Unusual Portal of Entry of *Vibrio vulnificus*: Evidence of Its Prolonged Survival on the Skin

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*Vibrio vulnificus* biotype 3 is an emerging pathogen isolated from cultures of skin and blood samples obtained from patients who were directly injured by the fins of tilapia fish bred in artificial ponds. We describe a patient infected with this pathogen after being punctured by a wire. Meticulous anamnestic investigation demonstrated for the first time that this pathogen can survive on the skin for at least 24 hours.

A 68-year-old man was admitted to the orthopedic ward because of a 24-h history of fever (body temperature, 39°C) and redness and swelling of the right hand and forearm with lymphangitic spread to the axilla. He also complained of pain in the index finger of his right hand, where there was a mild skin excoriation with a minimal serous secretion.

Two days before admission to the hospital, while the patient was repairing the engine of his van, a free wire tip punctured the index finger of his right hand. He abruptly attempted to pull away his hand, which received a strong blow from a metal part. He did not seek medical aid. The patient had non–insulin-dependent diabetes mellitus. At admission, laboratory tests showed leukocytosis (13.9 90) with a predominance of neutrophils, an erythrocyte sedimentation rate of 8 mm/h (for the first hour), and a blood glucose level of 333 mg/dL. Analysis of radiographs indicated that the patient had a previously undisplaced fracture of the base of the phalanx of the second finger of the right hand. A blood sample was obtained at admission, before the initiation of antimicrobial therapy, and cultured; 2 blood culture bottles (Bactec Plus/F; Becton Dickinson) yielded *Vibrio vulnificus* biotype 3. The isolate was identified by means of conventional biochemical tests and API 20 NE (BioMérieux) and Microscan Negative Combo panels (Dade Behring), with modified interpretation: as we have demonstrated previously, biotype 3 differs from biotypes 1 and 2 in cellobiose fermentation [1]. The presence of cytotoxin gene has been shown to be critical to the pathogenicity of *V. vulnificus* [2, 3]. We also performed PCR for the presence of the *V. vulnificus* cytotoxin gene (figure 1) [4, 5].

A closed undisplaced fracture of the right index finger, cellulitis, lymphangitis, and uncontrolled diabetes were diagnosed, and treatment with intravenously administered amoxicillin-clavulanate and subcutaneously administered insulin was started. The patient had a favorable systemic response; body temperature, leukocyte count, and serum glucose values returned to normal ranges at the end of the first week. The local lesion did not improve initially, and necrotic areas developed. On day 17 of hospitalization, a wide debridement of necrotic tissue and skin graft implantation was performed. In addition,
a groin flap was used to enable complete repair and functioning of the right arm. The patient was discharged from the hospital after 1 month, and he recovered completely.

Infections due to *V. vulnificus* biotype 3 were first described by us in 1996 [6]. During the summers of 1996 and 1997, there were 2 seasonal outbreaks of >200 cases in our region. All cases were related to injuries caused by the fins of tilapia (St. Peter’s fish); the fish were bred in artificial ponds. The number of cases increased during the summer season, when the salinity of the water in these ponds increased because of the greater evaporation rate in the Jordan Valley. The outbreaks were finally controlled after the implementation of a new marketing policy, which required that tilapia only be sold frozen and after meticulous cleaning, and which disallowed the handling of fresh fish with unprotected hands. Since then, only sporadic cases of infection have been reported—and again, all of them have been related to a puncture from a fresh tilapia fin. However, the mortality rate is increasing; in the past 2 years, 20% of the patients infected with *V. vulnificus* biotype 3 died.

In the present case, *V. vulnificus* infection was not suspected at first. The patient’s phalanx was broken during a traumatic work accident and an ascending cellulitis appeared on his hand, beginning from the wire puncture in the finger. Blood cultures were performed because of the development of fever and cellulitis. When, 12 h later, 2 of the cultures grew a curved gram-negative rod, which was finally identified as *V. vulnificus* biotype 3, anamnesis was repeated to search for any contact with tilapia fish. It was only then that the patient recalled having purchased tilapia, which he held with unprotected hands, 24 h before the accident. He was not injured by the fish, had no wounds on his hands at that time, and claimed to have washed them at least once after handling the fish. The fish sold in the store came from artificial ponds that were known to be colonized by *V. vulnificus* biotype 3. Fish from these ponds were the source of previous clinical cases.

Because tilapia are currently the only known reservoir of this emerging pathogen in our region, it is clear that, after being in contact with the fish, the patient’s skin was colonized with *V. vulnificus* biotype 3 for >24 h, despite his having washed his hands, until the wire puncture inoculated the pathogens into the bloodstream. The patient then developed the typical presentation of cellulitis with serous-hematic bullae and necrotic areas that has been seen in many patients in our region, which is an uncommon complication for a simple finger fracture.

In conclusion, we present a case with an unusual portal of entry of *V. vulnificus* biotype 3, and for the first time, there is evidence of prolonged survival of this pathogen on the skin for at least 24 h. A review of all the cases described to date [7] revealed that symptoms began no later than 4 h from the time of inoculation, and always in association with fish contact. In cases in which *V. vulnificus* biotype 3 infections are suspected, we recommend that the anamnestic investigation, especially questioning regarding any contact with tilapia, must seek information about the period >24 h before the commencement of symptoms.

References