中文題目：食用生牡蠣後引發創傷弧菌壞死性筋膜炎：一個病例報告

英文題目：Vibrio vulnificus induced necrotizing fasciitis after taking raw oysters: A case report

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Introduction: *Vibrio vulnificus* infection carries the highest fatality rate of any food-borne pathogen, usually with intake of raw oysters. Soft-tissue infection, primary septicemia, and gastroenteritis may develop in infected patients. Early administration of adequate antibiotics and possible surgical intervention could lower the mortality rate.

Case report: A 70-year-old man without underlying disease developed fever, diarrhea, general malaise, and bilateral leg bruises for one day after taking ten raw oysters few days ago. He was then brought to the emergency room. Upon arrival, tachycardia (heart rate: 123 bpm) and hypotension (blood pressure: 79/48 mmHg) were noted. Physical examination revealed drowsy consciousness and bilateral forearms and legs bruises (Figure 1 and Figure 2). Laboratory examination showed immature white blood cells (WBC: 5.39 K/uL, Myelocyte: 7%, Metamyelocyte: 19%, Band form: 21%), elevated serum C-reactive protein (23.93 mg/dL), and elevated serum creatinine (3.9 mg/dL). Septic shock due to intra-abdominal infection was suspected first, so empirical antibiotics (ceftriaxone plus metronidazole) and norepinephrine were given after obtaining blood culture. He was then admitted to the medical intensive care unit (MICU).

However, progressive hypotension and four limb hemorrhagic bullae [Figure 1] were noted at the first night of MICU admission. Necrotizing fasciitis of four limbs was highly suspected. The antibiotics were switched to doxycycline plus ceftriaxone for the suspicion of *vibrio vulnificus* infection. The patient also received fasciotomy by the plastic surgeon immediately. [Figure 2] The pathogen at surgical wound showed *Vibrio vulnificus*, and the blood culture also yielded *Vibrio vulnificus*. After fasciotomy, the hemorrhage bullae discontinued to extend. Nevertheless, the patient still presented with intermittent fever and high dose vasopressor use. After well explanation to the patient, he agreed with amputation surgery for infection source control. Therefore, bilateral above knee amputation and right hand amputation were successively performed by the plastic surgeon. [Figure 3] The hemodynamic status of the patient improved much after amputation, and the vasopressor was gradually tapered off. Follow-up laboratory exam showed decreased serum C-reactive protein (3.67 mg/dL) and decreased serum creatinine (1.6 mg/dL). He was then transferred to ward for further wound management and complete antibiotics treatment.

Tracing back the patient's risk factor, his liver function and renal function were previously normal. He did not take steroid or immunosuppressant before. No cancer, immunodeficiency, or diabetes mellitus was record. The abdominal ultrasound also revealed no liver cirrhosis. Only male gender and old age were considered as the possible risk factors.

Discussion: *Vibrio vulnificus* is a gram-negative halophilic marine rods. It is a normal microbiota of estuarine waters, and occurs in high numbers in molluscan shellfish around the world. Infection of *vibrio vulnificus* is responsible for over 95% of seafood-related deaths in the United states (Jones and Oliver, 2009), and carries the highest fatality rate of any food-borne pathogen (Rippey, 1994).

There are three main infectious portals of entry: (1) consumption of contaminated seafood (raw or undercooked molluscan shellfish, primarily oysters, which may primary presents septicemia); (2) exposure of open wounds or broken skin to contaminated salt water; (3) handling contaminated seafood (which creates micro-injury). Over 90% of patients with primary *vibrio vulnificus* septicemia reported having consumed raw oysters prior to the onset

of illness. Risk factors of *vibrio vulnificus* infection include liver cirrhosis, immunocompromised (cancer, immunosuppressive medications, AIDS), hemochromatosis, end stage renal disease, older patient (> 40 years), and male (~ 85% of cases), etc…
In our patient, the patient presented rapid progression of hemorrhagic bullae at upper and lower extremities. He also developed septicemia of *vibrio vulnificus*, and even septic shock. Systemic antibiotics injection and surgical fasciotomy were performed immediately upon suspicious of *vibrio vulnificus* infection, but the patient's symptoms still progressed with unstable hemodynamic status. The condition of the patient eventually stabilized after amputation and continuous systemic antibiotic therapy. Adequate antibiotics and early surgical intervention were essential upon diagnosis of *vibrio vulnificus* infection, and could even save the patient's life.
Managements include adequate antibiotics, physiological monitoring and support (adequate nutrition, balance of fluid, or vasopressors), and surgical intervention (debridement, fasciotomy, or even amputation) if needed. The standard medical treatment include minocycline or doxycycline (100 mg BID) plus cefotaxime (2 g Q8H) or ceftriaxone (1 g QD), cefotaxime (2 g Q8H) plus ciprofloxacin (400 mg Q12H), or fluoroquinolone monotherapy (e.g. levofloxacin 750 mg QD). In critical and rapidly progressive disease, early surgical intervention within 12 hours could result in a significant improvement in survival. Hyperbaric oxygen (HBO) was also used as an adjunctive therapy for *Vibrio vulnificus* infection. The bactericidal activity of HBO was shown to be due to reactive oxygen species.

Conclusion: In critically ill patients with rapid progression of necrotizing fasciitis with history of raw molluscan shellfish exposure, *Vibrio vulnificus* infection could be considered first and early surgical intervention is urgent in addition to medical treatment for its higher mortality rate.

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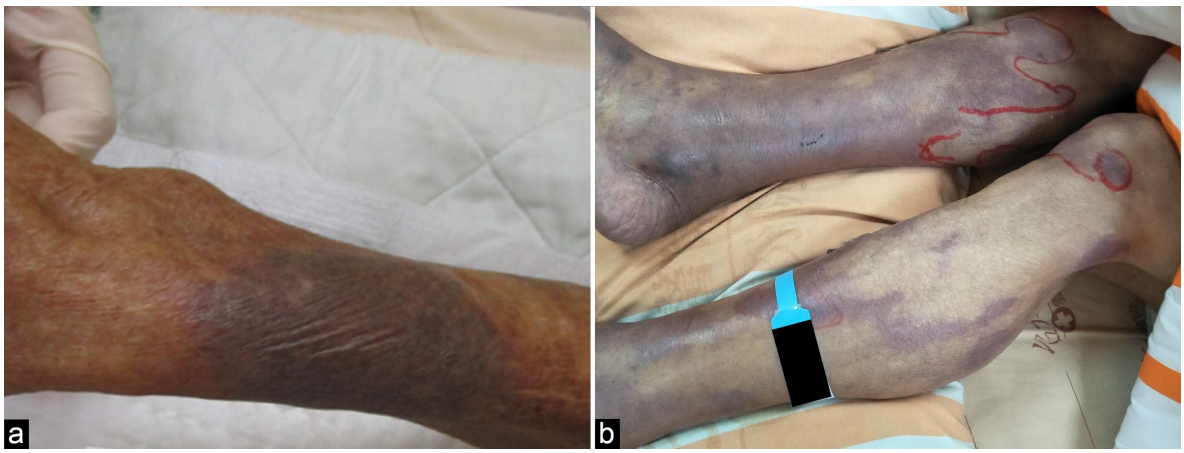

Figure 1. (a) Bruise-like lesion at right forearm; (b) hemorrhage bullae at bilateral legs

Figure 2. (a) Status post fasciotomy at right lower leg; (b) status post fasciotomy at right forearm and hand

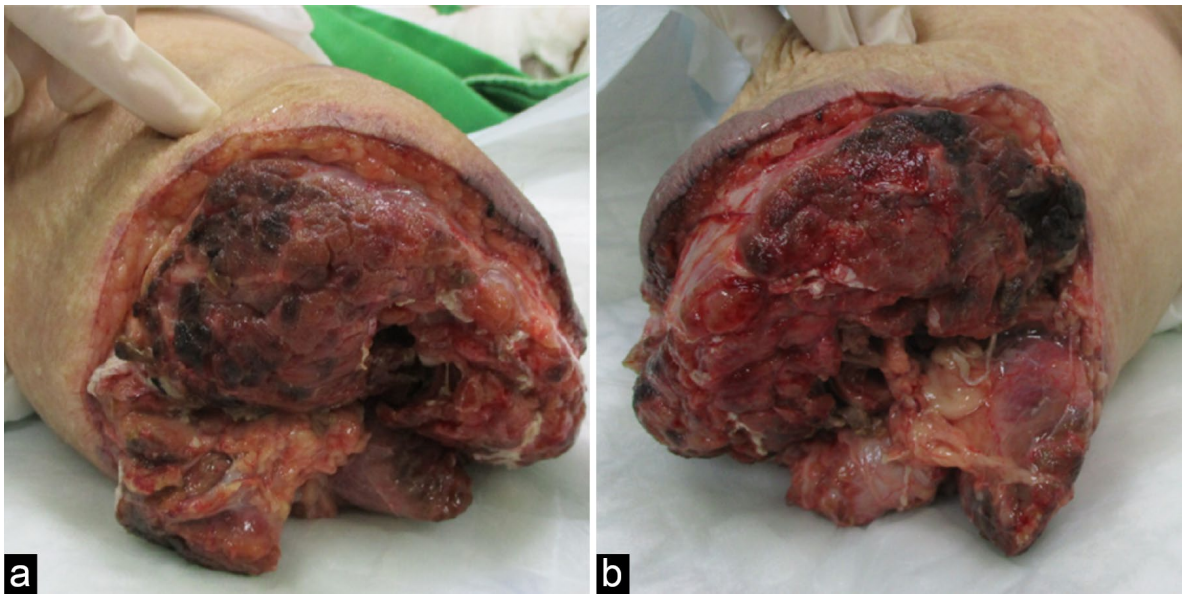

Figure 3. (a) Status post above knee amputation at left leg; (b) status post above knee amputation at right leg