

## CASE REPORT

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# A *Shewanella* infection in burn patient from Saudi Arabia

Fatimah A Alibrahim, Bassam Alwan, Salim Baharoon

## ABSTRACT

**Introduction:** *Shewanella algae* is a Gram-negative rod marine bacterium usually found in nonhuman sources and has been shown to be pathogenic in multiple human clinical cases mentioned in the literature.

**Case Report:** We here present a male patient who developed soft tissue infection in both upper and lower limbs after exposure to a flame burn in a plastic factory. After multiple debridements over a few days, the patient became febrile, and multiple tissue cultures from upper and lower limbs grew *Shewanella algae*. The patient was managed by more debridement and antibiotics. To the best of our knowledge, this is the first case report of *Shewanella algae* in a burn patient worldwide.

**Conclusion:** Clinicians should be aware of this organism and its potential to cause infection.

**Keywords:** Burn, *Shewanella*, *Shewanella algae*, Soft tissue infection

### How to cite this article

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## INTRODUCTION

*Shewanella* is saprophytic motile, nonfermenting Gram-negative bacilli that are the only genus in the family *Shewanellaceae* [1]. They are widely prevalent in warm and temperate regions and are marine microflora (oysters, abalone, clam, and water samples) worldwide. They are tolerant of a wide range of temperatures and salinities [2].

*Shewanella* spp. are unusual causes of disease in humans, but recently increasing in the reported cases worldwide [3]. Most of the reported human infections occurred in individuals with underlying disorders and associated with exposure to seawater during warm seasons [1, 3]. Soft tissue infection due to *Shewanella* spp. has not been previously reported in any burn patient. We describe the case of a soft tissue infection with *Shewanella algae* in a burn patient. To our knowledge, this is the first case described of this infection in the patient population.

## CASE REPORT

A 35-year-old male patient working in a plastics factory in Riyadh (Saudi Arabia) who was brought by emergency medical services (EMS) as a victim of flame burn at the factory, was found on the top cached in flames.

He sustained a 60% burn, second-degree burn of face and neck, and fourth degree in the upper and lower limb. He also sustained severe inhalation injury for which he was electively intubated. After initial fluid resuscitation, he underwent left upper limb fasciotomy and lower limbs, right upper limb escharotomy was also done.

He started to have fever 48 hours after admission with an increase in his mechanical ventilation setting, and chest imaging changes. So hospital-acquired pneumonia was the first impression on this patient, upon investigation, his respiratory culture grew *Streptococcus pyogenes* (Group A), started empirically on Cefepime (fourth generation cephalosporin).

Also, he underwent multiple debridements and tissue cultures, which are taking from left arm and right leg,

which is showing *Shewanella algae* (Figures 1 and 2), *Klebsiella pneumoniae*, and *Enterobacter cloacae*.

*Shewanella algae* are Gram-negative bacilli grew on BAP (blood agar plates) sheep blood agar with characteristics of mucoid yellowish-brown colonies, 1–2-mm in size, and on MacConkey CV (crystal violet) agar with a characteristic of none lactose fermenting (Figure 1).

The *Shewanella algae* were identified using an automated mass spectrometry microbial identification system that uses Matrix-Assisted Laser Desorption Ionization Time-of-Flight (MALDI-TOF) technology VITEK MS V3.2. The *Shewanella algae* were also identified biochemically using an automated instrument for ID/AST testing GN VITEK 2 Vo8.01.

The patient received antibiotics of Cefepime, then meropenem.

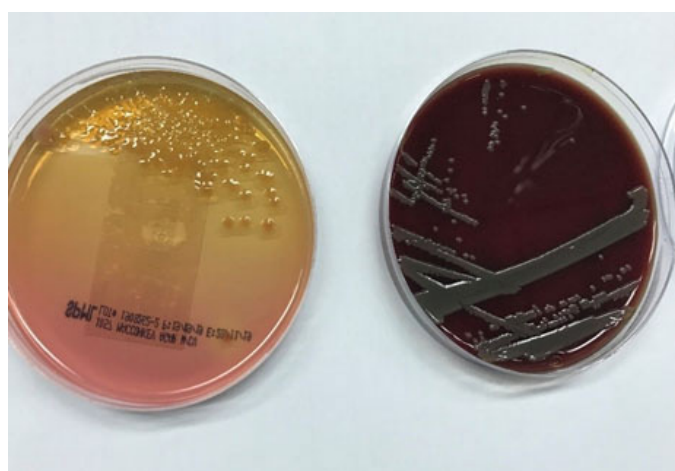


Figure 1: *Shewanella algae* in MacConkey and blood agar.

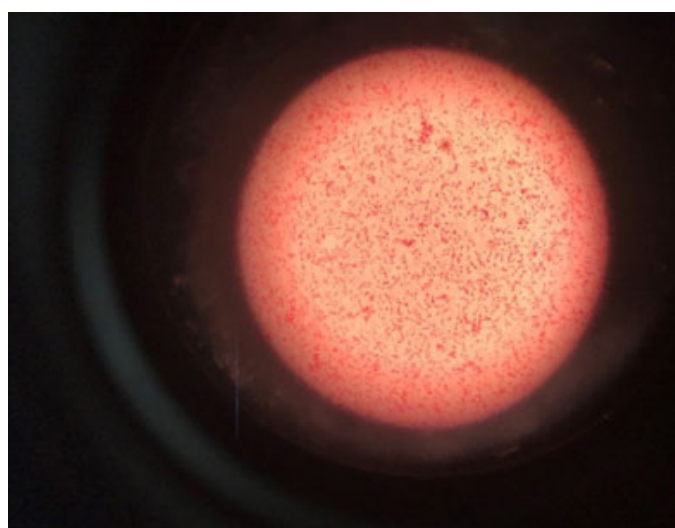


Figure 2: *Shewanella* under the microscope.

## DISCUSSION

The genus *Shewanella* has more than sixty species [3]. Only five have been associated with human infection

[4–6]. *Shewanella algae*, followed by *Shewanella putrefaciens*, are by far the most frequent causes of human infections.

*Shewanella* spp. infections have been mainly reported in immunocompromised patients from coastal regions. The absence of marine exposure, however, has been reported. To our knowledge, however, this is the first case described in the burn patient. Risk factors that have been reported in *Shewanella* infections included renal failure, snake bite, seawater exposure, raw seafood ingestion, trauma in a marine environment, prematurity, and immune system impairment [7–11]. Burn has not been previously identified as a risk factor for this infection. Although *Shewanella* infections most characteristically have been associated with marine exposure, cases without having been well described.

*Shewanella* spp. can cause different infection syndromes, including pneumonia, bacteremia, endocarditis, osteomyelitis, cholecystitis, peritonitis, and pericarditis [6, 7, 12–14]. However, soft tissue infection is the most common frequent presentation, including deep ulcers and necrotizing fasciitis. *Shewanella algae* have been linked to most cases of soft tissue infections [7, 15, 16].

*Shewanella algae* is characteristically susceptible to aminoglycosides, carbapenems, erythromycin, and quinolones but resistant to penicillin [12, 16].

## CONCLUSION

In conclusion, clinicians should be aware of this organism, its potential to cause infection, especially, in burn patients.

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### Author Contributions

Fatimah A Alibrahim – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

Bassam Alwan – Conception of the work, Design of the work, Acquisition of data, Analysis of data, Interpretation of data, Drafting the work, Revising the work critically for important intellectual content, Final approval of the version to be published, Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved

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### Guarantor of Submission

The corresponding author is the guarantor of submission.

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### Consent Statement

Written informed consent was obtained from the patient for publication of this article.

### Conflict of Interest

Authors declare no conflict of interest.

### Data Availability

All relevant data are within the paper and its Supporting Information files.

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