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# Research Week 2024

## From endophyte to enemy – *Delftia acidovorans* as a skin and soft tissue pathogen in an immunocompetent patient: a case report

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### Keywords

*Delftia acidovorans*, *Pseudomonas acidovorans*, *Comamonas acidovorans*

### Abstract

#### Introduction

Known previously as *Comamonas acidovorans* and *Pseudomonas acidovorans*, the endophytic gram-negative bacterium *Delftia acidovorans* is typically a benign organism omnipresent in soil and water. Pathogenicity of this bacterium is exceedingly rare with the most recent retrospective cohort study presenting 59 cases between the years of 2002-2020, with only seven cases localized to tissue or wound. Literature review has consistently shown pathogenicity of *D. acidovorans* within airway secretions, blood, urine and medical equipment, as well as being associated with the following patient characteristics: male, immunocompromised, presence of comorbidities, nosocomial cause, and resistance to aminoglycoside antibiotics.

#### Case Presentation

34-year-old immunocompetent female patient kicked by her horse and found to have a non-healing wound. She has a 7.5 pack history, alcohol and marijuana use, recent abnormal pap and following timeline:

Day 1 - horse kick; 6cm laceration; 10 stitches and updated tetanus

Day 9 - infection concern; aerobic/anaerobic cultures collected; cephalexin prescribed

Day 15 - culture shows *Delftia acidovorans* with sensitivities to tobramycin, gentamicin, ceftazidime, ciprofloxacin

Day 16 - patient returns to clinic with no improvement; receives ciprofloxacin prescription and STAT surgery referral for debridement

Day 20 - referral delayed; worried patient goes to ED; unremarkable CT

Day 26 - debridement finally performed

Present day - patient healthy

## Discussion

Pathogenicity of *Delftia acidovorans*, the source and localization of the infection, characteristics of the patient, and the susceptibilities of the bacteria are particularly noteworthy in this case.

Usually benign, this bacterium proved noxious when it was transferred from the soil of the horse's hoof to the patient's ankle. It did not progress to bacteremia but remained within the skin and tissue. Moreover, this infection was not introduced in a hospital or via a catheter, but occurred in the field where the bacteria typically reside without harm to humans.

The typical characteristics of patients infected by *D. acidovorans* include the following: male, immunocompromised, and presence of comorbidities including a high rate of malignancy (~42%). This patient was young, female, immunocompetent and lacked significant morbidities.

*Delftia acidovorans* is notorious for being highly resistant to all aminoglycoside antibiotics. This case showed susceptibility to two aminoglycoside agents, tobramycin and gentamicin.

Due to the rarity of infections caused by *Delftia acidovorans*, the scientific community relies heavily on case reports to better understand the nature of this unpredictable pathogen. As this particular case goes against nearly every known norm regarding these infections, there are numerous takeaways. First, it speaks to the utility of culturing wounds that do not heal, and wounds that originate from sources like animals who dwell among soil. Second, *D. acidovorans* infections exhibit alarming first-year all-cause mortality; the fact that this patient has no lingering problems offers optimism and reassurance to patients with similar characteristics and providers who have likely never encountered this pathogen. Lastly, the susceptibilities garnered from the aerobic culture in this case offer invaluable insight regarding effective treatments for these infections and challenge the accepted notion that *D. acidovorans* is highly resistant to aminoglycoside agents. This unanticipated susceptibility divulges there is still much to learn about this elusive pathogen—and that there may be reason to hope.