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Single Case

Comamonas testosteroni: Is It Still a Rare Human Pathogen?

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Keywords

Comamonas testosteroni · Stool culture · Colostomy in situ

Abstract

Comamonas testosteroni (formally *Pseudomonas testosteroni*) is common environmental bacterium that is not part of the human microbiome. Since its identification as a human pathogen in 1987, numerous reports have drizzled in, implicating this organism for various infections. Although these organisms are of low virulence, some of their obscurity perhaps is due to the incapability of clinical laboratories to identify them. Most of the reported cases are bloodstream infections. We report a case of gastroenteritis caused by this organism in a 65-year-old female with colostomy in situ.

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Introduction

Comamonas belong to the genus *Comamonas*, family Comamonadaceae, which are betaproteobacteria in the pseudomonas rRNA homology group III [1]. *Comamonas testosteroni* strains are capable of utilising testosterone, 4-hydroxybenzoate, acetate, and lactate as their sole carbon sources, but not glucose and most of the carbohydrates, hence the name “testosteroni” [2]. *Comamonas* species are aerobic, gram-negative, motile, pink-pigmented, oxidase-positive bacilli that grow well on routine bacteriological media. This group consists of four species: *C. terrigena*, *C. testosteroni*, *C. denitrificans*, *C. nitrativorans*. The organisms have low

virulence and occasionally cause human disease [3]. *C. testosteroni* can be found in intravenous catheters, the respiratory tract, the abdomen and urinary system, and the central nervous system [4]. Here, we present a case of *C. testosteroni*-associated bout of passage of fresh blood through a colostomy site.

Case Report

A 65-year-old female with a 4-year history of colostomy was admitted to the emergency department of our tertiary care hospital, with a bout of passage of fresh blood through the colostomy site. Two days prior she had had 2 episodes of vomiting followed by watery diarrhoea. Physical examination revealed a pulse rate of 120 beats/min and a blood pressure of 100/60 mm Hg. The colostomy site showed no visible inflammation or ulceration.

Laboratory Investigations

Routine haematological investigation showed haemoglobin 9 g/dL, leucocytosis (total leucocyte count $24.2 \times 10^3/\mu\text{L}$), and a platelet count within normal limits. Biochemical parameters (liver function, renal function tests, and serum electrolytes) were within the reference range. Serology for human immunodeficiency virus, hepatitis B virus surface antigen, and hepatitis C virus were non-reactive. Ultrasonography incidentally revealed cholelithiasis. Stool and blood cultures were sent to the microbiology laboratory of Government Medical College Srinagar. The patient was given fluid and electrolyte replacement and empirically started with oral ciprofloxacin 500 mg b.i.d.

Stool Workup

A fresh semi-formed sample was received in a universal container. Microscopic examination showed red blood cells as well as peripheral blood monocytes and polymorphonuclear leucocytes. Saline and iodine mounts did not show any pathogenic parasite. The sample was cultured on blood agar plate (Fig. 1), MacConkey agar (Fig. 2), xylose lysine deoxycholate (XLD) agar (Fig. 3), and Selenite F broth. Cultures were incubated in air at 35–37°C [5].

Observations

After overnight incubation, there was a predominant growth of non-lactose-fermenting colonies (colourless) on MacConkey agar (Fig. 2) and red colonies without black centre on XLD agar plate (Fig. 3). The red colonies without black centre were found to be motile and catalase and oxidase positive. They were then subjected to an enteric screening procedure using VITEK 2 COMPACT (bioMérieux, Inc.) gram-negative card No. GNB 280. The stool culture report was positive for *C. testosteroni* with 99% probability. The isolate was susceptible to amikacin, gentamicin, cotrimoxazole, minocycline, cefepime, imipenem, meropenem, ceftazidime, cefoperazone/salbactam, piperacillin/tazobactam, ceftazidime, and tigecycline/colistin, whereas it was resistant to ciprofloxacin, levofloxacin, and aztreonam. The blood culture was sterile after 24 and 48 h of aerobic incubation. The patient was cured of dehydration; however, she continued to have diarrhoea, but the stool was not bloody. Oral ciprofloxacin treatment was halted after 3 days and the patient was put on probiotics. She continued to pass loose stools for about 6 days, then the stool consistency was normal.

Discussion

Comamonas are ubiquitously found in nature and have a global distribution. Intra-abdominal infections are the commonest infections reported with this organism [6]. Passage of blood with stool through a colostomy site may indicate many aetiologies, including trauma, ulcer, growth, or infection. Among causes of food poisoning accompanied by diarrhoea and vomiting, *Salmonella*, *Shigella*, *E. coli* 0157, H7, *Staphylococcus aureus*, *Campylobacter* spp., *Plesiomonas*, and *Aeromonas* have been commonly implicated in otherwise normal individuals. In the absence of known pathogens, alteration in the gut microflora could be the reason for continuous diarrhoea, as is observed with patients on antibiotics. The high genetic pliability of *Comamonas* species, as well as their inherent ability as an environmental pathogen to survive in various ecological niches, make it a formidable candidate to cause mild but persistent infections, especially in individuals with predisposing conditions. Arda et al. [7] reported a case of *C. testosteroni* meningitis in a patient with recurrent cholesteatoma. This could point to the gall bladder as a site of colonisation for such microorganisms. Our patient also showed cholelithiasis on ultrasonography, but the gall bladder was not inflamed. Ma et al. [8] studied the prototypic strain of the bacteria and found that they have poor ability to metabolise carbohydrates. However, they possess genes that utilise aromatic and short-chain fatty acids as carbon source, but have poor sugar metabolising pathways. Biliary secretions are rich in fatty acids, and theoretically *C. testosteroni* can thrive in the bile-rich environment of the gall bladder, an assumption that could be investigated.

This is a rare incidence of *C. testosteroni* being a predominant organism in primary stool culture in an elderly women with colostomy in situ. Opota et al. [9] reported a case of *C. kersersii* bacteraemia in a 65-year-old female in a setting of diverticulitis and gastrointestinal infection. They also isolated *C. testosteroni* in a stool sample from a patient in Lausanne University Hospital, Switzerland. The blood culture in our patient was sterile, possibly because there was no fever with the diarrhoea. This could further point to local displacement of the gut microflora, mainly anaerobes, in patients with colostomies. Most laboratories are ill equipped to detect such atypical pathogens that can cause human disease in certain clinical settings and confuse the clinical picture. Therefore, automated identification systems can help identify such isolates. In addition, brisk spread of drug resistance in environmental pathogens signals an alarm for the medical fraternity for limited options of antibiotic use which they are left with for the treatment of infections. The case for isolation of environmental organisms, predominantly from stool cultures of diarrhoea patients, compels us to think beyond the normal gut pathogens in causal relationship of diarrhoeas in special clinical settings such as irritable bowel, ulcerative colitis, colostomies, etc., *Comamonas* being one of them. The myriad gut microflora discovered by the ambitious Human Microbiome Project would help us in better understanding the intricate relationships between endogenous gut microflora and transient environmental bacteria that possibly can lead to bowel disturbances. We believe that such interactions need to be further researched into. Moreover, probiotics such as *Lactobacillus casei*, *Saccharomyces boulardii*, and *Enterococcus* lactic acid bacteria are known to be useful in shortening the duration of acute infectious diarrhoea and decreasing stool frequency. We recommend that patients on colostomies be put on probiotic prophylaxis, since such patients frequently have a history of bowel disturbances.

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Statement of Ethics

The article was done according to the World Medical Association Declaration of Helsinki ethical principles for medical research involving human subjects.

Disclosure Statement

The authors declare no conflict of interest.

References

- 1 Lipuma J, Currie B, Peacock S, Vandamme P: *Burkholderia*, *Stenotrophomonas*, *Ralstonia*, *Cupriavidus*, *Pandoraea*, *Brevundimonas*, *Comamonas*, *Delftia*, and *Acidovorax*; in Jorgensen J, Pfaller M, Carroll K, Funke G, Landry M, Richter S, Warnock D (eds): Manual of Clinical Microbiology, vol 43, ed 11. Washington, DC, ASM Press, 2015, pp 791–812.
- 2 Liu L, Zhu W, Cao Z, Xu B, Wang G, Luo M: High correlation between genotypes and phenotypes of environmental bacteria *Comamonas testosteroni* strains. BMC Genomics 2015;16:110.
- 3 Bayhan GI, Tanır G, Karaman I, Özkan S: *Comamonas testosteroni*: an unusual bacteria associated with acute appendicitis. Balkan Med J 2013;30:447–448.
- 4 Altun E, Kaya B, Taktakoglu O, Karaer R, Paydas S, Balal M, Seyrek N: *Comamonas testosteroni* peritonitis secondary to dislocated intrauterine device and laparoscopic intervention in a continuous ambulatory peritoneal dialysis patient. Perit Dial Int 2013;33:576–578.
- 5 Pezzlo M: Processing and interpretation of bacterial fecal cultures; in Isenberg HD (ed): Essential Procedures for Clinical Microbiology. Washington, DC, ASM Press, 1998, pp 90–94.
- 6 Reddy AK, Murthy SI, Jalali S, Gopinathan U: Post-operative endophthalmitis due to an unusual pathogen, *Comamonas testosteroni*. J Med Microbiol 2009;58:374–375.
- 7 Arda B, Aydemir S, Yamazhan T, Hassan A, Tunger A, Serter D: *Comamonas testosteroni* meningitis in a patient with recurrent cholesteatoma. APMIS 2003;111:474–476.
- 8 Ma YF, Zhang Y, Zhang JY, Chen DW, Zhu Y, Zheng H, Wang SY, Jiang CY, Zhao GP, Liu SJ: The complete genome of *Comamonas testosteroni* reveals its genetic adaptations to changing environments. Appl Environ Microbiol 2009;75:6812–6819.
- 9 Opota O, Ney B, Zanetti G, Jatou K, Greub G, Prod'homme G: Bacteremia caused by *Comamonas kerstersii* in a patient with diverticulosis. J Clin Microbiol 2014;52:1009–1012.

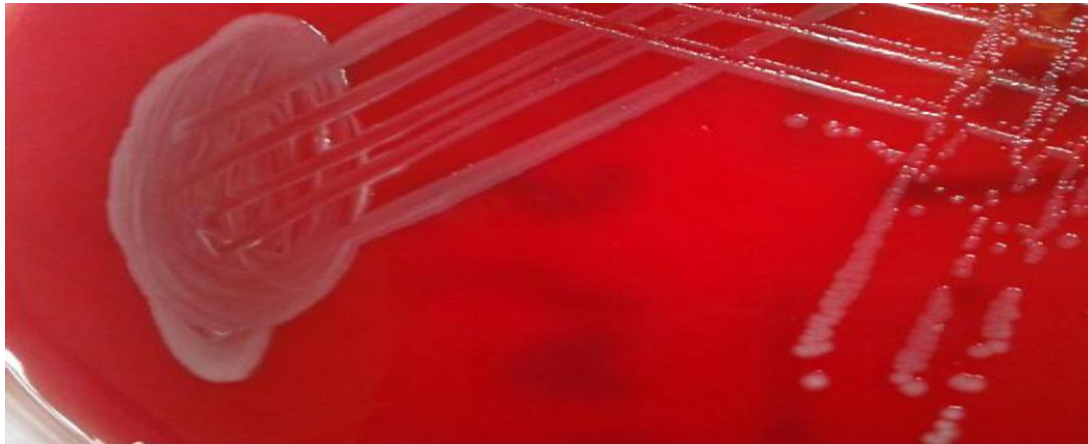


Fig. 1. *C. testosteroni* culture on blood agar showing grey-white, non-haemolytic colonies.

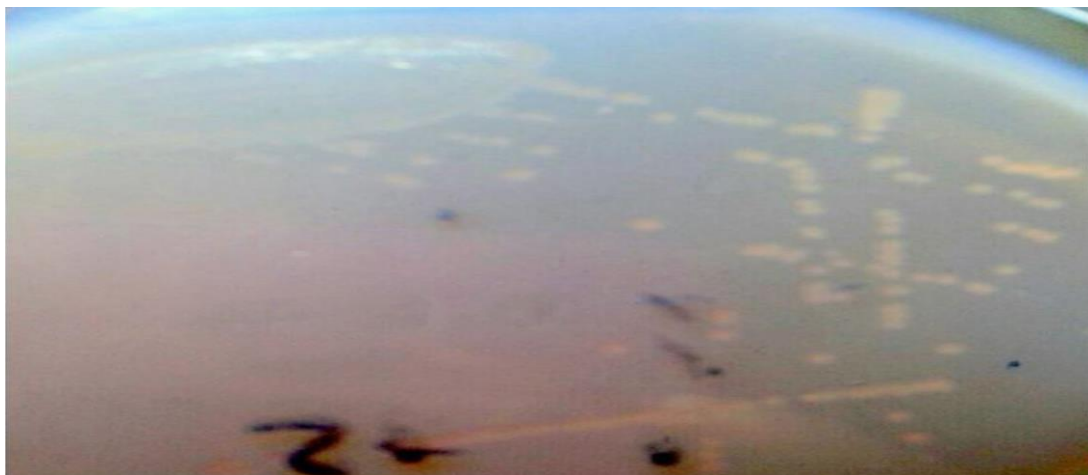


Fig. 2. *C. testosteroni* culture on differential and selective medium. MacConkey agar showing pale non-lactose-fermenting colonies.



Fig. 3. *C. testosteroni* growth on highly selective and differential medium for gut pathogens. Xylose lysine deoxycholate agar showing red colonies.