

Delftia acidovorans: A Rare Pathogen Isolated from Pleural Fluid in an Immunocompromised Host

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ABSTRACT

Delftia acidovorans is an aerobic, non fermentative gram negative rod that belongs to the Pseudomonas ribosomal Ribonucleic Acid (rRNA) homology Group III. The sources of isolation are sludge, biological waste water treatment plants. Patients in hospitals or with compromised immune systems are more likely to be affected. *Delftia acidovorans* can result in infectious endocarditis, ocular infections, otitis media, peritonitis, urinary tract infections, empyema, cavitary and interstitial pneumoniae, and nosocomial bacteraemia, including bacteraemia linked to central venous catheters in people with compromised immune systems. This case report is about a 57-year-old male with complaints of loss of appetite for six days and vomiting, as well as loss of weight. He was diagnosed with HIV two years ago and was on HAART (Highly Active Antiretroviral Therapy). This atypical bacterium was isolated from pleural fluid of the patient; and he was managed with albumin infusion, anticoagulants, beta blockers, fluid and salt restriction and intravenous antibiotics. It is an emerging source of Gram negative bacilli which is normally a non pathogen causing serious infections among immunocompromised patients.

Keywords: Human immunodeficiency virus, Highly active antiretroviral therapy

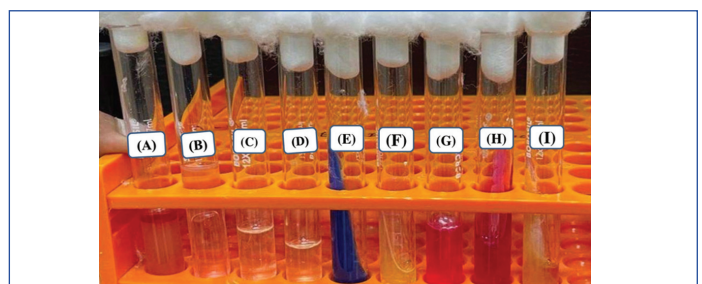
CASE REPORT

A 57-year-old male presented to the Department of Gastroenterology with the complaints of loss of appetite for six days associated with vomiting, weight loss of about 12 kgs in the past one month. He was a known case of retroviral disease, diagnosed with HIV two years ago, and was on HAART. He was admitted a year ago for shortness of breath, orthopnea, abdominal pain, and was diagnosed to have Decompensated Chronic Liver Disease (DCLD), grade III esophageal varices, and portal hypertensive gastropathy.

On physical examination, he had pallor, and mild pedal edema. His abdomen was distended, there was splenomegaly, and free fluid was present. On auscultation, there was decreased air entry on the right lung and a chest drain in-situ was present on the right side. Complete Blood Count (CBC) done on the day of admission revealed increased total leucocyte count ($14.7 \times 10^3/\mu\text{L}$), and differential count revealed increased neutrophils (77%), decreased lymphocytes (7%), increased monocytes (14%) with increase in alkaline phosphatase (175 U/L), Gamma-glutamyl transferase (GGT) (77 U/L), S.creatinine (1.15 mg/dL), ammonia (149 $\mu\text{g}/\text{dL}$), and reduced serum sodium (115 meq/L). After 24 hours, urine chemical analysis revealed increased leucocytes (2+) and urine culture done on Hicrome UTI (HiMedia) agar reported significant bacteriuria with *Escherichia coli*. The chest drain was kept in place and the pleural fluid was sent for analysis. Macroscopically (with naked eye) colourless, cloudy, slightly clotted pleural fluid were seen, whereas, microscopically Giemsa staining revealed lymphocytes, macrophages, few neutrophils, and scattered mesothelial cells with red blood cells, suggestive of chronic inflammation. Meanwhile, the Gram-staining of pleural fluid showed pus cells and Gram negative bacilli in direct smear with heavy growth of non lactose fermenting colonies in MacConkey agar and oxidase-positive reaction identified as *Delftia acidovorans* in culture [Table/Fig-1,2]. Identification and antimicrobial susceptibility testing were done in VITEK 2 compact calorimetric card (version 9.02) with excellent identification of rate 98%. The isolate was sensitive to BL+BLI combinations like Piperacillin-tazobactam (MIC=16), Cefaperazone-sulbactam (MIC ≤ 8) and Carbapenems (MIC ≤ 0.25) like Imipenem, Meropenem and Doripenem. This isolate demonstrated not only resistance to aminoglycosides but also an index case of fluoroquinolone resistance, which is a concerning trend for this bacteria.



[Table/Fig-1]: Non lactose fermenting colonies on MacConkey agar.



[Table/Fig-2]: a) Pumpkin orange indole; b) Glucose sugar - not fermented, no gas; c) Lactose sugar - not fermented; d) Sucrose - not fermented; e) Citrate - utilised; f) Urease - negative; g) Mannitol - Not fermented; h) TSI agar - K/K, no gas, No H₂O; i) PPA agar - negative.

On the second day of admission USG abdomen and CT chest were done. USG abdomen showed chronic parenchymal liver disease with splenomegaly, portal vein thrombosis with right sided pleural effusion. CT abdomen revealed similar findings along with an additional finding of right-sided inguinal hernia containing ascitic fluid. CT chest revealed that moderate pleural fluid collection involving parenchymal strands in lower lobe of the left lung along with CORADS-1 score, in-situ chest drain observed.

The final diagnosis was DCLD with pleural effusion and subsequent secondary bacterial superinfection with pure culture of *Delftia acidovorans*. He was treated with intravenous Magnex Forte (Cefoperazone-sulbactam) for 10 days (according to culture and sensitivity report of pleural fluid), i.v. albumin, anticoagulants, anti-hypertensives with beta blockers, electrolytes and insulin were given.

The patient's general condition improved following antibiotic therapy and he was discharged in a stable condition. He was advised to get readmitted one week later for Trans-jugular intrahepatic portosystemic shunt (TIPS) procedure or report immediately to emergency if there was fever, abdominal pain or gastrointestinal bleed.

DISCUSSION

Delftia acidovorans (formerly *Comamonas acidovorans*) is an aerobic, non fermentative gram negative rod which grows on MacConkey agar that belongs to the *Pseudomonas* rRNA homology Group III [1]. Generally considered non pathogenic bacteria, it has been isolated from sludge, biological waste water treatment plants [2]. It occurs most commonly in hospitalised or immune-compromised patients [3]. *Delftia acidovorans* can cause infective endocarditis, ocular infections, otitis media, peritonitis, urinary tract infections, empyema, cavitary and interstitial pneumonia, and nosocomial bacteraemia, including bacteraemia induced by central venous catheters in people with compromised immune systems [4]. These are inherently resistant to all aminoglycosides especially gentamicin [5]. An increase in the number of people infected with this pathogen who are immune-competent without a doubt is a disturbing trend [1].

The genus *Delftia* consists of 4 species: *D. acidovorans*, *D. lacustris*, *D. litopenaei* and *D. tsuruhatensis*. *D. acidovorans* is the most common of this group to be isolated from clinical specimens like sputum, urine, ureters of transplanted kidney, corneal scrapings and blood [6]. There were reports on *Delftia acidovorans* associated with catheter related bacteraemia, suppurative otitis, urinary tract infection, ocular infections and peritonitis in a patient who underwent Continuous Ambulatory Peritoneal Dialysis (CAPD) [5,7]. *D. acidovorans* endocarditis has also been described in a 42-year-old intravenous drug abuser [5]. Other conditions associated with bacteria are Acquired Immunodeficiency Syndrome (AIDS) associated pneumonia, an immune-competent patient with chronic empyema in the pleural cavity, and a case of umbilical sepsis in neonates [7].

The ability of the organisms to make anthranilic acid from tryptophan is boosted when Kovac's reagent is added to the medium, giving the media its unique "Pumpkin Orange" colour [1]. Subsequent biochemicals were acetamide positive and nitrate reduction positive without gas formation [8]. When the indole test is performed with xylene and Ehrlich's reagent, these same strains produce a vivid yellow reaction [8].

D. acidovorans is usually susceptible only to broad-spectrum cephalosporins, ureidopenicillins, co-trimoxazole, fluoroquinolones and tetracyclines [8]. *D. acidovorans* is often resistant to aminoglycosides, a class of drugs commonly used empirically to treat systemic Gram negative infections. Timely identification of this organism to its species level is necessary to determine the most appropriate antibiotic therapy [3]. The organism can survive in the biofilm formed in water-pipes or sewage pipes [9]. In present case, AST (VITEK 2 and manual) showed Polymyxin B (300 µg) and colistin (MIC ≥16) resistant with intrinsic resistance to aminoglycosides like Amikacin, Gentamycin, Netilmycin and Tobramycin. Other drugs which were resistant include Piperacillin, Ciprofloxacin and Levofloxacin. The isolate showed intermediate sensitivity to Ceftazidime (MIC=16) and Cefepime (MIC=4).

Cases of *Delftia acidovorans* empyema, endophthalmitis, and newborn umbilical sepsis have been reported in India [7,10,11]. *Delftia acidovorans* was isolated from B cell lymphoma, peritonitis and pneumonia in HIV patients [3,12,13]. Others were isolated from endocarditis in i.v. drug users, UTI and bacteraemia [5,14,15], and skin infection in a diabetic individual.

CONCLUSION(S)

This is probably the first case of *Delftia acidovorans* isolated from a pleural fluid of a HIV positive patient. In terms of therapy, it is similar to *Pseudomonas*, however this isolate showed resistance to aminoglycosides and fluoroquinolones, which is an alarming trend for this bacteria. With rising rates of medication resistance among immunocompromised patients with major co-morbidities, a disturbing situation has arisen in which saprophytic bacteria have turned pathogenic and are causing serious infections.

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