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# Case Report

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## **Fatal Course of *Chryseobacterium indologenes* Bacteremia in an Infant with Biliary Atresia and Cytomegalovirus Infection**

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*Chryseobacterium indologenes* is a rare isolate from humans but has been implicated in cases of pneumonia, meningitis, pyomyositis, keratitis, cellulites, bacteremia and indwelling device sepsis. Here-in fatal outcome of sepsis due to *C. indologenes* in a four month old girl with biliary atresia and cytomegalovirus (CMV) infection was presented. Clinical course may be severe including disseminated intravascular coagulation and severe pneumonia mimicking adult-respiratory distress syndrome. Our case is also indicative that *C. indologenes* may occur in children with no history of malignancy, diabetes or indwelling device. Underlying disease including infection like CMV or other chronic conditions like cholestasis or long duration of hospitalization due to chronic illness may be affecting factors on the clinical course of our patient.

**Key words:** *Chryseobacterium indologenes*, bacteremia, children, CMV infection

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## INTRODUCTION

Chryseobacteria, formerly known as Flavobacterium, are a group of nonmotile, catalase positive, oxidase positive, indole positive, non-glucose fermenting, gram negative rods that produce a distinct yellow to orange pigment. Chryseobacteria are not a part of the human flora but are found in soil, plants, foodstuffs and water sources and also it can thrive in aqueous environment and exist in water systems and on wet surface of medical tools and equipment (Hsueh *et al.*, 1996a). *Chryseobacterium indologenes* is a rare isolate from humans but has been implicated in cases of pneumonia, meningitis, pyomyositis, keratitis, cellulites, bacteremia and indwelling device sepsis. In the English literature nearly 40 cases with infection caused by *C. indologenes* were reported. Generally these infections have been implicated in nosocomial or opportunistic infection, especially in immunocompromised status (Hsueh *et al.*, 1996a, b, 1997; Cascio *et al.*, 2005; Akay *et al.*, 2006; Christakis *et al.*, 2005; Lin *et al.*, 2003; Lu and Chan, 1997; Green and Nolan, 2001; Nulens *et al.*, 2001). Here-in severe respiratory failure and fatal outcome of sepsis due to *C. indologenes* in a four month old girl with biliary atresia and cytomegalovirus (CMV) infection was presented.

## CASE REPORT

A 4-month old girl was admitted to our clinic due to cholestasis and suspected CMV infection. She was the first child of the non-related parents. She was born at 32 weeks of pregnancy, 1890 g and followed-up in newborn intensive care unit for 10 day because of prematurity and hyperbilirubinemia. She had no history of total parenteral nutrition, blood transfusion or mechanical ventilation. At 17th day of her life, she was re-hospitalized because of hyperbilirubinemia as 20 mg dL<sup>-1</sup> and she discharged after phototherapy during 3 days. At third months of her life, she hospitalized because of bilateral inguinal and umbilical hernia but operation was not done because of mildly elevated serum AST level as 201 IU L<sup>-1</sup>. Seven days prior of her admission, jaundice progressed and she had also vomiting and acolic gaita. She was referred to our hospital because she had positive Anti CMV-IgM, Anti CMV-IgG antibodies. Physical examination revealed that weight was 4900 g, height was 53 cm, she had icteric appearance to groin, she had hepatomegaly measuring 3-4 cm at the costal margin, bilateral inguinal hernia and umbilical hernia. Because of she has positive Anti-CMV IgM and IgG antibodies with low avidity and CMV antigenemia with polymerase chain reaction, ganciclovir

therapy was started. At 6th day of her admission; clinical status was sudden deteriorated. She was pale, she had respiratory distress and low oxygen saturation. Because of she had metabolic acidosis complicating with hypercarbia, she was intubated. Chest X-ray showed diminished aeration, interstitial pattern mimicking adult respiratory distress syndrome. White blood cells count risen 29300 mm<sup>-3</sup> and erythrocyte sedimentation rate was 48 mm h<sup>-1</sup>, serum CRP levels was 18.7 mg dL<sup>-1</sup>. Because of she had prolonged PT and PTT and low fibrinogen levels and elevated fibrin degrading products; vitamin K, fresh-frozen plasma and low dose heparin were started. Surfactant therapy was administered two times. Cefepime, ampicillin, vancomycin therapy were used consecutively with other supportive treatments. Two blood cultures obtained from different peripheral vein yielded, pure growth of gram-negative rods on sheep blood agar as non-hemolytic, yellow pigmented colonies. The isolate also grew on chocolate agar, but poorly on EMB agar. The isolate was positive for catalase, oxidase and indole. It was identified by the Vitek system (bioMérieux, Marcy l'Etoile, France) as *Chryseobacterium indologenes*. Antibiotic susceptibility testing of the isolate was carried out by the E-test (AB Biodisk, Solna, Sweden) according to the manufacturer's instructions. The isolate was found to be susceptible to amikacin (MIC, 12 µg mL<sup>-1</sup>), ceftazidime (MIC, 6 µg mL<sup>-1</sup>), piperacillin-tazobactam (MIC, 6 µg mL<sup>-1</sup>) and trimethoprim-sulfamethoxazol (MIC, 0.25 µg mL<sup>-1</sup>) and it was resistant to meropenem (MIC, >256 µg mL<sup>-1</sup>) and cefotaxime (MIC, >32 µg mL<sup>-1</sup>). In spite of all therapeutic interventions, her clinical status worsened and she was died. Postmortem liver necropsy showed intrahepatic biliary atresia and no inclusion bodies or pathological findings related CMV infection.

## DISCUSSION

Intravascular catheter-related bacteremia or nosocomial infections are the main source of most *Chryseobacteria* infections and the most majority of cases are immunocompromised such as leukemia, solid tumors, bone marrow transplant, uremia, diabetes mellitus, or burns (Hsueh *et al.*, 1996; Lin *et al.*, 2003). Our case had history of prematurity may be associated with congenital CMV infection and she had biliary atresia. She has no malignancy, usage of antibiotics or clinical findings associated immune dysfunction but she was hospitalized three times after birth in different medical centers. The majority of *C. indologenes* infections are linked to the use of indwelling devices but non-catheter-related bacteremia may also occur like our

case (Cascio *et al.*, 2005; Christakis *et al.*, 2005). Although *C. indologenes* is widely distributed in hospital environments, the source of infection in the majority of infections remains unknown. It is likely that the establishment of an infection requires the presence of the production of a biofilm on foreign materials or a suitable portal of entry and immunodeficiency (Hsueh *et al.*, 1996a, b, 1997; Pan *et al.*, 2000).

In our case, two different blood cultures obtained from two peripheral veins revealed *C. indologenes* at 6th days of her admission. Her clinical course dramatically worsened and she died in spite of broad spectrum antibiotics and other supportive treatments. *C. indologenes* has been implicated in cases of pneumonia, meningitis, pyomyositis, keratitis, cellulitis, bacteremia and indwelling device sepsis (Hsueh *et al.*, 1996a, b, 1997; Cascio *et al.*, 2005; Akay *et al.*, 2006; Christakis *et al.*, 2005; Lin *et al.*, 2003; Lu and Chan, 1997; Green and Nolan, 2001; Nulens *et al.*, 2001). Our patient had severe pneumoniae mimicking adult respiratory distress syndrome requiring mechanical ventilation and surfactant therapy and had also disseminated intravascular coagulation. Pan *et al.* (2000) reported that isolates from blood samples-like our case- had significantly protease activity than the samples obtained from other site and they suggested that elevated protease activity may be implicated in the invasiveness of the microorganism.

Our patient has also both CMV antigenemia and anti-CMV antibodies with low avidity. CMV infection may be related with severe pneumoniae or several courses especially in immunocompromised status. But in our case, her clinical status was suddenly deteriorated despite of 6th day of ganciclovir therapy. Erythrocyte sedimentation rate and CRP levels suddenly increased and blood samples demonstrating *C. indologenes* at this period, we thought that these clinical findings were associated with *C. indologenes* septicaemia. Underlying CMV infection and cholestasis due to biliary atresia, recurrent hospitalization and prematurity may be the predisposing factors for this clinical course of *C. indologenes* bacteremia. Also postmortem examination revealed no supporting findings to severe CMV infection.

Effective antimicrobial agents against *C. indologenes* are difficult to choose because of multiresistant nature of organism (Hsueh *et al.*, 1996a; Chang *et al.*, 1997). Hsueh *et al.* (1996b) reported that broad spectrum antibiotics which were routinely prescribed against glucose non-fermenting gram negative rods, had poor activities against *Chryseobacterium* species. Piperacillin, piperacilline-

tazobactam, cefoperazone, ceftazidime and cefepime are usually effective and were considered the drugs of choice (Hsueh *et al.*, 1996b; Chang *et al.*, 1997; Kirby *et al.*, 2004). But her clinical status worsened and she died in spite of combined antimicrobial therapy including cefepime and ampicillin.

Our case is also indicative that *C. indologenes* may occur in children with no history of malignancy, diabetes or indwelling device. Underlying disease including infection like CMV or other chronic conditions like cholestasis or long duration of hospitalization due to chronic illness may be affecting factors on the clinical course of our patient. Also clinical course may be severe including DIC and severe pneumonia mimicking ARDS.

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