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Bicytopenia and Urinary Infection Due to Chryseobacterium *indologenes* in an Immunocompetent Patient: A Case Report

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Abstract: Chryseobacterium *indologenes* was saprophytic gram-negative rods which can give multiple organ failure among the immunocompromised patients. In this paper, we herein report a case of bicytopenia and severe urinary infection due to Chryseobacterium *indologenes* in immunocompetent patient. The case consisted of a 45-year-old Malagasy male immunocompetent patient, admitted for acute onset of fever and chills three days after laparotomy. He had no past medical history. Clinical examination showed low blood pressure 80/40mmHg, heart rate beat 130 bpm. He presented distended bladder. The remainder of the physical examination was unremarkable. Laboratory test showed anemia and thrombocytopenia and elevated C reactive protein. Urine culture was positive for multiresistant C. *indologenes*, but the antibiogram was unavailable. The patient's inflammatory and vasculitis work-up was unremarkable. Malignancy work-up was also negative. Bladder catheter was removed. Clinical improvement was observed on empiric levofloxacin® and trimethoprim-sulfamethoxazole® antibiotic therapy. Bicytopenia and severe form urinary infection in an immunocompetent patient was a manifestation of C. *indologenes* in our case. Association of broad-spectrum antibiotic might be used in nosocomial infection if the antibiogram was unavailable in this infection. Removing the bladder catheter may also be an important consideration. Furthermore, there was no similar case in our hospital. So, more epidemiological studies are required to explain the transmission mechanism and develop effective preventive measures.

Keywords: Chryseobacterium *indologenes*, Nosocomial Urinary Infection, Bicytopenia, Immunocompetent

1. Introduction

Chryseobacterium *indologenes* was saprophytic gram-negative rods though widely distributed in environment, responsible for an uncommon human pathogen. This infection may cause multiple organ failure, particularly among the immunocompromised patients [1-3]. However, there is no gold standard for the management of C. *indologenes*. This infection is frequently reported in Asia with a few sporadic cases in Europe and in the United States. Related data are rarely reported in immunocompetent patient from sub-Saharan Africa. In this paper, our aim was to report a case of bicytopenia and severe form of urinary infection due to C. *indologenes* in an immunocompetent patient,

successfully controlled by empiric levofloxacin® and trimethoprim-sulfamethoxazole® antibiotic therapy.

2. Observation

The case consisted of a 45-year-old Malagasy man, hospitalized for further management of acute onset of fever from three days after laparotomy. Two weeks earlier, he was victim of abdominal bladed weapon accident. He had no past medical history. At admission, he was alert. Clinical examination recorded hyperthermia at 38.9°C and chills, low blood pressure at 90/55 mmHg and tachycardia at 120 bpm. He presented distended bladder. Abdominal and cardiopulmonary examination was normal. The remainder of the physical examination was unremarkable. Laboratory test showed normocytic anemia at 10 g/dl, thrombocytopenia at 61 G/L, normal white blood cell count, and elevated C reactive protein at 48 mg/L. Malaria test was negative. Viral hepatitis B, C and HIV serology was negative. Renal, hepatic and thyroid functions were normal. The thoracic, abdominal and pelvic CT scan was unremarkable. Intravenous ceftriaxone® and ciprofloxacin® was administered. After three days, the patient always presented fever and chills. The remainder of his physical examination was within normal limits. Reinterpretation of the abdominal CT-scan was unremarkable. Another abdominal CT scan was normal. Then, he was hospitalized in the intensive care for septic shock with high fever at 39°C and chills, low blood pressure at 80/40 mmHg and heart rate 130 bpm. He was managed with administration of noradrenalin® associated with intravenous hydrocortison. Another antibiotic was started including imipenem® and amikacin®. After seven days, a result of urine culture was arrived and identified a gram-negative bacillus of the Chryseobacterium *indologenes*. This germ was multi-resistant and laboratory's VITEK system refused automatically to give the antibiogram. The blood culture came back negative. Laboratory test confirmed normocytic anemia at 9 g/dL, thrombocytopenia at 54 G/L, elevated C reactive protein at 96 mg/L and serum ferritin 975 ng/ml. The antinuclear antibodies and antineutrophil cytoplasmic antibodies were negative. Cardiac ultrasound was normal. The patient's inflammatory and vasculitis work-up was unremarkable. Malignancy work-up was also negative. Diagnosis of bicytopenia and nosocomial urinary infection due to Chryseobacterium *indologenes* was finally established. There was no other similar case in our Hospital. He was managed for levofloxacin® and trimethoprim-sulfamethoxazole® administered empirically for two weeks. The evolution was uneventful, with complete remission of the symptoms. The patient was followed for more than one year and there was no other new systematic symptom.

3. Discussion

C. indologenes, although uncommon, is an important pathogen causing especially bicytopenia and severe urinary infection cases in the immunocompetent patient, successfully controlled by empiric levofloxacin® and trimethoprim-sulfamethoxazole® antibiotic therapy.

The majority of reported cases are nosocomial, often associated with immunosuppression or indwelling catheters. It has been reported as the causative agent in bacteremia, peritonitis, pneumonia, empyema, pyelonephritis, cystitis, meningitis and central venous catheter-associated [4-6]. However, only few cases were reported in immunocompetent patient. So, in Portugal in 2014, Cunha et al, reported a case of a 60-year-old man, who presented community acquired C. *indologenes* in immunocompetent patient, susceptible only to ciprofloxacin® [7]. So, C. *indologenes* was a rare disease agent with low pathogenicity but capable of causing severe illness. In our case, the patient presented bicytopenia and severe septic shock. The origin of cytopenia (anemia and thrombocytopenia) was unclear, probably secondary to the severe infection. However, antibiogram was unavailable. So, levofloxacin® and trimethoprim-sulfamethoxazole® were administered empirically. The clinical and biological evolution was uneventful. In Spain, in 2013, Acosta et al, reported the case of a patient who developed a urinary tract infection caused by C. *indologenes*, treated successfully with empiric levofloxacin® alone [1]. The study of susceptibility is not standardized. This infection produces a metallo-b-lactamase that provides resistance to carbapenems. According to the results of the SENTRY antimicrobial surveillance program, the most active agents against C. *indologenes* are the quinolones (gatifloxacin and levofloxacin) and trimethoprim-sulfamethoxazole (> 95% susceptibility). Ciprofloxacin, cefepime, ceftazidime, piperacillin, and rifampin showed reasonable activity (85% susceptibility). Furthermore, from the SENTRY antimicrobial surveillance program (1997–2001), vancomycin, chloramphenicol, linezolid, and glycopeptides are not appropriate for treating infections due to this organism [8-10]. Yadav et al reported a case of 56-year-old Indian man in 2018 who suffered of leukemia, with acute fever. Urine culture found C. *indologenes*, multi-resistant; but sensitive only to nitrofurantoin [11]. These infections have often been associated with a high mortality rate according a result of the increased resistance to antibiotics and the absence of a gold standard. The mortality rate of C. *indologenes* varies with different studies. However, in a 2011 study from Taiwan, which included 10 patients with C. *indologenes* with sepsis showed that the mortality rate was 40% [9]. Further, the analysis of 215 other C. *indologenes* cases, always from Taiwan study, revealed that the hospital mortality rate was very high ranging 35% to 63% from pneumonia and bacteremia respectively [8]. These studies did not mention the mortality rate from urinary tract infection. So, the table 1 showed the mortality rate around 11.11% or (1/9 patients) from urinary infection. The death consisted of a 42-year-old Senegalese patient with chronic myeloid leukemia [2]. Furthermore, to accelerate the improvement of infection, indwelling catheters or invasive medical devices should be removed [8]. If the indwelling catheter-related infection caused by C. indologenes does not cause rapid clinical

deterioration, then the device does not require removal [12-14]. However, in some immunocompromised patients, removal of a port or central catheter may hasten recovery [15].

Table 1. *Cases of urinary infection due to Chryseobacterium indologenes reported in the literature.*

Authors	Country Year	Age / Gender	Predisposition factor	Clinical sign	Treatment	Evolution
Acosta et al, [1]	Spain 2013	86/F	Diabetes	Cardiac failure	Levofloxacin (Empiric)	Uneventful
Omar et al, [2]	Senegal 2015	42/F	Leukemia	Acute fever	Ceftriaxone (Resistant)	Death
Palewar et al, [3]	India 2017	52/M	Diabetes	Urinary infection	Trimethoprime-Sulfamethoxazole	Uneventful
Palewar et al, [3]	India 2017	38/F	Uterine myoma	Dysuria	Ciprofloxacin or Levofloxacin	Uneventful
Bhuyar et al, [4]	India 2012	19/F	Urinary catheter	Fever, dysuria	Piperacillin-Tazobactame	Uneventful
Solanke et al, [5]	India 2016	21/F	Post-abortion	Acute fever	Tigecycline	Uneventful
Mukerji et al, [6]	USA 2016	63/M	Urinary catheter	Acute fever, dysuria	Piperacillin-Tazobactame	Uneventful
Cunha et al, [7]	Portugal 2014	60/M	Immuno-competent	Sepsis dysuria	Ciprofloxacin or Levofloxacin	Uneventful
Yadav et al, [11]	India 2018	56/M	Leukemia	Acute fever	Nitrofurantoin	Uneventful

To return at the case in discussion, although it is an uncommon germ, it must be considered as an uncommon cause of bicytopenia and severe urinary infection, especially in immunocompetent patients with invasive medical devices. Because of varying susceptibilities, it has been suggested that the treatment of the organism should be based on its sensitivity pattern. In our case, the antibiogram was not unavailable. Our isolated pathogen was sensitive to the empiric association of levofloxacin® and trimethoprim-sulfamethoxazole®. C. *indologenes* was Betalactamase producer and presents multiple resistances to very strong antibiotics. So, we have to reinforce the fight against nosocomial infection. Furthermore, causal relationship between bicytopenia (anemia and thrombocytopenia) and C. *indologenes* was established. As far as we can tell, there have been no more such cases that have been formally published, and this would be the first Malagasy case report in the literature.

4. Conclusion

Bicytopenia and severe urinary infection due to C. *indologenes* coexisted in immunocompetent patient. From this case, C. *indologenes* consisted of the main differential diagnosis of bicytopenia and severe urinary infection in immunocompetent patient. Association of broad-spectrum antibiotic such as levofloxacin® and trimethoprim - sulfamethoxazole® might be used in nosocomial infection if the antibiogram was unavailable in this infection. There was no similar case in our hospital. So, more epidemiological studies are required to explain the transmission mechanism and develop effective preventive measures and to fight against nosocomial infection.

Conflict of Interest

The authors declare that they have no competing interests.

Author's Contribution

All authors contributed to project conception and critical review of manuscript. The author (s) read and approved the final manuscript.

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