

# Aeromonas hydrophila-induced necrotizing fasciitis complicated by psoriasis and diabetes mellitus: A case report

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April 20, 2024

# **Aeromonas hydrophila-induced necrotizing fasciitis complicated by psoriasis and diabetes mellitus: A case report**

## **Key Clinical Messages**

Necrotizing fasciitis, a life-threatening condition caused by *Aeromonas hydrophila* infection, affects patients with weaker immune systems, particularly those with psoriasis or diabetes. Early recognition and intervention are crucial.

## **Abstract**

Necrotizing fasciitis (NF), a necrotizing skin and soft tissue infection, is an uncommon yet potentially fatal condition. *Aeromonas hydrophila*, a Gram-negative and facultative anaerobic water bacterium widely distributed in nature, is a rare trigger of necrotizing fasciitis. Chronic psoriasis, an inflammatory cutaneous disorder, is caused by an improper immune response involving immune cells and keratinocytes, often leading to suppressed immune systems and immunocompromised states in patients. We present a case of necrotizing fasciitis caused by *Aeromonas hydrophila* infection in an elderly man with psoriasis and severe, long-term uncontrolled type 2 diabetes mellitus. The patient underwent timely and adequate debridement procedures, vacuum sealing drainage (VSD), and a skin grafting procedure due to the extensive trauma area. Despite this, the patient's general condition was satisfactory, and his joints exhibited free movement. Given the scarcity of reports on the combination of psoriasis and necrotizing fasciitis, we emphasize the acute and fulminant nature of necrotizing fasciitis caused by infection. When dealing with patients who have both psoriasis and diabetes, we must maintain a high level of vigilance for signs of necrotizing fasciitis and take prompt action.

**Key-words:** Necrotizing Fasciitis, Psoriasis, Diabetes Mellitus

## **1.Introduction**

Necrotizing fasciitis (NF) is a rare and potentially fatal soft tissue infection, typically caused by bacteria that produce toxins<sup>1</sup>. Compared to the general population, patients with diabetics, alcoholics, immunocompromised patients, intravenous drug users, and patients with peripheral vascular disease have an increased risk of developing necrotizing fasciitis<sup>2</sup>, but it is still a rare occurrence among these comorbidities.

## **2.Case History/Examination**

A 72-year-old male inadvertently cut his left upper extremity while fishing in his family's private pond. The injury went unnoticed at the time. After 18 hours, he experienced severe pain and redness in his left arm. Despite seeking medical attention at a local hospital, his symptoms persisted, and his pain and dizziness intensified. He was referred to our emergency department for further evaluation. Upon examination, we observed elevated skin temperature, severe erythema, and blistering on his left arm, indicating a severe infection. Additionally, the patient had developed hypotension five hours prior to admission, placing him in a state of shock. Immediately upon arrival, we administered pressor agent medication to stabilize his blood pressure.

Physical, Laboratory tests, pathogenic biological culture, and imaging examination results (Table 1, Table 2, Table 3 ).

## **3.Methods**

### **3.1 Diagnoses**

Based on the patient's history and examination results, the following diagnoses were made:

- \* Necrotizing fasciitis of the left upper extremity
- \* Septic shock

- \* Psoriasis
- \*Type 2 diabetes
- \* Hypoproteinemia
- \* Electrolyte disorders
- \* Pulmonary infection
- \* Emphysema

### **3.2 Treatment**

We promptly informed the patient's family about his critical condition and immediately started him on anti-shock symptomatic supportive therapy, which includes cardiac monitoring, oxygen, and rehydration. We performed surgical debridement as soon as the patient's condition allowed. During the operation, we found that the patient had an infection in the fascial layer of the left upper extremity, and he also exported a large amount of fluid containing necrotic tissue (Figure 1,2). Therefore, we continued postoperative anti-infective and anti-inflammatory therapy.

Over the next month, the patient required four more debridements of the left upper extremity, as well as vacuum-assisted closure (VAC) therapy (Figure 3). He was also treated for type 2 diabetes mellitus with ketosis and psoriasis. The swelling of the left upper extremity trauma significantly reduced, and fresh granulation tissue grew. However, due to the extensive trauma to the left upper extremity, the healing process was slow, and only drug changes were made. The trauma near the elbow joint left a scar contracture that would affect joint function. With the consent of the patient and his family, we performed debridement of necrotizing fasciitis of the left upper extremity, bilateral inguinal and bilateral thigh skin excision, and full-thickness skin grafting of the left forearm, left elbow joint, and left upper arm (Figure 4,5).

Postoperatively, due to the patient's large skin defect area, poor skin foundation, and difficulty in epithelial transformation, we used platelet-rich plasma (PRP) and recombinant bovine basic growth factor gel for local wound dressing. Hydrocolloid excipients were also used to maintain wet wound

healing, promote epithelialization, and reduce exudation and scar formation (Figure 6).

#### **4.Outcome and follow-up**

There was no significant necrosis observed in the skin fragment, and he was discharged on the 54th day after admission. After three months of follow-up, the function of his left upper limb has returned to normal(Figure 7).

#### **5.Discussion**

In this case, the patient had both diabetes mellitus and psoriasis. Diabetes mellitus is a significant risk factor for necrotizing fasciitis, and therefore, in patients with diabetes who experience swelling, pain, and erythema due to skin infections, a high suspicion of necrotizing fasciitis should be entertained<sup>3</sup>. Psoriasis is an immune-mediated, inflammatory, chronic papular skin disease<sup>4</sup>, which is now often treated clinically with hormones or immunosuppressive agents<sup>5</sup>. Therefore, due to the presence of dual risk factors, the patient's disease progressed rapidly. A speedy and accurate diagnosis, along with prompt and adequate surgical intervention, were crucial in saving his life.

*Aeromonas hydrophila* is a noteworthy aquatic bacterium that frequently infects humans, leading to gastrointestinal inflammation, diarrhea, and even more severe conditions. While necrotizing fasciitis caused by this bacterium is rare, it is particularly fatal in immunocompromised individuals. This bacterium is prevalent in drinking water, sewage, and seafood, making it a significant public health concern<sup>6,7</sup>.

The three primary and crucial clinical indicators of necrotizing fasciitis are fever, intensifying pain that is disproportionate to the extent of tissue damage, and sudden erythema and swelling<sup>8</sup>. The "Finger Test" at the bedside can aid in the identification of NF, but the most reliable method for diagnosing NF remains deep incisional tissue biopsy and cultures for both aerobic and anaerobic microorganisms<sup>1</sup>. For necrotizing fasciitis, there is limited evidence of effective pharmacological treatment. Instead, early recognition, antibiotics,

and surgical debridement are the primary lifesaving measure<sup>9</sup>. Patient survival is dependent on the promptness and adequacy of surgical debridement and fasciotomy<sup>10</sup>.

## 6. Conclusion

There are few reports on the combination of psoriasis and necrotizing fasciitis, and we would like to emphasize the acute and fulminant nature of necrotizing fasciitis caused by infection. When dealing with patients who have both psoriasis and diabetes, we should be highly vigilant for signs of necrotizing fasciitis and take prompt action.

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Table 1. Physical Examination Results

<b>T</b>	<b>HR</b>	<b>R</b>	<b>BP</b>
37.1°C	107 / min	24 / min	77/46 mmHg
<b>Breathing Sound</b>	<b>Lungs</b>		
Thick	Wet rales at the bottom of both lungs		
<b>Skin Condition</b>	<b>Description</b>		
Uniform redness and inflammation	Swelling, elevated skin temperature, and tightness on the left hand, forearm, and upper arm		
	Hemorrhagic blisters from the metacarpophalangeal joint to the shoulder joint, some ruptured and leaking		

Table 2. Laboratory Results Table

<b>Test</b>	<b>Result</b>
Glucose	14.69 mmol/L
Potassium	3.09 mmol/L
Blood Urea Nitrogen (BUN)	12.3 mmol/L
Ultrasensitive C-reactive protein (CRP)	62.62 mg/L
Albumin	22.1 g/L
<b>Coagulation Tests Results</b>	
Prothrombin time (PT)	10.8 s
Activated partial thromboplastin time (APTT)	22.9 s
Fibrinogen (Fbg)	34 g/L
Fibrin degradation products (FDP)	6.4µg/mL
D-dimer	1.68 ng/ml
<b>Blood Culture and Wound Culture Results</b>	
Blood Culture	Visible spores
Wound Culture	Aeromonas hydrophila

Table 3. Chest CT Report

<b>Finding</b>	<b>Description</b>
Emphysema	Scattered in both lungs

Exudation	Occurs in the lower lobe of both lungs
Calcified Nodules	Scattered in the right lung
Aortic and Coronary Arteries	With sclerosis
Pleural Effusion	Small in bilateral cavity



Figure 1. A 72-year-old male with blackened skin and vesicles containing pale yellow pus on the hand (A) and forearm (B) prior to surgical treatment.



Figure 2. The patient underwent a comprehensive debridement of necrotic tissue in both the hand (A) and forearm (B) following the initial surgical intervention.



Figure 3. Due to the extensive exudate and rapid necrosis of surrounding tissues, the patient required a second surgical intervention. To facilitate drainage, Vacuum Sealing Drainage (VSD) was utilized at the surgical wound site (A B C).



Figure 4. After the patient underwent the third surgical treatment, the wound showed a significant improvement, with a fresh appearance and good growth of granulation tissue. Growth factors were applied to further promote wound healing. Additionally, the surgical wound continued to be drained using Vacuum Sealing Drainage (VSD).



Figure 5. The left upper necrotizing fasciitis debridement, bilateral inguinal and thigh skin removal, and full thickness skin grafting of the left forearm, left elbow, and left upper arm have been successfully performed.



Figure 6. PRP (Platelet Rich Plasma), which is rich in growth factors, effectively promotes skin regeneration.



Figure 7. After three months of follow-up, the function of the left upper limb has been restored to normal.