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CASE REPORT

First Report of Shewanella alga as Emerging Infection in India: Two cases

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ABSTRACT

Shewanella alga is a rare isolate from clinical specimens. Repeated isolation of the organism from two cases in elderly non-immunocompromised males, as treated successfully thereafter, confirms the need of utmost microbiological vigilance to identify this unusual pathogen.

Introduction

In 1985, MacDonell and Colwell proposed the new genus *Shewanella*, which is composed of three species: *S. putrefaciens*, *S. hanedai* and *S. benthica* [1]. Currently, there are at least 22 species in genus *Shewanella*, most of them being associated with aquatic and marine habitats [2]. In 1990, Simidu et al. proposed the name *S. alga* for a tetrodotoxin-producing isolate recovered from red algae [3]. Although there are reports of the isolation of *S. putrefaciens* from human clinical specimens, it is an uncommon cause of human disease and isolates from clinical specimens usually indicate colonisation [4],[5],[6]. Very few reports, on the other hand, are available so far about the isolation of *S. alga* from the human clinical samples, which has been reported as the predominant human pathogen within the genus [7],[8],[9]. In India, there is only one report of the isolation of *S. putrefaciens* in 1998 [10] and there is no report so far of *S. alga* from clinical samples in our knowledge. We are reporting two cases where *S. alga* was isolated: one from peritoneal collection in a case of post-operative peritonitis and the other from sputum of a patient with chronic obstructive pulmonary disease with acute exacerbation.

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Case 1

A 41-year-old male, cook by profession, non-diabetic and non-hypertensive, presented with vomiting and acute abdominal pain (not related with food intake) with distension. He did not pass any flatus or stool for last 2 days. On physical examination, the patient had central distension, guarding rigidity around umbilicus and diffuse abdominal tenderness. Exploratory laparotomy revealed subacute intestinal obstruction. The patient was having high fever and tenderness along the suture line on third postoperative day, and haematological investigation revealed white blood cell (WBC) count 15.3×10^9/l, haemoglobin 10.1 g/dl and ESR 30 mm (normal 0–10 mm). There was a collection of free fluid in right iliac fossa on CT scan, which was aspirated twice 3 days apart and sent for microbiological culture. Blood was also sent for culture.

Case 2

A 75-year-old male, farmer by occupation, presented with dyspnoea on exertion for last 1 year. There was an acute exacerbation of cough along with copious production of thick sputum, chest pain and fever for last 1 week. The patient was neither hypertensive nor diabetic. On auscultation, basal crepts were noticed. Chest X-

ray showed a segmental infiltrate in right lower lobe close to diaphragm, which was consistent with pneumonia. Haematological investigation revealed WBC count of 12×10^9/l, haemoglobin level of 12.0 g/dl and ESR was 42 mm. ECG showed type I heart block. Sputum was sent twice for microbiological culture.

The samples (sputum and peritoneal fluid) showed plenty of pus cells and Gram-negative rods on Gram staining. Samples were inoculated onto sheep blood agar and MacConkey agar plates (Hi media, Mumbai, India) and incubated at 37°C in 5% CO_2 atmosphere. Another Sheep blood agar was also incubated anaerobically for peritoneal fluid at 37°C, but there was no growth after 48 hours. Fungal and mycobacterial cultures of the samples showed no growth. Blood from the first patient was sterile. Pure growth of small brown moist non-lactose fermenting colonies was observed on MacConkey agar plate (approximately 10^5 CFU per plate) on second day, which exhibited beta-haemolysis with tan-to-brown pigment on the sheep blood agar [Table/Fig 1]. The Gram-negative bacilli were motile, oxidase positive, ornithine decarboxylase and gelatine hydrolysis positive, and grew readily on TSI with heavy blackening of stabbed butt due to H_2S production. The bacteria were identified as *S. alga* since both organisms showed the growth in 6.5% NaCl and at 42°C and were beta haemolytic on BA [7],[11]. Both the isolates were sensitive to aminoglycosides, quinolones and cephalosporins but showed tolerance to penicillin as tested by Kirby–Bauer method [12].

Table/Fig 1

Characteristic growth of *Shewanella alga* on sheep blood agar.

The first patient was started empirically with cefoperazone–sulbactam (2 g IV q12h) and the second patient with third-generation cephalosporin (ceftriaxone: 2 g once daily IV). Both the patients were switched to oral cephalosporins after the antibiotic sensitivity report, which improved the clinical and radiological (in case of second patient) outcome on follow-up.

Discussion

Although *Pseudomonas aeruginosa* is the most common non-fermenter isolated from clinical specimens, *Shewanella* spp. has recently attracted the attention of the clinical bacteriologists. Recognition of the organism has long been hampered as the isolation of *Shewanella* spp. has long been considered merely colonisation rather than active infective agent [4],[5]. More reports are coming in favour of *S. putrefaciens* as confirmed by API system, which, however, is unable to differentiate *S. alga* from *S. putrefaciens* [8]. Our idea to cite these two case reports is to derive more attention for speciation of *Shewanella* biochemically. This is also imperative because due to immunocompromisation, even rare organisms can cause infection. Moreover, Kim et al. reported evolution of carbapenem resistance in *S. alga* in recent past [13]; so carrying out the antibiogram is equally important. Antibiotic sensitivity pattern on both the occasions showed that these were sensitive strains, although tolerance to penicillin was observed.

Drugs against *Pseudomonas* spp. (most commonly reported non-fermenter in clinical specimens) are mostly parenteral and relatively costly in comparison to those effective against *Shewanella*, such as ampicillin, amoxicillin, cotrimoxazole, first- and second-generation cephalosporins and doxycycline. De-escalation of higher antibiotics is also essential if *Shewanella* is confirmed as the causative agent, since they might give rise to the resistance of the organism.

The isolation of *S. alga* from above two cases strengthens the assumption that the organism should be regarded as a potential emerging pathogen, which is sensitive so far to most of first- and second-line drugs in this part of the world. Utmost microbiological vigilance to diagnose the unusual pathogen will facilitate the institution of treatment at the earliest, thereby getting satisfactory clinical response.

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