

**Case report:**

**Fatal Case of *Chromobacterium violaceum* Bacteraemia**

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**Abstract:**

*Chromobacterium violaceum* is rarely associated with human infection in tropical and subtropical regions. We report a fulminant fatal case of bacteremia in a 52-year-old lady, with underlying diabetes mellitus, who was presented with a month history of back swelling associated with fever, lethargy and poor oral intake. *C. violaceum* was isolated from blood and identify by standard biochemical test. However the patient's condition deteriorating rapidly and succumbed to death on the day of admission. In these regions, *C. violaceum* should be one of the differential causes of sepsis, especially if the patient presented with skin lesions and/or multiple organ abscesses with history of exposure to soil or stagnant water.

**Keywords:** *Chromobacterium violaceum*; septicemia; diabetes mellitus

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**Introduction:**

*Chromobacterium violaceum* (*C. violaceum*) usually found in stagnant water and soil in the tropical and subtropical regions. Human infections caused by this organism are very rare. In general, *C. violaceum* infection typically starts with a localized skin infection after contact with stagnant water or soil and it can progress to fulminating septicemia, with necrotizing metastatic lesions and multiple abscesses. Although human infections caused by this organism are uncommon, it is noteworthy for clinicians to consider it as part of the differential diagnosis of sepsis associated with a history of exposure to stagnant water.

**Case report**

52-year-old Malay lady, was presented with a month history of back swelling associated with fever, lethargy and poor oral intake. She had underlying diabetes mellitus and hypertension, however defaulted treatment for almost 3 months. The swelling became progressively increase in size and

was associated with pus discharge within one week prior to admission.

She was initially presented in district hospital, and upon admission, she was conscious but tachypnoeic, hypotensive (blood pressure 90/61 mmHg) and tachycardic (pulse rate 127 bpm). On examination, there was a large abscess at the posterior trunk extending from upper thoracic to lumbar region associated with foul smelly pus discharge.

Blood investigations showed leukocytosis (total white count:  $16.7 \times 10^9/L$ ), anaemia (hemoglobin: 8.1 g/dL), with normal renal function and no metabolic acidosis. Intravenous amoxicillin clavulanate 1.2g was initiated and the patient was transferred to general hospital for further management. Upon arrival, her condition worsening. She became persistently hypotensive despite on inotropic support and succumbed to death on the day of admission.

Two sets of blood culture which was obtained from district and general hospital were sent to microbiology laboratory. Growth were detected from both culture

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following few hours of incubation and gram stain from the blood smear showed gram negative bacilli (Figure 1 A). The sample was inoculated on blood agar and MacConkey agar, and the following day of incubation, smooth, round, convex, with deep violet-pigmented colonies were noticed on all the plates (Figure 1 B and C). Triple sugar iron (TSI) showed alkaline slant, acid butt, with no gas production. The organisms are motile, biochemically negative for indole but positive catalase and oxidase (Figure 1 D). Based on the colony morphology and the biochemical reactions, the isolate was identified as *Chromobacterium violaceum*.

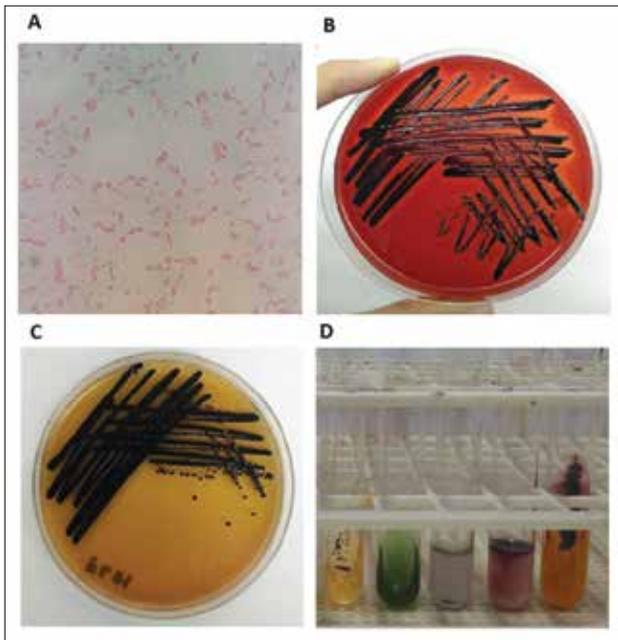


Figure 1: Identification of the organism. A. Gram stain of *C. violaceum* showed Gram negative bacilli. B. *C. violaceum* on blood agar with wide zone beta hemolysis. C. *C. violaceum* on MacConkey agar. D. Biochemical reaction of the organism. From right to left: triple sugar iron showed alkaline slant, acid butt with no H<sub>2</sub>S; motility positive; indole negative; citrate negative, urease negative.

#### **Ethical Clearance:**

This case report was submitted for publication after getting Ethical approval from the Ethics Committee of the School of Medical Sciences, Universiti Sains Malaysia Health Campus, 16150 Kubang Kerian, Kelantan, Malaysia.

#### **Discussions**

Infections of *C. violaceum* in humans are rare and most cases tend to progress rapidly with high mortality rates. First infection of *C. violaceum* was fatal septicemia in water buffaloes in Philippines

which was reported by Wooley in 1905, while the first human infection was described by Lesslar JE in 1927 in Malaya, and reported in 1953<sup>1</sup>.

Yang and Li (2011) in their review described four leading clinical manifestations among patients with *C. violaceum* infection, which were fever, sepsis, skin lesions, abdominal pain, and localized abscess. Liver was the most commonly involved organ with mortality achieved 53%<sup>2</sup>. They also found that only 15% of them had comorbidities (such as chronic granulomatous disease, glucose-6-phosphatase deficiency, diabetes mellitus, leukemia, and renal failure), while 57% of them had predisposing factors (such as trauma, exposure to water or soil, or both).

While most cases presented as skin lesions and localized abscess, interestingly, there are report of *C. violaceum*-associated diarrhea<sup>3</sup> and a fatal case *C. violaceum* bacteraemia associated with ruptured appendicitis<sup>4</sup>, where the probable route of exposure was suggested as from the ingestion of contaminated water. Case of urinary tract infection<sup>5</sup> and a fatal case of pulmonary *C. violaceum* infection following aspiration of drain water also has been reported<sup>6</sup>.

*C. violaceum* infection can mimic melioidosis which is caused by *Burkholderia pseudomallei*. Both occurs in similar endemic regions and can present with fulminant life-threatening septicemia, multiple abscess formation in various organs and rapidly spreading soft tissue infections<sup>6</sup>. However, while most cases of melioidosis affect those with diabetes mellitus and other underlying immune compromised states<sup>7</sup>, only few of the reported cases of *C. violaceum* infections had underlying comorbidities<sup>2</sup>.

*C. violaceum* is a motile, Gram negative, facultative anaerobic bacilli. It grows readily on simple nutrient media, including MacConkey agar, at 35–37°C, with ability to produce violet pigment (violacein). On blood agar, it appears as wide zone of beta hemolysis surrounding the colony. In TSI, acid is formed without H<sub>2</sub>S production, while the slant reaction is variable in TSI, depending on the strain. It is positive for catalase and oxidase reactions, but negative for indole, citrate and urease.

Most *C. violaceum* generally gives rise to pigmented colonies. However, non-pigmented strains have been reported, which can be wrongly identified as belonging to other genera of non-pigmented Gram-negative bacilli and may be regarded as contamination or non-pathogen<sup>8</sup>. Both of these strains, nevertheless has not been shown to be statistically significant in term of disease severity, suggesting that pigmentation of *C. violaceum* is not related to its pathogenicity<sup>9</sup>.

Susceptibility testing results for *C. violaceum* varied in different clinical settings and there is no established zone diameter for resistance and susceptibility associated with minimum inhibitory concentration (MIC) breakpoint by Clinical and Laboratory Standards Institute (CLSI). Based on previous reported cases, *C. violaceum* was found to be extremely resistant to penicillins and cephalosporins and recent report showed an increased beta-lactamase activity in *C. violaceum*<sup>2</sup>.

There are no standard guidelines for the treatment of *C. violaceum* infections. Fluoroquinolone and carbapenem, have demonstrated good activity against this microorganism<sup>2</sup>. Study by Aldridge also found that ciprofloxacin was the most active drug to combat this strains<sup>10</sup>. Prompt surgical debridement of infected tissue is needed. Occult microabscess or hidden septic focus may persist in a patient's internal organs despite adequate treatment and may remain potentially fatal<sup>5</sup>. Therefore, an extended period of treatment and maintain a close follow-up procedures

are necessary.

In conclusion, *C. violaceum* infection may become an emergent infection and represents a difficult-to-treat entity, which demand special attention. A prompt and correct diagnosis, optimal antimicrobial therapy, and adequate therapeutic duration for *C. violaceum* infection are essential for the successful of therapy.

#### **Conflict of interest**

We declare that we have no conflict of interest.

#### **Authors' Contributions:**

Data gathering and idea owner of this study: Zakuan Zainy Deris, Nur Hafiza Muharam

Study design: Zakuan Zainy Deris, Nur Hafiza Muharam

Data gathering: , Zakuan Zainy Deris, Nur Hafiza Muharam, Azura Hussin

Writing and submitting manuscript: Zakuan Zainy Deris

Editing and approval of final draft: Zakuan Zainy Deris, Nur Hafiza Muharam

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