

First US Case of Vagococcus Lutrae Infection in a Human: A Case Report

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Abstract

Vagococcus lutrae is a gram-positive, catalase-negative bacterium, that has been isolated from different animal species. It is an extremely rare pathogen in humans and has been documented in only two human cases globally. We present a case of *V. lutrae* infection in a human being, which is the third in the world and first in the US to be documented in literature. The patient was a 75-year-old male with a history of hypertension and hyperlipidemia who presented with a right groin abscess with associated skin necrosis and cellulitis. *V. lutrae* was identified in the culture of the abscess fluid. The diagnosis was made after conventional biochemical tests, automated methodology, and mass spectrometry (MALDI-TOF MS). The patient underwent incision and drainage of the abscess, was treated with antibiotics, and showed improvement upon follow-up. Our case highlights the importance of considering *V. lutrae* as a potential pathogen in patients with skin infections, particularly those with a history of contact with contaminated water or soil. Further studies are needed to better understand the epidemiology and clinical manifestations of *V. lutrae* infections in humans.

Keywords: *Vagococcus lutrae*, *Vagococcus* genus, Bacterium, MALDI-TOF MS, Skin and soft tissue infection

Introduction

Vagococcus lutrae is a Gram-positive, facultatively anaerobic, catalase-negative, motile, non-fermentative, non-spore-forming cocci bacterium [1]. It was first isolated from a road-killed common otter (*Lutra lutra*, thus the name of the bacterium) in the UK in 1999 [1]. Since then, it has been found in various other sources, such as the intestine of a largemouth bass (*Micropterus salmoides*) caught in the wilds of Maine, USA [2], and pigs in Brazil [3]. *Vagococcus lutrae* is considered one of 19 species of the *Vagococcus* genus, which has been placed close to *Enterococcus* and *Carnobacterium* based on 16S rRNA [5]. To date, there are only two documented cases of *V. lutrae* infection in human beings. The first documented case was of a skin and soft tissue infection documented in France in 2015 [6]. The second documented case was a bloodstream infection documented in Denmark in 2017 [7]. In this case report, we present the third globally documented case of *V. lutrae* infection

in human beings, the first documented in the USA, and only the second documented case of *V. lutrae* skin infection in a human being globally.

Case Presentation and Management

A 75-year-old male, with a previous medical history of hypertension and hyperlipidemia, presented with right groin soft tissue swelling. The patient reported intermittent swelling and drainage of the same lesion for the past 20 years. Two years ago, he underwent incision and drainage to treat the abscess, but the lesion recurred. The lesion then was treated with lancing and resolved through self-management by squeezing the area to drain the pus. However, over the two weeks preceding his presentation in our clinic, the swelling had been progressively increasing in size and becoming more painful. On examination, a 1 x 2 cm ovoid indurated and fluctuant region of swelling on the patient's anterior right hip was noted (figure 1).



Figure 1: Right groin moderate-sized soft tissue abscess.

Figure 1 demonstrates right groin moderate-sized soft tissue abscess with overlying hard and crusted skin necrosis and cellulitis. The image of this cutaneous lesion was captured at the time of physical examination before the microbiology culture and surgical debridement.

The lesion was surrounded by erythema, which was discrete without lymphadenopathy or lymphadenitis. There was eschar at the top of the lesion without signs of drainage. The patient was diagnosed with a right groin moderate-sized abscess of what appeared to be an infected sebaceous cyst, with associated skin necrosis and cellulitis. The patient underwent incision and drainage of the abscess, during which a 5-cc purulent fluid was obtained for culture. The wound was irrigated with sterile saline

and loosely packed with moist gauze and covered with a dry dressing. The patient was treated with empiric antibiotic with sulfamethoxazole-trimethoprim (800-160 MG twice a day). The wound cultures were positive for blood agar, positive for chocolate agar, and negative for McConkey agar (figures 2–4). *Vagococcus lutrae* was identified in the wound culture by matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS).



Figure 2: The result of inoculation of the microbiome on sheep blood agar plates after 24 hours.

Figure 2 demonstrates the growth of *Vagococcus lutrae* on sheep blood agar plates, showing (3+) growth of shiny, grayish, odorless microbial colonies.

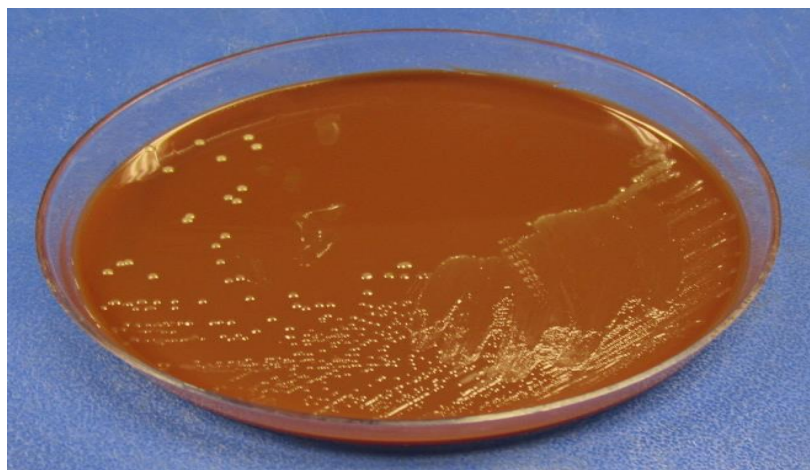


Figure 3: The result of inoculation of the microbiome on chocolate agar plate after 24 hours.

Figure 3 demonstrates the growth of *Vagococcus lutrae* on chocolate agar culture, showing (3+) growth of shiny, grayish, odorless microbial colonies.

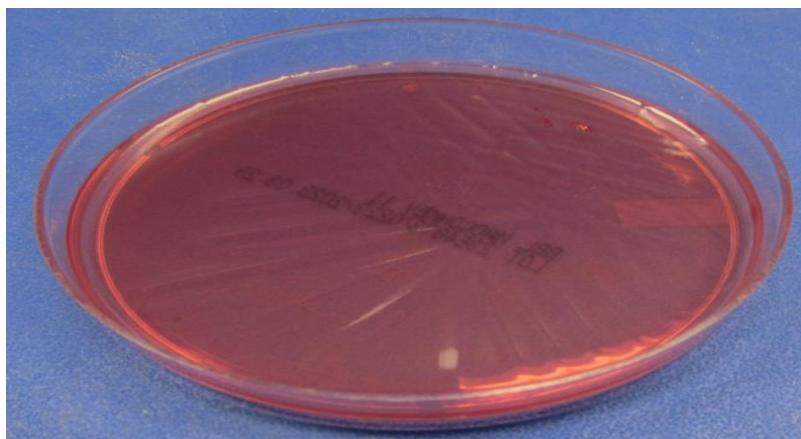


Figure 4: The result of inoculation of the microbiome on MacConkey agar plate after 24 hours.

Figure 4 demonstrates no microbial growth on MacConkey agar plate.

Upon follow-up, the patient presented for follow-up two weeks after the incision and drainage procedure. On examination, a small area of skin, roughly 2 cm in diameter, eroded down to the level of the subcutaneous tissues, was noted. The area was clean with some surrounding skin irritation, but no pus or warmth was noted. The patient was advised that the cyst capsule needs to be removed for complete healing, and he understood and agreed to return when the wound was completely healed for further management.

Discussion

Skin and soft tissue infections arise from different types of pathogens, including gram-positive bacteria. *Staphylococcus aureus* is a significant contributor, causing a spectrum of infections from impetigo to deeper cellulitis and abscesses [8]. Some methicillin-resistant *Staphylococcus aureus* strains can cause MRSA infections due to their resistance to multiple antibiotics, making treatment challenging [9]. *Streptococcus pyogenes* (Group A *Streptococcus*) causes streptococcal infections, and Group B *Streptococcus* (*Streptococcus agalactiae*) impacts neonates and the immunocompromised [10]. Certain *Clostridium* species, mainly gram-positive anaerobes, can induce skin infections like gas gangrene [11]. *Vagococcus lutrae* is an uncommon pathogen to cause infections in humans, and there is limited information on its clinical manifestation and significance. It is a rarely reported pathogen in human infections, with only two cases reported previously in literature. Its pathogenesis is not thoroughly studied yet due to limited literature, but it is likely that it enters the body through breaks in the skin or mucus membranes and then causes infections.

To the best of our knowledge, this is the first reported case of *V. lutrae* infection in humans in USA and the third reported case of human *V. lutrae* infection worldwide. The first case of *V. lutrae* infection in humans was reported in 2015 in France with skin and soft tissue infection [6]. The patient was admitted to a hospital with extensive skin lesions on his abdomen and limbs after prolonged bed rest. The genus *Vagococcus* was identified by MALDI-TOF, and the species *V. lutrae* was identified by 16S RNA PCR. The second case was reported in 2017 in Denmark with sepsis status and unknown primary infection [7]. MALDI-TOF MS was also used to identify *V. lutrae* in the blood samples taken from this patient. The authors of this case report hypothesized that *V. lutrae* entered the bloodstream from a skin infection by the same organism.

The case this article reports is the second documented skin and soft tissue infection caused by *V. lutrae*, and it highlights the importance of considering uncommon pathogens in the differential diagnosis of skin and soft tissue infections. *V. lutrae* is a catalase-negative bacterium and grows well on blood agar (figure 2) and chocolate agar (figure 3) but not on MacConkey agar (figure 4). It can be identified by matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (MALDI-TOF MS) or by 16S rRNA gene sequencing. In our case, the diagnosis of *V. lutrae* infection was made after the culture of the wound swab showed growth of a gram-positive cocci bacterium that was identified as *V. lutrae* by MALDI-TOF MS.

The treatment of *V. lutrae* infection is not well established due to its rarity. The choice of antibiotic therapy should be guided by susceptibility testing of the isolated strain. The patient in this case report was treated empirically with sulfamethoxazole-trimethoprim, which is commonly used to treat skin and soft tissue infections. Surgical intervention may also be necessary to drain abscesses and remove infected tissue.

Conclusion

Vagococcus lutrae is an extremely rare pathogen that can cause human infections, including skin infections. The clinical significance of this bacterium is not well understood. The diagnosis and treatment of *V. lutrae* infection can be challenging to its rarity and limited studies on the bacterium. Clinicians should be aware of this bacterium and consider it as a potential pathogen in patients with skin and soft tissue infections or bloodstream infections.

Our case highlights the importance of considering *Vagococcus lutrae* as a potential pathogen in patients with skin infections, particularly those with a history of contact with contaminated water or soil. Further studies are needed to better understand the epidemiology and clinical manifestations of *Vagococcus lutrae* infections in humans.

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