

# Shewanella Dysentery in a Patient with Underlying Malignancy

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### SUMMARY

***Shewanella* spp is a facultatively anaerobic, motile, gram-negative bacillus and can be found throughout the world mainly in marine environments and soil. It is a rare pathogen in human and infection by it is usually associated with underlying severe morbidities. We report a case of a 69-year old woman who presented with *Shewanella putrefaciens* dysentery and who was subsequently found to have underlying malignancy.**

### KEY WORDS:

*Shewanella*, dysentery, cancer

### INTRODUCTION

Dysentery is defined by the World Health Organization as bloody diarrhoea, i.e. any diarrhoeal episode in which the loose or watery stools contain visible red blood. Pathogens like *Shigella*, *Campylobacter*, *Escherichia coli*, and *Salmonella* species are the most common bacterial causes for dysentery. However, dysentery due to *Shewanella* species is rare. To the best of our knowledge, no *Shewanella* infection has ever been reported in Saratok District, Sarawak, Malaysia. Herein we report the first case of *Shewanella* dysentery in a patient who was subsequently found to have underlying malignancy.

### CASE REPORT

A sixty-nine years old Iban housewife from a longhouse was admitted to Saratok district hospital in March 2012 complaining of fever, reduced oral intake and blood-streaked loose stool and diarrhoea for about a week prior to admission. She had a history of eating freshwater red tilapia fish (*Oreochromis spp*) about a week prior to the onset of her symptoms. Other members of her family were not affected. She was known to have hypertension and hyperlipidaemia. Her case was notified to the district health office as acute dysentery.

On admission, she was afebrile and her vital signs were stable. Blood tests showed total white cell count was 10.3 x 10<sup>3</sup>/uL (normal 3.5-10 x 10<sup>3</sup>/uL) with slightly high monocytes of 0.9 x 10<sup>3</sup>/uL (normal 0-0.8 x 10<sup>3</sup>/uL), within normal red cell count 4.67 x 10<sup>6</sup> /uL (normal 3.8-5.8 x 10<sup>6</sup>/uL) with low mean corpuscular hemoglobin concentration (MCHC) 29.8 g/dL (normal 31.5-35 g/dL) and low mean platelet volume (MPV) count 3.8 fL (normal 6.5-11 fL). The erythrocyte sedimentation rate (ESR) was 87 mm (normal 1-9 mm/ 1 hour). Her fasting blood sugar level was

borderline high at 6.4 mmol/L (normal 4.2-6.4 mmol/L). She was provisionally diagnosed as a case of acute dysentery and treated with oral metronidazole 400 mg three times a day for a week. She was discharged two days later once her symptoms resolved in the ward.

Her stool sample was also sent for laboratory investigation. The stool appearance was mucoid and watery, and positive for occult blood. The stool specimen was initially cultured on Xylose-Lysine-Desoxycholate (XLD) agar and incubated under aerobic condition at 36°C. It yielded mix growth overnight; one unusual colony was identified and further subcultured on blood agar and MacConkey agar, producing a non-mucoid, transparent or nonfermentative growth with black spots. Upon further testing, the organism was found to be gram-negative, positive for hydrogen sulfide in triple sugar iron (TSI) and oxidase-positive, rod bacillus. No growth was detected for *Salmonella spp*, *Shigella spp*, *Escherichia coli*, and *Vibrio cholera*.

Using BD BBL Crystal™ Enteric/Nonfermenter Identification Kit and an automated computerised BBL Identification System Electronic Codebook (BBL Becton Dickinson Microbiology Systems, 1996; Cockeysville, Maryland, USA) the organism was identified as *Shewanella putrefaciens*.

The Müller Hinton agar disk diffusion method was used for antimicrobial susceptibility determination and each zone size was interpreted by reference to the National Antibiotics Sensitivity, Surveillance and Research (NASSR)-Antibiotic Testing Panel Guideline (Clinical and Laboratory Standards Institute, Updated 14 September 2011). The organism was susceptible to ceftazidime and cefoperazone but resistant to gentamicin and amikacin.

The patient was called up to come to the outpatient department after the results were reviewed by a medical officer. Her condition was reassessed and she was given oral cefuroxime 500 mg twice a day for another one week. However, the next day she presented again to the outpatient department with complaint of sudden passing out a large amount of profuse blood per rectum earlier that day. Further physical examination of the rectum revealed that there was a tumor situated 3cm from the anus. She was then referred to a tertiary hospital for further investigation and management. Rectal growth biopsy revealed adenocarcinoma (grade II). The tumor was surgically removed in June 2012 and she responded well to chemotherapy.

This article was accepted: 23 September 2014

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## DISCUSSION

*Shewanella spp* is a facultatively anaerobic, motile, gram-negative rod bacilli belonging to the Vibrionaceae<sup>1</sup> family. It can be found throughout the world, mainly in marine environments and soil; hence, the source of the infection is mainly via exposure to seawater or consumption of contaminated fish.<sup>1,2</sup> Illnesses due to *Shewanella* infection that have been described in the literature include infections of skin and soft tissues following trauma, and bacteremia,<sup>3</sup> and are usually associated with predisposing risk factors such as severe underlying debilities or immunocompromised conditions.<sup>3</sup> The mortality rate due to *Shewanella* infection is estimated to be between 20-30% but this could be attributed to the severe underlying diseases.<sup>4</sup>

Out of more than 30 different species of *Shewanella* that have been identified, only *Shewanella algae* and *Shewanella putrefaciens* cause infections in human<sup>1</sup>. Nozue *et al* found that most strains isolated from human clinical specimens and identified as *Shewanella putrefaciens* were shown, after further testing, to be *Shewanella algae*.<sup>5</sup> This problem arises because in most of automated and semi-automated computerised identification systems, databases for *Shewanella algae* were not included.<sup>1</sup> According to Holt *et al*, it seems likely that more than 80% of isolates from humans are *Shewanella algae*.<sup>1</sup> Therefore, the culture result which identified *Shewanella putrefaciens* in the case reported here should be interpreted with caution. Studies have shown that the two organisms could be differentiated from each other by conducting phenotypic characterizations,<sup>1,5</sup> and by *Shewanella algae* being able to produce beta-haemolysis on sheep blood agar, to grow at 42°C and in 6% NaCl, an ability to reduce nitrite, and mucoid colony consistency, in contrast to *Shewanella putrefaciens*.

However, even though some studies indicate that *Shewanella algae* appears to be the more virulent species, possibly due to the production of a hemolytic substance,<sup>1</sup> species identification in this case did not affect patient's management. *Shewanella* infections are usually managed using combination of surgical interventions such as debridements/drainage and effective antibiotics.<sup>1,3,4</sup>

## CONCLUSION

The lessons learnt from this case are twofold: (i) *Shewanella spp* is an unusual cause for acute bacillary dysentery, especially in those with a history of exposure to seawater or eating contaminated fish, and (ii) whenever *Shewanella spp* is identified, the presence of underlying co-morbidities such as malignancies or immunocompromised conditions should be considered, prompting further assessment.

## ACKNOWLEDGEMENT

The author would like to thank the Director General of Health, Malaysia for permission to publish this paper. Many thanks to Dr Claire Abeng, the Director of Saratok District Hospital, for giving permission to review the case; special thanks to Ms. Laxmi Ji Raja, Medical Laboratory Technician of Saratok District Hospital for her information on identification of the organism and Datu Dr Andrew Kiyu, consultant epidemiologist, Sarawak Health Department for his comments.

## REFERENCES

- Holt HM, Gahrn-Hansen B, Bruun B. *Shewanella algae* and *Shewanella putrefaciens*: clinical and microbiological characteristics. Clin Microbiol Infect 2005;11(5):347-52.
- Nath R, Saika L, Choudhury G, Das PP. Isolation of *Shewanella algae* from rectal swabs of patients with bloody diarrhoea. Indian J Med Microbiol 2011; 29(4): 422-5.
- Tsai MS, You HL, Tang YF, Liu JW. *Shewanella* soft tissue infection: case report and literature review. Int J Infect Dis 2008; 12: e119-24.
- Liu PY, Shi ZY, Lin CF, *et al*. *Shewanella* infection of snake bites: a twelve-year retrospective study. Clinics 2012; 67(5): 431-5.
- Nozue H, Hayashi T, Hashimoto Y, *et al*. Isolation and characterization of *Shewanella* alga from human clinical specimens and emendation of the description of *S. alga* Simidu, *et al.*, 1990, 335. Int J Syst Bacteriol 1992; 42(4): 628-34.