvic abdominal fluid collection and ascites with turbid fluid.

Due to the patient's renal impairment condition, a CT abdomen without contrast was conducted which demonstrated bilateral moderate pleural effusion, with bilateral lungs lower lobe consolidation, along with an appreciable amount of loculated fluid seen distending the abdomen-pelvic cavity (anterior peritoneal, right-left paracolic, and pelvic suprapubic regions).

The patient developed acute kidney injury, necrotizing pancreatitis with third space shifting and ascites. The presence of the intra-abdominal focus of infected mesenteric

fat and gas-filled abscess led to the development of bacteremia.

The blood sample that was collected from the patient showed gram-negative rods on blood culture which were identified as *Sphingobacterium thalpophilum*. Antibiotic sensitivity was done and is portrayed in Table 1. Accordingly, 2 other antibiotics were added besides meropenem (1000 mg IV q12hr) which were metronidazole (100 ml IVq8hr) and tigecycline (50 mg IV q12hr).

Table 1: Antibiotic sensitivity testing

Drug	<i>Sphingobacterium thalpophilum</i>	
	MIC interpreting	MIC Dilution
Cefepime	S	<=1
Ceftriaxone	S	2
Chloramphenicol	I	16
Levofloxacin	S	<=0.12
Meropenem	S	<=0.25
Minocycline	S	<=1
Piperacillin	S	<=4
Tetracycline	S	2
Tigecycline	S	<=0.5

The patient's condition was deteriorating and he developed hematemesis and hypovolemic shock. In addition to that, his SOFA score was 7 which predicts a mortality risk of 33% and his hemoglobin dropped to 7.4 g/dL. After receiving 2 units of RBCs he was shifted to the ICU where he was intubated and mechanically ventilated with noradrenaline support. A timeline of the patient's condition is portrayed in Figure 1.

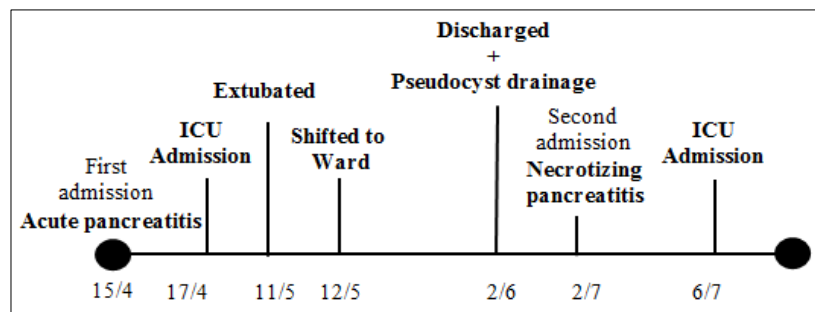


Fig 1: Timeline of the patient's condition.

The physician discussed the case with the family and agreed on the importance of transferring the case to a tertiary care unit as to provide better care under the supervision of a specialized multidisciplinary team since the current hospital is a secondary care unit. As such the patient was transferred to Cleveland Clinic in Abu Dhabi, United Arab Emirates.

3. Discussion

The bacteria *Sphingobacterium thalpophilum* isolated in this case was first identified in 1983 as *Flavobacterium thalpophilum*. It was characterized as an aerobic, rod shaped, non-motile, gram negative bacteria. It is also capable of oxidizing glucose and reducing nitrate. Moreover, it has the ability to produce acid from adonitol which is unique to this *thalpophilum* species only whereas other species are not capable of doing so [1]. *Sphingobacterium* microorganisms can be usually found in water sources, plants and soils but are rarely isolated from human specimens(7). Since these bacteria have low

virulence, they do not usually cause infections in immunocompetent human hosts, however they can cause a variety of symptoms in the immunocompromised [8, 9].

Few cases of bacteremia have been associated with *S. multivorum* and *S. spiritvorum* in the recent years [8, 9]. In some cases, the presence of underlying diseases such as diabetes were thought to play a pivotal role in the infection process. However, other reports suggested that these bacteria can also cause infections in immunocompetent hosts [6]. Upon further review of literature, it was found that *S. thalpophilum* can also be associated with bacteremia as reported in the United States [10].

The patient in this case suffered from multiple attacks of acute pancreatitis and was admitted to the ICU due to multiorgan failure over the course of few months. This could be the contributing factor that led to the infection with an opportunistic pathogen such as *S. thalpophilum*.

Since infections with *Sphingobacterium* are not common, the treatment depends on the antimicrobial susceptibility provided by the lab. In this case, *S. thalophilum* was shown to be sensitive to the various common antibiotics including Cefepime, Piperacillin, Tetracycline and Levofloxacin with Levofloxacin being the most effective due to having the lowest minimum inhibitory concentration. This result goes along with the case reported in the United States where the patient was treated with Piperacillin-Tazobactam empirically leading to recovery in 5 days of treatment [10].

This is the first reported case of infection with *S. thalophilum* in the United Arab Emirates up to our knowledge. Which makes this report a unique addition to the limited available literature about human infections due to the *Sphingobacterium* genus and a possible contribution to the management protocols of such infections.

4. Conflict of interest

The Authors declare that there is no conflict of interest.

5. Ethics and Consent

The identity of the patient has been concealed. The patient provided permission and gave consent to publish the case.

6. Funding statement

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