A case of wound infection caused by Shewanella algae in the south of Iran

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Abstract

Shewanella algae was isolated from the purulent discharge in the navel area of a young male with a history of swimming in the Persian Gulf. A routine laboratory diagnosis procedure, followed by 16S rRNA gene sequence analyses, was used to avoid misidentification with other species of Shewanella. The bacterium was susceptible to cefazidime, ciprofloxacin, nalidixic acid, nitrofurantoin, amikacin, ceftriaxone, cefotaxime, gentamicin and co-trimoxazole but was resistant to amoxicillin, vancomycin, doxycycline, cephalaxin, ampicillin, tetracycline, cethalothin and cefotizoxime. The patient successfully recovered after treatment with antibiotics.

Keywords: Antibacterial susceptibility, marine environment, molecular identification, Shewanella algae, wound infection

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Research Note

We report here on a case of wound infection due to Shewanella algae in the navel area of a patient. A 24-year-old man was admitted to the MEHR outpatient clinic in Bushehr, southern Iran, in December 2010 with an infection in his navel area. A preliminary diagnosis suggested that the patient had a pilonidal cyst and/or un-shut suture from his neonatal period which had caused the infection in that area. Interviewing the patient revealed that a purulent discharge had developed after he had been swimming in the Persian Gulf, 3 months earlier. The patient was prescribed a combination of cloxacillin (500 mg/6 h for a week), cefixime (<400 mg/12 h for 5 days) and ciprofloxacin (500 mg/12 h for a week). The affected area was also cleaned with 70% alcohol daily but the purulent discharge did not stop. A swab culture was taken from the lesion’s exudate and submitted to the pathology laboratory. Results indicated the pure growth of an organism forming light-brown mucoid colonies on 5% sheep blood agar. The organism was subsequently identified as a member of the S. putrefaciens group with the API 20E system (biomerieux, Inc., Hazelwood, MO, USA). Further tests, including hydrogen sulfide production on TSI slants, growth on media containing 6.5% NaCl and reduction of nitrite [1], identified the organism as S. algae although the bacterium did not produce β-haemolysis on sheep blood agar as shown by others [2, 3]. PCR amplification of the 16S rRNA was performed using the universal primer pair fD1 and rp2 [4], and sequencing of the PCR product showed 99% similarity to S. algae.

The bacterium was susceptible to cefazidime (30 μg), ciprofloxacin (5 μg), nalidixic acid (30 μg), nitrofurantoin (300 μg), amikacin (30 μg), ceftriaxone (30 μg), cefotaxime (30 μg), gentamicin (10 μg), co-trimoxazole (trimethoprim 1.25 μg/sulfamethoxazole 23.75 μg) but was resistant to amoxicillin (30 μg), vancomycin (30 μg), doxycyclin (30 μg), cephalaxin (30 μg), ampicillin (10 μg), tetracycline (30 μg), cethalothin (30 μg) and cefotizoxime (30 μg).

More than 50 species of Shewanella have been described but with the exception of the recent case report of S. xiamensis causing a peripancreatic infection [5], all other reported illnesses involving the genus Shewanella have been linked to either S. putrefaciens and S. algae infection with the latter being more common in clinical cases [1, 5, 6]. These bacteria are found in marine environments and in countries with warm climates or during especially warm summers in other countries [1] with the most common portal of entry being injured skin [6, 7].

The most common clinical syndrome reported in the literature is infection of the skin and soft tissues [8–10]. It often occurs in elderly patients with chronic ulcers of the lower extremities, but soft-tissue infections in healthy subjects have also been described [10]. Only a few patients will develop necrotizing fascititis [7, 11, 12]. Otitis media is mostly found in children after contact with seawater [2, 13]. Shewanella spp. have also been reported as pathogens causing intra-abdominal infections [14]. lower respiratory tract infections [15], meningitis [1, 16], and abscesses [17, 18]. Severe disease with bacteremia has been described in patients with predisposing factors such as immunodeficiency [6, 19], malignancy [8].
hepatobiliary disease [6, 8] and renal failure [13]. Only two cases of arthritis and two cases of osteomyelitis and one case of spondylodiscitis have been reported so far [13, 20].

Here, we report a wound infection caused by S. algae in a healthy young man without any underlying diseases. The source of organism that caused the cutaneous navel lesion was likely to be the marine environment and the bacterium was isolated in pure culture from the purulent discharge. To the best of our knowledge, this is first case of wound infection clearly caused by S. algae to be reported in Iran. In this region, there has been only one more case of wound infection reported in Turkey but the agent was shown to be S. putrefaciens [21]. Commercial automated identification systems cannot distinguish S. algae from S. putrefaciens and, therefore, it is possible that some of the isolates reported as S. algae [1, 2]. In this regard we recommend that molecular techniques such as 16S rRNA gene sequence analysis be used to confirm identification of this bacterium, as has also been emphasized by others [20].

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References

1. Holt HM, Gahrn-Hansen B, Bruun B. Shewanella algae and Shewanella putrefaciens: clinical and microbiological characteristics. Clin Microbiol Infect 2005; 11: 347–352.
2. Khashe S, Janda JM. Biochemical and pathogenic properties of Shewanella algae and Shewanella putrefaciens. J Clin Microbiol 1998; 36: 783–787.
3. Tan CKC, Lai C, Kuar WK, Hsueh PR. Purulent pericarditis with greenish pericardial effusion caused by Shewanella algae. J Clin Microbiol 2008; 46: 2817–2819.
4. Weisburg WG, Barns SM, Pelletier DA, Lane DJ. 16S ribosomal DNA amplification for phylogenetic study. J Bacteriol 1991; 173: 697–703.
5. Zang Z. Nosocomial peripancreatic infection associated with Shewanella xianmensis. J Med Microbiol 2011; 60: 1387–1390.
6. Tsai MS, You HL, Tang YF, Liu JW. Shewanella soft tissue infection: case report and literature review. Int J Infect Dis 2008; 12: 119–124.
7. Dominguez H, Vogel BF, Gram L, Hoffman S, Schaebel S. Shewanella algae bacteraemia in two patients with lower leg ulcers. Clin Infect Dis 1996; 22: 1036–1039.
8. Chen YS, Liu YC, Yen MY, Wang JH, Wann SR, Cheng DL. Skin and soft tissue manifestations of Shewanella putrefaciens infection. Clin Infect Dis 1997; 25: 225–229.
9. Goyal R, Kaur N, Thakur R. Human soft tissue infection by the emerging pathogen Shewanella algae. J Infect Dev Ctries 2011; 5: 310–312.
10. Leong J, Mirkazemi M, Kimble F. Shewanella putrefaciens hand infection. Aust N Z J Surg 2000; 70: 816–817.
11. Garcia-Fragoso L, Garcia-Garcia I, Rivera A. Shewanella algae bacteraemia in a preterm newborn. Pediatr Infect Dis J 2012; 31: 104–105.
12. Myung DS, Jung YS, Kang SJ et al. Primary Shewanella algae bacteraemia mimicking Vibrio septicemia. J Korean Med Sci 2009; 24: 1192–1194.
13. Gressier M, Mbayao D, Deramond H, Grados F, Eb F, Canarelli B. First case of human spondylodiscitis due to Shewanella algae. Int J Infect Dis 2010; 14S: 261–264.
14. Blandari S, Pan TL, Horvath J, Tiller D. CAPD, swimming in Shewanella. Nephrol Dial Transplant 2000; 15: 1484–1485.
15. Jorens PG, Goovaerts K, Leven M. Shewanella putrefaciens isolated in a case of ventilator-associated pneumonia. Respiration 2004; 71: 199–201.
16. Yilmaz G, Aydin K, Bektas D, Caylan R, Koksal I. Cerebellar abscess and meningitis, caused by Shewanella putrefaciens and Klebsiella pneumonia, associated with chronic otitis media. J Med Microbiol 2007; 56: 1558–1560.
17. Bazir N, Ling Yong AM, Chong VH. Shewanella putrefaciens, a rare cause of splenic abscess. J Microbiol 2012; 45: 151–153.
18. Sharma KK, Kalawat U. Emerging infections: Shewanella—a series of five cases. J Lab Physicians 2010; 2: 61–65.
19. Jover-Diaz F, Gracia-Ruiz de Alda M, Cuadrado-Pastor JM, Martin-Gonzalez C. Shewanella algae bacteraemia after contact with seawater in an immunocompromised patient. Rev Clin Esp 2011; 211: 489–490.
20. Botelho-Nevers E, Gouriet F, Rovery C et al. First case of osteomyelitis due to Shewanella algae. J Clin Microbiol 2005; 43: 5388–5390.
21. Bulut C, Ertem GT, Gökçek C, Tulek N, Bayar MA, Karakoc E. A rare cause of wound infection: Shewanella putrefaciens. Scand J Infect Dis 2004; 36: 692–694.