Cureus
Part of SPRINGER NATURE

Open Access Case Report

Achromobacter xylosoxidans Endotipsitis Following Transjugular Intrahepatic Portosystemic Shunt Revision: A Case Report of an Unusual Device-Associated Infection

Justin Weiner [1], Brett S. Silverstein [1], Erfidia Restrepo [2]

1. Internal Medicine, Icahn School of Medicine at Mount Sinai, Queens Hospital Center, Jamaica, USA 2. Infectious Diseases, Icahn School of Medicine at Mount Sinai, Queens Hospital Center, Jamaica, USA

Corresponding author: Justin Weiner, jweine04@nyit.edu

Review began 07/17/2026
Review ended 08/29/2026
Published 10/20/2026

© Copyright 2026
Weiner et al. This is an open access article distributed under the terms of the Creative Commons Attribution License CC-BY 4.0., which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

DOI: 10.7759/cureus.118243

Abstract

Transjugular intrahepatic portosystemic shunt (TIPS) infection, or endotipsitis, is a rare but life-threatening complication with limited guidance regarding optimal management. We report a case of endotipsitis caused by *Achromobacter xylosoxidans*, an opportunistic gram-negative organism known for biofilm formation and multidrug resistance. The case highlights the organism's ability to rapidly develop antimicrobial resistance, complicating treatment and limiting therapeutic options. Unlike many device-related infections, definitive source control is often not feasible because TIPS removal carries a substantial risk of catastrophic hemorrhage. Management relies on prolonged, susceptibility-guided antimicrobial therapy and close multidisciplinary collaboration. This report emphasizes the importance of recognizing *A. xylosoxidans* as a potential cause of persistent bacteremia in patients with TIPS and the need for further research to guide management of these challenging infections.

Categories: Radiology, Internal Medicine, Infectious Disease
Keywords: achromobacter xylosoxidans, cirrhosis with portal hypertension, device-associated infection (dai), endotipsitis, gastroesophageal varices, multidrug-resistant pathogen, transjugular intrahepatic portosystemic shunt (tips)

Introduction

Transjugular intrahepatic portosystemic shunt (TIPS) placement is recognized as a therapeutic procedure for complications of portal hypertension, persistent variceal hemorrhage, and refractory ascites. While TIPS efficiently decreases portal pressure and reduces the danger of rebleeding, it comes with procedural and post-procedural risks, including shunt dysfunction, hepatic encephalopathy, occlusion, and infection [1]. Serious complications succeeding TIPS placement or revision are infrequent but can be life-threatening, predominantly in patients with advanced cirrhosis and numerous comorbidities. Additional risk factors include prior biliary procedures, such as percutaneous cholecystostomy tube placement or stent placement, which increased the risk of endotipsitis by up to 10.9% after 30 days compared to patients that did not have prior interventions, with the complication rate only being 0.4% after 30 days [2].

While there is no predominant organism that causes endotipsitis, the most common organisms seen include gram-positive organisms such as *Staphylococcus*, *Enterococcus* species, and *Streptococcus*, accounting for 19 of the 36 patients studied in the Mizrahi et al. paper [1]. However, gram-negative and fungal pathogens have also been documented, including *Enterobacteriaceae*, anaerobes, and fungal infections. The pathogenesis of endotipsitis is rare and not well understood. It has been thought that early infections are a result of seeding during the procedure or portal vein-to-bile duct fistula. Later infections after months or years can also occur, especially if the TIPS is revised in the setting of stenosis [1]. Additionally, cirrhotic patients are particularly susceptible to major infections because of dysregulated immune homeostasis, diminished hepatic synthetic function, and intensified bacterial translocation [3]. Invasive techniques such as TIPS revision may promote an increased risk of bloodstream infection, particularly in the setting of shunt dysfunction or occlusion.

Achromobacter xylosoxidans is an aerobic, non-fermenting gram-negative bacillus frequently associated with cystic fibrosis (CF) patients and can cause opportunistic infections in immunocompromised hosts. The microbe was first described in the 1970s and progressively became recognized as an opportunistic infection seen in both healthcare and immunocompromised populations [4,5]. It has become a pathogen of interest in CF patients, and its presence has been correlated to advanced pulmonary deterioration, exacerbations, and increased antibiotic resistance over time. Though CF patients represent the main population affected by the microbe, infections have been seen with immunocompromised hosts such as chronic liver disease, malignancy, organ transplantation, and prolonged hospitalizations [4]. Finally, the pathogen demonstrates resilience, permitting it to persist in aqueous settings and hospital water systems [6], providing the ability to colonize medical equipment, ventilators, and intravascular devices [7], and has been seen in device-related

infections, mainly in the presence of indwelling catheters or prosthetic material [4].

Notably, *Achromobacter xylosoxidans* is commonly multidrug resistant, with resistance mechanisms including efflux pumps and beta-lactamases. Cephalosporins and aminoglycosides are often ineffective, with variable resistance to tetracyclines and fluoroquinolones, posing substantial therapeutic challenges [8].

Endotipsitis is a rare complication in itself; however, *Achromobacter xylosoxidans* is also not commonly seen, especially in the setting of biliary and catheter infections. The case presented includes an uncommon complication post-TIPS procedure with a rare causative organism, leading to major complications in the patient's clinical course.

Case Presentation

A 48-year-old woman with a past medical history of severe alcohol dependence, decompensated alcoholic cirrhosis with portal hypertension complicated by recurrent esophageal varices status post multiple banding procedures and previous TIPS placement done 19 days prior to presentation, comes to the emergency department with hematemesis and melena. She described it as sudden-onset epigastric pain followed by bright red emesis and numerous episodes of dark stools. Due to her history of prior upper gastrointestinal bleeding and TIPS placement, she was admitted to the medical intensive care unit for management of what is believed to be acute variceal hemorrhage.

On admission, the patient was made NPO and started on an octreotide infusion, intravenous proton pump inhibitor therapy, and ceftriaxone for spontaneous bacterial peritonitis prophylaxis. On the second day of her admission, the patient was found to be bacteremic with gram-negative rods; however, identification was not available at that time.

Esophagogastroduodenoscopy revealed an esophageal bleeding source approximately 30 cm from the incisors, likely related to ulceration from prior banding in the setting of known varices. CT abdomen and pelvis (Figure *1*) revealed possible TIPS occlusion, and ultrasound of the right upper quadrant (US RUQ) showed lack of color Doppler in the catheter (Figure *2*), prompting consultation with interventional radiology (IR) due to concern that shunt dysfunction was precipitating the recurrent bleeding.

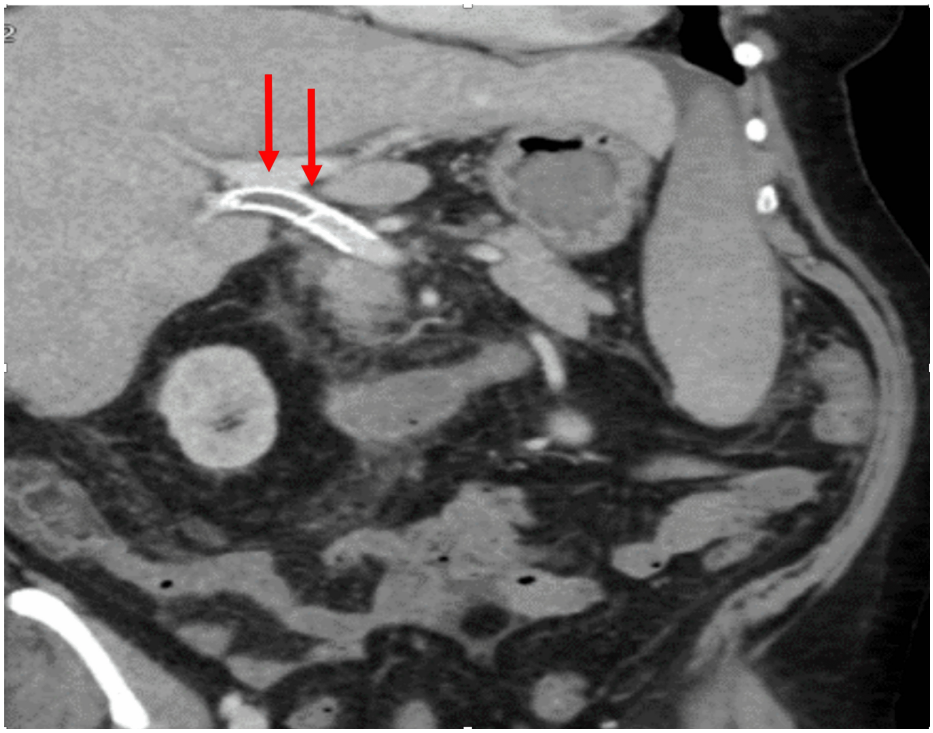


FIGURE 1: Computed tomography of the abdomen and pelvis

The arrows point to the occluded transjugular intrahepatic portosystemic shunt (TIPS) catheter.

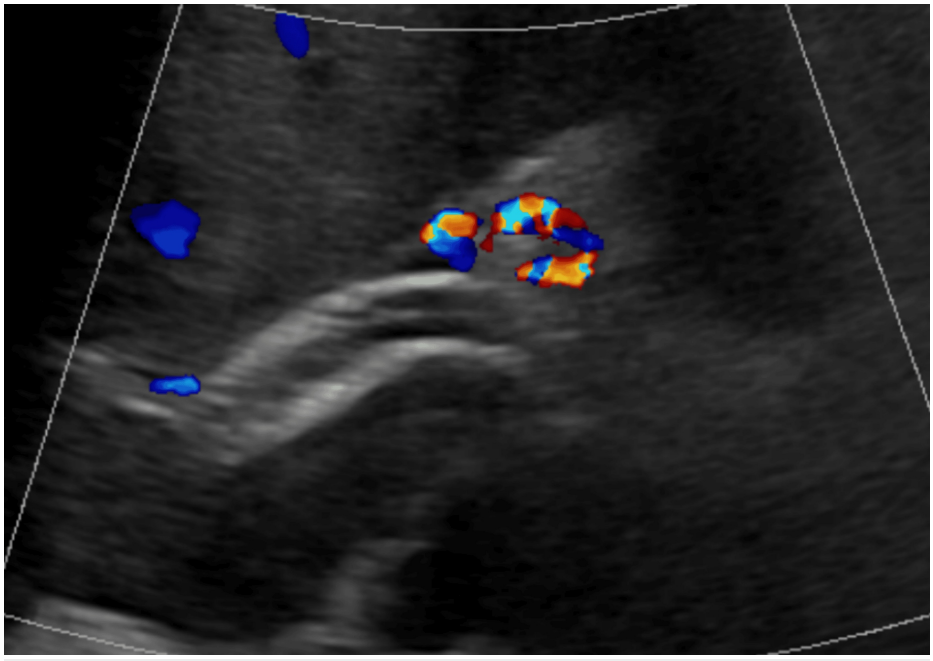


FIGURE 2: Right upper quadrant ultrasound

Showing a lack of color Doppler within the transjugular intrahepatic portosystemic shunt (TIPS) catheter.

Due to intermittent fevers that were not resolving with ceftriaxone, antibiotic choice was escalated to piperacillin-tazobactam. The final result from the first set of blood cultures was *Achromobacter xylosoxidans,* with sensitivity to fluoroquinolones, meropenem, trimethoprim-sulfamethoxazole (TMP-SMX), and piperacillin-tazobactam. The patient's intermittent low-grade fevers and mild leukocytosis resolved with continuation of piperacillin-tazobactam. Two sets of blood cultures collected on hospital days 7 and 9 were negative.

On day 11 of her hospitalization, she subsequently underwent TIPS revision with catheter recanalization. Within three hours of the intervention, the patient became hypotensive and tachycardic, requiring transfer to the stepdown unit. She subsequently developed fever, reaching as high as 103 degrees; rigors; marked leukocytosis to a peak of 30,000; worsening metabolic acidosis; and hypotension necessitating vasopressor support, suggestive of septic shock. Antibiotics were escalated to meropenem and vancomycin at that time.

Blood cultures drawn during this decline grew gram-negative rods in aerobic bottles and were later recognized as *Achromobacter xylosoxidans*. Unlike the first set of blood cultures, this set showed marked resistance to many antibiotics that were sensitive previously. Levofloxacin and meropenem showed intermediate susceptibility, with minimum inhibitory concentrations (MICs) of 4 and 8, respectively, and Bactrim continued to be sensitive. At this time, infectious disease was consulted, with recommendations to increase meropenem from 1 gram every 12 hours to 1 gram every eight hours due to intermediate susceptibility.

It was requested from IR to replace the TIPS shunt for concern of infected hardware; however, IR informed the team the procedure was not to be done, as there was a very high bleeding risk and the shunt was already integrated into the hepatic parenchyma.

Overall, the patient received 13 days of meropenem treatment, with seven of those days with the higher meropenem dosing. She remained afebrile for the rest of her stay, however, with an intermittent elevation in her WBC count.

The patient underwent a TIPS revision one month later, presumably to check the function of the catheter. She underwent balloon dilation, with no signs of obstruction or sepsis post-procedure (Figure *3*). At that time, the patient noted she had abstained from alcohol.



FIGURE 3: Fluoroscopy showing contrast flowing through the catheter

The arrows point to the contrast before and after flowing through the transjugular intrahepatic portosystemic shunt (TIPS).

Three months later, the patient was readmitted to an outside hospital with abdominal pain and diarrhea for three days. She had also resumed drinking about a week prior to the presentation. In the ED, the patient was found to be hypotensive and in septic shock and admitted to the ICU. A CT abdomen/pelvis showed portal hypertension, likely chronic in nature, but the US RUQ showed adequate hepatopetal flow, indicating the TIPS catheter was not occluded. A first set of blood cultures grew *Pseudomonas aeruginosa*, and the patient was started on piperacillin-tazobactam, which was escalated to ceftolozane-tazobactam by infectious disease in the setting of concern for a carbapenem-resistant organism. A second set taken two days later grew *Achromobacter xylosoxidans*. Both the *Pseudomonas* and *Achromobacter* cultures eventually were found to be susceptible to piperacillin-tazobactam and meropenem, and antibiotics were switched to piperacillin-tazobactam. However, at this point the patient continued to remain critically ill, and a decision was made to transition to hospice care, where the patient eventually expired. Timeline of events is summarized in Table *1*.

Time Point	Events	Cultures and Antibiotics
19 days prior to presentation	TIPS catheter placed for portal hypertension complications.	N/A
Day 1	Presented to ED with hematemesis, melena, and epigastric pain. Admitted to MICU for acute variceal hemorrhage.	Blood culture x2 positive for *Achromobacter xylosoxidans*. Ceftriaxone started.
Day 3	EGD done, showed bleeding varices. CTAP showed possible TIPS occlusion, confirmed by Doppler.	Antibiotics escalated to piperacillin-tazobactam due to persistent fevers. *Achromobacter* susceptible to fluoroquinolones, meropenem, TMP-SMX, and piperacillin-tazobactam.
Day 11	Underwent recanalization of TIPS catheter. Three hours after the procedure, became septic, febrile, hypotensive, and tachycardic.	Blood culture x2 positive for *Achromobacter xylosoxidans*. Meropenem started.
Day 12-24	Improvement on meropenem; patient improved and was discharged.	Meropenem susceptibility intermediate with MIC of 8. Meropenem continued for a 2-week course.
1 month after discharge	TIPS catheter checked by IR, showed good flow and no sign of occlusion.	N/A
3 months after discharge, Day 1, 2nd hospitalization	Presented with abdominal pain and diarrhea. CTAP showing portal hypertension, US liver showing adequate hepatopedal flow through the TIPS catheter.	Blood cultures x2 for *Pseudomonas aeruginosa*. Started on piperacillin-tazobactam, escalated to ceftazidime-avibactam.
Day 3	Continued antibiotics and supportive ICU care.	Blood cultures x2 now positive for *Achromobacter xylosoxidans*.
Day 4	Patient continues to deteriorate.	Antibiotics switched back to piperacillin-tazobactam as both organisms are susceptible to this antibiotic.
Day 5	Patient seen by palliative care; family opts for comfort care, patient expires a few days later.	N/A

TABLE 1: Timeline of events

IR: interventional radiology; TIPS: transjugular intrahepatic portosystemic shunt; MIC: minimum inhibitory concentration; CTAP: computed tomography of the abdomen and pelvis; TMP-SMX: trimethoprim-sulfamethoxazole

Discussion

To our knowledge, this represents a rare case of endotipsitis caused by the gram-negative bacterium *Achromobacter xylosoxidans*. A unique feature of this bacteria is its ability to rapidly undergo resistance, demonstrated by two blood cultures separated by only 11 days with significantly different susceptibility testing, with increased MICs to multiple antibiotics (Tables *2*, *3*). As mentioned previously, the bacteria use efflux pumps and beta-lactamase inhibitors, quickly acquiring resistance as seen in this case. The accelerated modification in susceptibility patterns seen between the blood cultures highlights the adaptive ability of *Achromobacter xylosoxidans* under antibiotic pressure. Furthermore, the pathogen has the ability to form biofilms on foreign surfaces such as vascular catheters and prosthetic devices, further increasing the difficulty of eradication [9]. It was requested by our microbiology lab to obtain susceptibility to cefiderocol in case the infection did not resolve and continued therapy was needed, which showed the organism was susceptible to this antibiotic.

Antibiotic	MIC	Interpretation
Amikacin	>32	R
Aztreonam	>16	R
Cefepime	>16	R
Ceftriaxone	>32	R
Ciprofloxacin	1	S
Gentamicin	>8	R
Levofloxacin	1	S
Meropenem	<=1	S
Piperacillin-Tazobactam	<=8	S
Tobramycin	>8	R
Trimethoprim/Sulfamethoxazole	<=0.5/9.5	S

TABLE 2: Blood cultures taken on admission, growing Achromobacter xylosoxidans

S: susceptible; I: intermediate; R: resistant; MIC: minimum inhibitory concentration

Antibiotic	MIC	Interpretation
Amikacin	>32	R
Aztreonam	>16	R
Cefepime	>16	R
Ceftriaxone	>32	R
Ciprofloxacin	>2	R
Gentamicin	>8	R
Levofloxacin	4	I
Meropenem	8	I
Piperacillin-Tazobactam	>64	R
Tobramycin	>8	R
Trimethoprim/Sulfamethoxazole	<=0.5/9.5	S

TABLE 3: Blood culture taken 11 days after admission, showing Achromobacter xylosoxidans with increased resistance

S: susceptible; I: intermediate; R: resistant; MIC: minimum inhibitory concentration

At the outside hospital, the regrowth of *Achromobacter xylosoxidans* as well as *Pseudomonas aeruginosa* in blood cultures can be interpreted in a few ways. Firstly, the CT of the abdomen and pelvis showed portal hypertension, and although it was unclear if the TIPS was actually clogged on initial CT imaging, the subsequent Doppler study showing hepatopedal flow makes recurrent TIPS occlusion less likely. However, there could have been leftover biofilm on the catheter that disseminated into the blood at this time. The *Pseudomonas* growth can also be interpreted in a few ways. It is known that *Pseudomonas* can be misidentified as *Achromobacter* [10]; however, at the outside hospital, both organisms were identified via matrix-assisted laser desorption/ionization time-of-flight (MALDI-TOF); therefore, this theory is less likely. There is a case report of diarrhea induced by *Pseudomonas* in a cirrhotic patient [11], and considering the

patient presented with diarrhea, the patient may have had a concurrent *Pseudomonas* diarrheal infection with dissemination into the blood. The patient also relapsed and began drinking before her presentation, so it is possible her alcohol intake may have worsened her overall health, leading to these two organisms regrowing in the blood culture.

The source of the TIPS catheter becoming infected is another point of discussion; it is possible that during the procedure the device became infected or there was possible translocation of the bacteria from the GI tract into the shunt during its insertion. The quick development of sepsis and the repeat positive blood cultures soon after manipulation of the TIPS confirmed hardware infection. Endotipsitis poses a challenge to management from the ID perspective. Unlike other device-related infections where catheters or hardware removal is recommended for decisive source control, removal of a TIPS catheter is rarely practical. This is due to the TIPS becoming incorporated into the hepatic parenchyma; attempting to remove it has a substantial risk of hemorrhage due to disruption of the portal and hepatic venous system [1]. For this reason, management mainly relies on extended antibiotic treatment or TIPS revisions, and for a small number of cases, liver transplant may be required if the infection persists [1].

In our patient, IR appropriately declined removal of the TIPS shunt due to the substantial bleeding risk related to extraction. Instead, the infection was managed with targeted antimicrobial therapy and careful monitoring. However, as seen in her second hospitalization, it is possible that, due to biofilm production and overall resilience of this organism, the organism was never fully eradicated from the catheter. It may be necessary for prolonged antibiotic courses or an indefinite course until the TIPS can be removed during a liver transplantation. As mentioned in the review article by Mizrahi et al., antibiotic durations can range from five to 1460 days depending on clinical response, and with persistent infection, antibiotics may need to be administered until liver transplantation, when the TIPS catheter can be removed [1].

Conclusions

This case highlights the rare instances of endotipsitis due to *Achromobacter xylosoxidans* following a TIPS revision in a patient with decompensated cirrhosis. Given the organism's capability for multidrug resistance and biofilm development on prosthetic material, early recognition and suitable antimicrobial therapy are crucial. Increased understanding of this pathogen is imperative when evaluating persistent bacteremia in cirrhotic patients with vascular devices, as proper identification can help guide effective management strategies. The difficulty of a cure with an infected TIPS catheter also remains a problem, as the device cannot be removed, and prolonged antibiotic regimens may be needed.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

Concept and design: Justin Weiner, Brett S. Silverstein, Erfidia Restrepo

Acquisition, analysis, or interpretation of data: Justin Weiner, Brett S. Silverstein, Erfidia Restrepo

Drafting of the manuscript: Justin Weiner, Brett S. Silverstein, Erfidia Restrepo

Critical review of the manuscript for important intellectual content: Justin Weiner, Brett S. Silverstein, Erfidia Restrepo

Supervision: Erfidia Restrepo

Disclosures

Human subjects: Informed consent for treatment and open access publication was obtained or waived by all participants in this study. **Conflicts of interest:** In compliance with the ICMJE uniform disclosure form, all authors declare the following: **Payment/services info:** All authors have declared that no financial support was received from any organization for the submitted work. **Financial relationships:** All authors have declared that they have no financial relationships at present or within the previous three years with any organizations that might have an interest in the submitted work. **Other relationships:** All authors have declared that there are no other relationships or activities that could appear to have influenced the submitted work.

References

1. Mizrahi M, Adar T, Shouval D, Bloom AI, Shibolet O: Endotipsitis-persistent infection of transjugular intrahepatic portosystemic shunt: pathogenesis, clinical features and management. Liver Int. 2010, 30:175-83. 10.1111/j.1478-3231.2009.02158.x

2. Ronald J, Bartlett D, Border L, et al.: Hepatobiliary infection after transjugular intrahepatic portosystemic shunt creation in patients with prior biliary intervention: a multi-institution retrospective study. J Vasc Interv Radiol. 2024, 35:1323-1331.e3. 10.1016/j.jvir.2024.06.009
3. Bajaj JS, Kamath PS, Reddy KR: The evolving challenge of infections in cirrhosis . N Engl J Med. 2021, 384:2317-30. 10.1056/NEJMra2021808
4. Bayless DR, Dumais MG, McHugh JW, Ranganath N, Fida M, Chesdachai S, Abu Saleh OM: Clinical and microbiologic features of Achromobacter species: a 10-year, multicenter experience. J Clin Microbiol. 2025, 63:e0072425. 10.1128/jcm.00724-25
5. Jakobsen TH, Hansen MA, Jensen PØ, et al.: Complete genome sequence of the cystic fibrosis pathogen Achromobacter xylosoxidans NH44784-1996 complies with important pathogenic phenotypes. PLoS One. 2013, 8:e68484. 10.1371/journal.pone.0068484
6. Amoureux L, Bador J, Fardeheb S, et al.: Detection of Achromobacter xylosoxidans in hospital, domestic, and outdoor environmental samples and comparison with human clinical isolates. Appl Environ Microbiol. 2013, 79:7142-9. 10.1128/AEM.02293-13
7. Yoon SH, Kim H, Lim SM, Kang JM: Nosocomial outbreak of Achromobacter spp. bacteremia due to germicide contamination: a systematic review. Eur Rev Med Pharmacol Sci. 2022, 26:6374-81. 10.26355/eurrev_202209_29664
8. Isler B, Kidd TJ, Stewart AG, Harris P, Paterson DL: Achromobacter infections and treatment options. Antimicrob Agents Chemother. 2020, 64:10.1128/AAC.01025-20
9. Liu C, Pan F, Guo J, et al.: Hospital acquired pneumonia due to Achromobacter spp. in a geriatric ward in China: clinical characteristic, genome variability, biofilm production, antibiotic resistance and integron in isolated strains. Front Microbiol. 2016, 7:621. 10.3389/fmicb.2016.00621
10. Kidd TJ, Ramsay KA, Hu H, et al.: Low rates of Pseudomonas aeruginosa misidentification in isolates from cystic fibrosis patients. J Clin Microbiol. 2009, 47:1503-9. 10.1128/JCM.00014-09
11. Chapman M, Lodh A, Tristeza J, Yang A: A rare case of Pseudomonas aeruginosa-associated diarrhea in a cirrhotic patient. Case Reports Hepatol. 2024, 2024:8238951. 10.1155/2024/8238951