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CASE REPORT

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The first report of *Pseudomonas oryzihabitansin* infection in a patient with hidradenitis suppurativa

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Abstract

Hidradenitis suppurativa (HS) is one of the neglected chronic inflammatory disorders which has not efficient treatment. These patients were susceptible to various infectious diseases because of their changes in immuneresponse. Also, HS pathogenesis remains unclear and its report can create novel insight into mechanism and pathogenesis of this infection. Moreover, given that different susceptibility patterns of *Pseudomonas* spp this species should be identified to the species level; molecular methods are rapid, inexpensive, and reliable method for identification of infectious agents to the species level and appropriate treatment of infections.

KEYWORDS

hidradenitis suppurativa, infection, *Pseudomonas oryzihabitans*

1 | INTRODUCTION

Hidradenitis suppurativa (HS) is an uncommon chronic recurrent dermal inflammatory disorder in which its cause is still unknown; we reported isolation of *Pseudomonas oryzihabitans* from skin lesions of HS patient for the first time in the current study. This report as a novel evidence will develop the understanding of this opportunistic bacterium's pathogenesis in HS disease.

Flavimonas oryzihabitans or *Chromobacterium typhiflavum*, currently recognized as *P oryzihabitansis*, is a

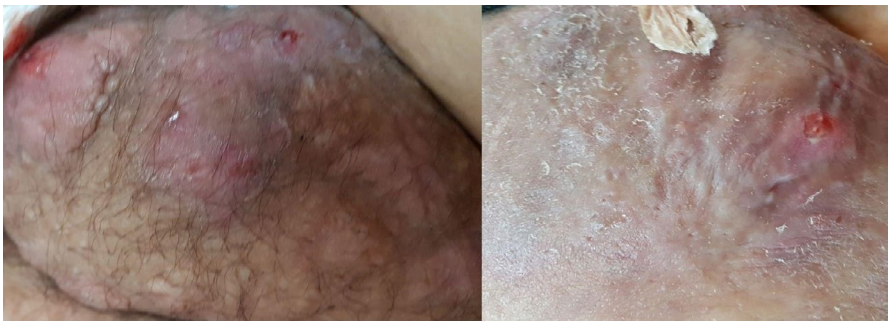

FIGURE 1 Cutaneous disseminated lesion of the patients which is spread to her buttocks

gram-negative, lactose-, and oxidase-negative bacterium producing rough yellowish colonies on agar culture media. *P oryzihabitans* is a saprophytic bacteruim that lives freely in environmental resources such as soil, rice paddles, medical equipment, or hospital wash-hand basin.[1,2] Primarily, *P oryzihabitants* was not referred to as a pathogenic bacterium until 1970s when the first case of bacteremia was reported by Hellou et al.[3] Nowadays, this bacterium is known as a pathogenic bacterium isolated from human infections such as wound and soft tissue infections, septicemia, hip infection, prosthetic valve endocarditis, peritonitis, meningitis, abscesses, pneumonia, and urinary tract infections.[4,5] According to previous reports, *P oryzihabitans* can be considered as a nosocomial agent associating with several outbreaks.[6,7] Given that literatures, immune-disorder patients are exposed to be infected with *P oryzihabitans* more than the others.[4,7]

Hidradenitis suppurativa is a chronic recurrent cutaneous inflammatory disorder and characterized by primary-subcutaneous nodules spontaneously ruptured and turned to painful abscesses and deep lesions on the axillae, groin, and anogenital sites; HS is more common in women with female: male ratio ~3:1.[8,9] The prevalence of HS relies on region and estimated at one case between 100 and 600 populations.[10]

In the present study, we report unusual isolation of *P oryzihabitans* from a patient with hidradenitis suppurativa for the first time.

2 | CASE PRESENTATION

A 37-year-old woman with mellitus diabetes in her medical history was admitted to Razi dermatology center in Tehran, Iran. The patient was suffering from multiple secreting nodules in her groin and axillae regions. Based on primary clinical evaluation, her blood pressure (bp), blood rate, respiratory rate, and body temperature were 130/100 mm Hg, 84, 18, and 36.8°C, respectively. It was diagnosed and confirmed based on skin biopsy evaluation after hidradenitis suppurativa examinations; then, the patient went undertreatment by infliximab, antibiotic-therapy, and surgery but the patient was not cured; she came back on April 2018 while recurrent lesions had been developed to multiple-deep abscess with sinus tracts, discharge, and pain (Figure 1). According to Histopathology report, dermal tissue sample was received in pathology laboratory. Sample size was about 20 × 10 mm. Sample was prepared in paraffin block and staining performed by H&E method. In microscopic examination, a heavy inflammatory infiltration and small area of healthy dermis were seen. Subcutis focal infiltration and chronic abscesses surrounded by polymorphnuclear cells and rarely giant cells were seen. In the upper half of the dermis tissue, bacillary bacterial cells, PMN infiltration, and died cell debrides represent a secondary infection to the hydrate adenitis. Folliculitis and feri-folliculitis frequently were present, but granulation was not present. In addition, referred to clinical tests, her blood cells' results were about 12.7 × 10 + 3μL WBC, 3.23 × 10 + 3μL RBC, 7.3 g/dL HGB, 25.3% HCT, and 459 × 10 + 3μL PLT and her biochemical findings included 139 mg/dL FBS, 150 mg/dL cholesterol, and presence of blood in urine; also, lesions' discharge was cultured on blood agar, chocolate agar, MacConkey agar, and thioglycollate broth and incubated at 37°C in the atmosphere of 5% CO2. After 3 days, numerous yellow-pigmented, nonhemolytic colonies were detected and purified on blood agar (Figure 2). Subsequently, analytical profile index (API) 20NE was utilized but it was not conclusive; therefore, the species' level by 16S rRNA Sanger-sequencing was investigated.

The bacterium isolated was gram-negative, rod-shaped, and negative for lactose and oxidase tests; also, results of 16S rRNA sequencing were aligned with referential type strain sequences in GenBank database and they were detected as *P oryzihabitans* using the MEGA 7.0 software*;* the GenBank accession number of our isolation is MH579418.1; also, the phylogenic relationship between our isolation and the closely related species within the genus *Pseudomonadaceae* was conducted by high bootstrap value using maximum-likelihood method in MEGA 5.0 software (Figure 3). Subsequently, antimicrobial drug susceptibility test was performed using the Kirby-Bauer disk diffusion method according to Clinical Standards Institute (CLSI) guidelines.[11] The strain was susceptible to amoxicillin/clavulanic acid, piperacillin/tazobactam, ceftazidime, imipenem, amikacin, gentamicin, trimethoprim/sulfamethoxazole (TMP-SXT), and ciprofloxacin

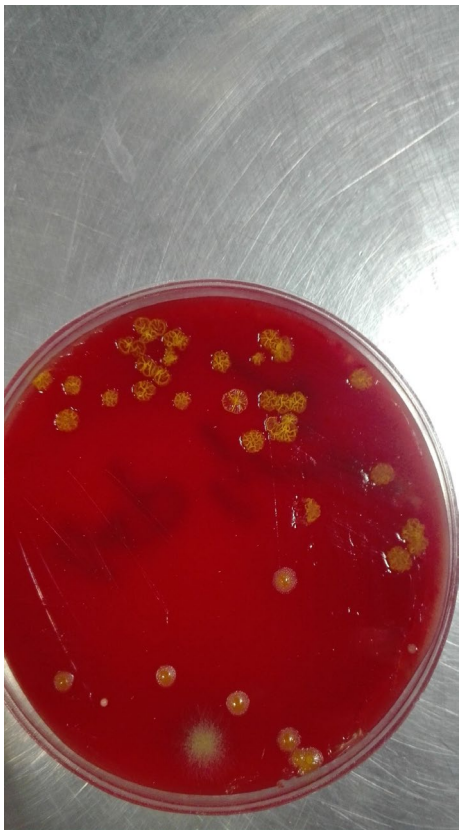

FIGURE 2 Colony morphology of *Pseudomonas oryzihabitans* on the blood agar media

but resistant to ampicillin. The patient was treated with piperacillin/tazobactam, imipenem, and amikacin followed by Co-amoxiclav for 4-6 weeks. After 3 weeks, the patient's lesions were recovered and her follow-up illustrated that the patient does not suffer from relapsing or spreading cutaneous abscess or reinfection caused by *P oryzihabitans*.

3 | DISCUSSION

Pseudomonas oryzihabitans is a potential nosocomial pathogen causing various infections, particularly cutaneous infections; due to lack of significant information about pathogenicity, virulence factor, and few clinical reports of this bacterium's infections, the pathogenicity of *P oryzihabitans* is still a puzzle for the scientific community. This bacterium is not human normal-flora and numerous reports suggested that the bacterium's transition is through environment.[2-4]

According to previous reports, the frequency of cutaneous infection due to *P oryzihabitansis* is 0.097%. Tena et al reported six cases of skin infected with this bacterium from surgical wounds, cutaneous abscess.[4] We reported the first case of skin infection of *P oryzihabitans* in a patient with hidradenitis suppurativa; we isolated the bacterium as monomicrobial infection in which its potential pathogenicity can be approved in the case of cutaneous infection. Patients with diabetes mellitus are susceptible to various infections caused by opportunistic agents; review of the literatures shows that patients with immune deficiency are provided with the best condition to be infected with *P oryzihabitans*.[4,5,12]

Pseudomonas oryzihabitans is an infrequent opportunistic pathogen not identified at the species level by phenotyping test, because of different phenotyping results in their strains. Moreover, *P oryzihabitans*'s signature 16S rRNA gene sequence is unique; therefore, molecular techniques such as 16S rRNA sequencing are recommended for accurate identification of the bacterium in clinical specimens.[2,13]

Previous studies suggested that *P oryzihabitans is* susceptible to wide range of antimicrobial drugs, for instance, quinolones, carbapenems, β-lactamase inhibitor drugs, or aminoglycosides in contrast to *Pseudomonas aeroginosa* and *Burkholderia cepacia*. Our patient was treated by piperacillin/tazobactam, imipenem, and ceftazidime. The former reports confirmed that imipenem and ciprofloxacin are the first therapeutic choices for *P oryzihabitant* infection.[2,4,5]

4 | CONCLUSION

In conclusion, this report was the first case of *P oryzihabitans* infection in a patient with hidradenitis suppurativa disorder; although the infections due to this bacterium are uncommon, paying attention to cutaneous infection with *P oryzihabitans* particularly in immune-disorder patients is of importance;

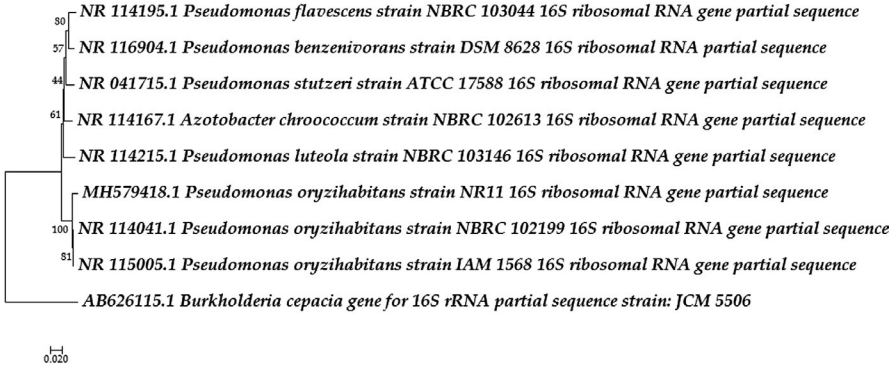

FIGURE 3 The phylogenetic relationship tree of our isolate (MH579418.1) and nearest related *pseudomonas* species. This tree was rooted via *Burkholderia cepacia*

furthermore, it is the first document that can help understanding of *P oryzihabitans* in hidradenitis suppurative pathogenesis in the development of HS disease.

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CONFLICT OF INTEREST

There are no conflicts of interest.

AUTHOR CONTRIBUTIONS

MK: drafted the manuscript. TS: received the patient. DA and MZ: revised critically the manuscript. MD: analyzed and interpreted the patient data. HR: involved in conception and design of the manuscript and has given final approval of the version to be published. All authors read and approved the final manuscript.

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