Shewanella algae: First case report of the fast emerging marine pathogen from squamous cell carcinoma patient in India

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Dear Editor,

Shewanella algae a marine pathogen is known to produce a strong neurotoxin (tetrodotoxin). Frequent and prolonged exposure of the surface of malignant growth to water would have led to infection with this marine pathogen in our patient.

A 74-year-old male patient an agriculturist by profession came to the oncosurgical outpatient department with history of chronic osteomyelitis since 12 years with associated purulent discharging cauliflower type of growth on the lateral aspect of right lower leg. He was treated for chronic osteomyelitis and underwent wound debridement twice for the same 12 years back. Pus discharge from the raw area of the growth was sent for microbiological workup. Gram's-stain showed numerous pus cells, Gram-negative bacilli and Gram-positive cocci in chains. Blood agar culture plates grew grey mucoid colonies with hemodigestion and nonlactose fermenting colonies on MacConkey plates after 24 hr of incubation at 37°C. Oxidase test was positive and hydrogen sulphide production in triple sugar iron agar slant media. Further morphological, biochemical and ability to utilize sugars[1,2] was done and organism was identified as *S. algae*. Phenotyping of the isolate was done based on Holt *et al*. species differentiation table[1] [Table 1]. The isolate was sensitive to amikacin, gentamicin, levofloxacin, ceftazidime, ceftriaxone, cefepime, imipenem, meropenem, tigecycline, pipercillin/tazobactum. Pus was negative for acid fast bacilli and for any fungal elements (smear and culture). Below knee amputated limb was sent to Histopathology Department and a diagnosis of "well-differentiated squamous cell carcinoma Grade 1" was made. This is the first report of *S. algae* isolation from a patient with squamous cell carcinoma due to predisposed chronic draining osteomyelitis.

Shewanella algae and *Shewanella putrefaciens* are frequently found in nonhuman sources such as the marine environment and foodstuffs, yet opportunistically pathogenic for humans.[3] Studies in mice indicate that *S. algae* appears to be more virulent than *S. putrefaciens* possibly due to the production of a hemolytic substance or exotoxins.[2] In a review of literature study by Tsai *et al*.[4] showed that in addition to a variety of immunocompromising conditions, a preexisting chronic ulcer over the lower limb was found in >50% of the affected patients. *Shewanella* species normally exist in the marine environment; cutaneous breaches on the legs of immunocompromised patients serve as a portal of entry for the opportunistic pathogens during their recreational activities. And *S. algae* has a predilection for causing infection in tissues with poor circulation.[5] *Shewanella* species is the only oxidase positive nonfermenting bacterium producing hydrogen sulphide in triple sugar iron agar slant media. This is the first report of isolation of the marine pathogen *S. algae* from immunocompromised patient from India. The raw area on the soft tissue of the malignant growth with underlying draining sinuses provide a nidus for potential pathogens to harbor and initiate infection and therefore necessitates to look for other pathogens more importantly in malignant growth with chronic osteomyelitis besides the frequently isolated opportunistic human pathogens in immunocompromised patients. To conclude any oxidase positive, motile, non fermenting Gram-negative rods should be evaluated further by basic phenotypic identification so as not to miss emerging nonhuman opportunistic infections.

Table 1: Phenotypic identification of *Shewanella* algae

Biotyping	Results
Oxidase	+
Catalase	+
Indole production	−
H_2S production	+
Urea hydrolysis	−
Gelatin hydrolysis	+
Nitrate reduction	+
Arginine dihydrolase	−
Lysine decarboxylase	−
Ornithine decarboxylase	+
Growth on	
NaCl 6-6.5%	+
Hemolysis (sheep blood agar)	+
Mucoid colony	+
Carbohydrate fermentation	
Arabinose	−
Ribose	+
Glucose	+
Fructose	−
Mannitol	−
Lactose	−
Maltose	−
Sucrose	−

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