

Delftia Acidovorans Isolated from Pus Sample in Hospitalized Patient: First Case Report

Original
Article

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ABSTRACT

The *Delftia acidovorans* bacteria is an aerobic, Gram-negative, nonfermenting Bacillus bacterium. It is considered nonpathogenic bacterium for humans, commonly distributed through nature in water and plants and rarely it becomes pathogenic for human. For the first time a hospitalized man at age 70 who had been diagnosed with chronic emphysema by the physician was admitted to the microbiology lab for identification of the pathogen responsible for the emphysema. A pus specimen was cultured on the blood, MacConkey, and Chocolate agar by using the VITEK 2 system, which indicates that this bacterium is the main causative agent for emphysema. In this case report, *Delftia acidovorans* was isolated and found to be sensitive to some antibiotics, including Cefotaxime, Ceftazidim, Trimethoprim/sulfamethoxazole, Levofloxacin, Ciprofloxacin, Piperacillin/Tazobactam, Aztreonam, Imipenem, and Meropenem. This is the first case report of the isolation of *Delftia acidovorans* from pus in a hospitalized patient in Iraq, mainly in Duhok City. The isolation of *D. acidovorans* in the pus specimen from the hospitalized patient by culturing on the Blood agar, MacConkey agar, and Chocolate agar, indicates that this bacterium is the main causative agent for emphysema.

Key Words: *Delftia acidovorans*, hospitalized, immunocompetent, VITEK® 2 system.

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INTRODUCTION

Delftia acidovorans (*D. acidovorans*) is a gram-negative, aerobic, nonfermenting bacillus. It is considered nonpathogenic bacterium for human^[1,2], it is distributed through nature in water and plants and rarely becomes pathogenic for human^[3,4]. Several reports have documented that *D. acidovorans* infect mainly hospitalized and immunocompromised patients^[5, 6], and in some cases it has been reported in immunocompetent patients; it is nosocomial^[7].

Several records mention the effects caused by this bacterium are urinary tract infections, emphysema, endocarditis, ocular inflammation, inflammation of the mid ear, keratitis, and inflammation of the peritoneum^[8]. Therefore, this bacterium is nonpathogenic for human but it can be clinically significant and may cause several fatal infections. The *D. acidovorans* grows on blood, chocolate, and MacConkey's agar. The Gentamicin which is typically the first line of antibiotics used for a Gram-negative bacterium, is something that it is traditionally resistant to^[9].

CASE REPORT

70 years hospitalized male patient who had been diagnosed by the physician as a chronic emphysema was investigated and a pus sample was taken from him and sent to the microbiology lab for identification of the pathogen responsible for the emphysema. After receiving the pus specimen, it was cultured on the blood agar, MacConkey agar and chocolate agar and incubated at 37° for overnight, as seen in (Figure 1). Later, a slide was prepared from the colonies and stained with gram stain that revealed a gram-negative bacillus as shown in (Figure 2).

The patient was diagnosed positive with *D. acidovorans* after culturing the specimen on the blood agar, as shown in (Figure 1). The antibiotic susceptibility test was done by both the classical disc diffusion method and by using the VITEK® 2 system and found that the *D. acidovorans* was sensitive to the following antibiotics; Cefotaxime (CTX), Ceftazidim (CAZ), Trimethoprim/sulfamethoxazole (SXT), Levofloxacin (Lfx), Ciprofloxacin (CIP), Piperacillin (PIP)/Tazobactam (TAZ), Aztreonam (AZT),

Imipenem (IMI), and Meropenem (MER), and this case was intermittent for Amikacin (AK) as seen in (Table 1). Isolation of *D. acidovorans* from pus was recorded for the first time in Iraq, mainly in Duhok City.

Table 1: Antimicrobial susceptibility results of the isolate *D. acidovorans*.

Antimicrobial	Interpretation
CTX	S
CAZ	S
SXT	S
Lfx	S
CIP	S
PIP/TAZ	S
AK	I
AZT	S
IMI	S
MER	S

S: Sensitive
I: Intermittent
R: Resistant

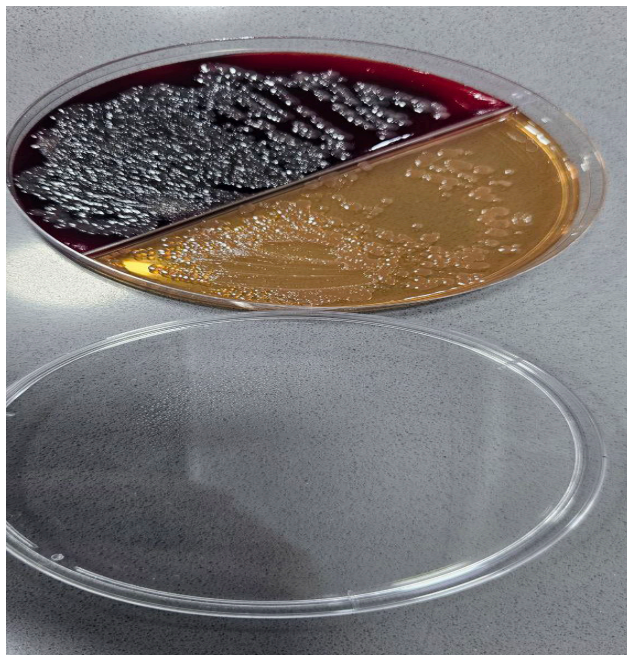


Fig. 1: A. Upper part of the plate: lactose fermenting colonies of *D. acidovorans* on blood agar
B. Down part of the plate: non-lactose fermenting colonies of *D. acidovorans* on MacConky agar

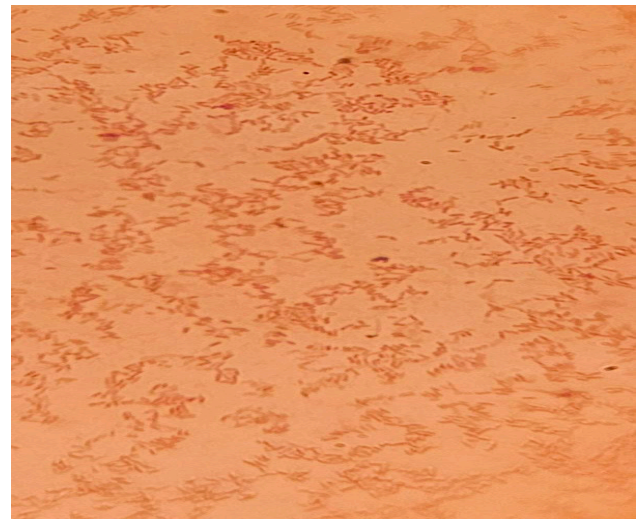


Fig. 2: A gram negative bacilli *D. acidovorans*.

DISCUSSION

Thus far, the *D. acidovorans* has been considered a nonpathogenic bacterium for human, and this is the first case report of the isolation of *D. acidovorans* in the pus specimen from a patient with emphysema in Iraq and mainly in Duhok City.

The isolation of *D. acidovorans* in the pus specimen from the hospitalized patient by culturing on blood agar, MacConkey agar, and chocolate agar indicates that this bacterium is the main causative agent for emphysema. *Chun et al.*^[10] similarly reported the same case report in a hospitalized male patient of 53 years old, and they suggested that *D. acidovorans*, the primary cause of emphysema, may be a patient who acquired the pathogen due to using the contaminated venous catheters. The same case was reported by *Ender et al.*^[11]. *D. acidovorans* has been known to produce infection, despite appearing to be of limited pathogenicity bacterium. The first outbreak of *D. acidovorans* was reported by *Weinstein et al.*^[12], who suggested that it was linked to tainted pressure monitoring equipment. *D. acidovorans* in a patient with endocarditis in an intravenous drug user was documented by *Horowitz et al.*^[13]. The patient was treated for streptococcal endocarditis infection with ampicillin. Furthermore, middle otitis, pneumonia, and ocular infections have been linked to *D. acidovorans*.

This case report also found that this bacterium was sensitive to several antibiotics: Cefotaxime, Ceftazidim, Trimethoprim/ sulfamethoxazole, Levofloxacin, Ciprofloxacin, Piperacillin/ Tazobactam, Aztreonam, Imipenem, and Meropenem, and there was no resistance to any antibiotics. *Agarwal et al.* (2023) supported this case report and reported that this bacterium was sensitive to carbapenems, tazobactam/piperacillin, and cephalosporins^[14]. The current report also agrees with Perl and Knutson, who recommended that Imipenem be the main treatment for chronic emphysema in combination with effective drainage^[15, 16].

CONCLUSION

This is the first case report on the isolation of *D. acidovorans* from an immunocompetent patient with chronic emphysema that has been reported in Iraq and Duhok City mainly.

CONFLICT OF INTERESTS

There is no conflicts of interest.

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AUTHOR CONTRIBUTIONS

The author conceived this work and drafted and finalized this study

DATA AVAILABILITY

The data that support the findings of this study are available on request from the corresponding author.

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عزل وتشخيص بكتريا *Delftia Acidovorans* من عينة قيح لمريض راقد في المستشفى

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Delftia acidovorans هي بكتيريا عضوية هوائية، سلبية الجرام، غير مخمرة. تعتبر بكتيريا غير مسببة للأمراض للبشر، وتنتشر عادة من خلال الطبيعة في الماء والنباتات، ونادرا ما تصبح مسببة للأمراض للبشر. لأول مرة، تم إدخال رجل في المستشفى يبلغ من العمر ٧٠ عاما تم تشخيصه بانتفاخ الرئة المزمن من قبل الطبيب إلى مختبر الأحياء الدقيقة لتحديد العامل الممرض المسؤول عن انتفاخ الرئة. تم ارسال عينة من القيح للمريض لتحديد العامل الممرض المسؤول عن انتفاخ الرئة حيث تم زراعة عينة على وسط اجار الدم، ماكونكي، وأجار الشوكولاتة. وباستخدام نظام VITEK ٢، تم عزل بكتريا (*Delftia acidovorans*) ووجد انها حساسة لبعض المضادات الحيوية بما في ذلك Cefotaxime و Ceftriaxone و Cefepime و Ceftazidim و Sulfamethoxazole / Trimethoprim و Levofloxacin و Ciprofloxacin و Metronidazole و Imipenem و Aztreonam و Tazobactam / Piperacillin و هذه هي الحالة الأولى لعزل بكتريا *Delftia acidovorans* من القيح لمريض راقد في المستشفى في مدينة دهوك - العراق.