



CASE REPORT

Chryseobacterium Indoloegenes Meningitis in a Patient with Ventriculo-peritoneal Shunt

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ABSTRACT

Chryseobacterium indologenes organism is mostly confined to water and soil and has been isolated from patients in hospitals with severe underlying disease with indwelling devices and implants. Despite its low virulence, it has been found to be inherently resistant to many antibiotics. A rare case of meningitis was reported by *C. indologenes* in an 18-year-old patient treated for hydrocephalous with meningitis with an indwelling ventriculoperitoneal shunt, who was successfully managed with levofloxacin and gentamicin and discharged. This case report describes identification and isolation of *C. indologenes* on the basis of biochemical and microbiological analysis along with clinical signs and symptoms of meningitis with an indwelling ventriculoperitoneal shunt.

Keywords: Central nervous system shunt, Cerebrospinal fluid, *Chryseobacterium*, Meningitis.

How to cite this article: Chatterji T, Das A, Sen M, Mittal V, Singh DK, Agarwal GR, Srivastava JK, Vanvani G, Joshi S. *Chryseobacterium Indoloegenes* Meningitis in a Patient with Ventriculo-peritoneal Shunt. MGM J Med Sci 2016; 3(2):105-109.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Chryseobacterium indologenes is a Gram-negative nonfermentative, nonmotile, oxidase-positive bacilli widely distributed in soil and water. In hospital environments, they have been recovered from water systems and humid surfaces. In 1993, it was first isolated from tracheal aspirate of a patient with ventilator-associated pneumonia infections caused by *C. indologenes*.^{1,2} This

infection is rare, but has been reported as a cause of serious infection in immune-compromised patients and patients with indwelling catheters and devices in world and Indian literature. We hereby report a case of meningitis by *C. indologenes* in an 18-year-old male with indwelling ventriculoperitoneal shunt. Attempt has been made to review the cases of meningitis and other infections from India due to *C. indologenes*.

AIM

The present study aimed to isolate *C. indologenes* in cerebrospinal fluid (CSF) sample that was collected from the extruded peritoneal end of a shunt with full aseptic precautions in an 18-year-old male patient at Dr. Ram Manohar Lohia Institute of Medical Sciences, Lucknow, India.

CASE REPORT

An 18-year-old male was admitted to the hospital complaining of headache, irritability, repeated vomiting, and extruded peritoneal end of shunt. On physical examination, the patient was febrile with signs of raised intracranial tension, signs of meningeal irritation with bilateral impaired vision by the way of perception of light only. The patient had neck torticollis and was suspected of palsy. Laboratory investigations revealed hemoglobin (Hb) of 12.2 g%, total leukocytes count (TLC) 13090/cubic mm with 75% polymorphs, platelet count of 368000/ μ L, sodium (Na) 132, PT/INR 13.0/0.95, and random blood sugar (RBS) 97 mg/dL. Physical examination of CSF revealed slight turbid with pH of 7.5 (alkaline); on chemical examination, sugar was found to be 35 mg/dL (N 70–140 mg/dL) and microprotein level of 133.8 mg/dL (N 8–43 mg/dL). Microscopic examination of CSF exposed TLC 480 cells/cubic mm, polymorphs 55%, and mononuclear cells 45%. Cerebrospinal fluid was collected from the extruded peritoneal end of shunt with full aseptic precaution and was sent to the microbiology laboratory for culture and sensitivity, followed by Gram stain and wet mount. Gram stain of the CSF showed 2 to 8 pus cells/oil immersion field and no microorganisms

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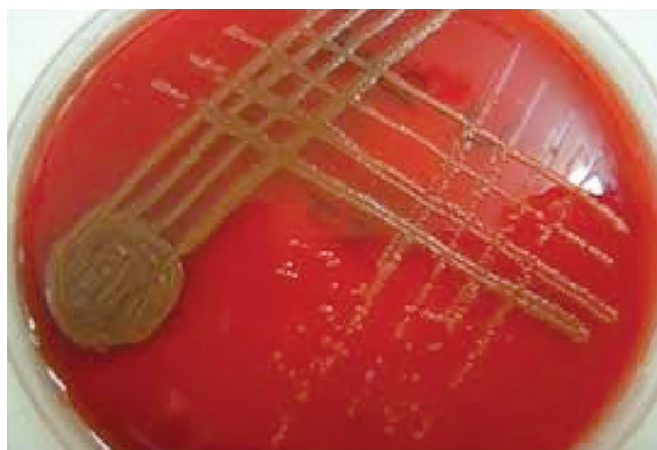


Fig. 1: Colonies of *Chryseobacterium indologenes* on blood agar

were seen. Wet mount examination revealed 4 to 10 pus cells/high power fields and no microorganisms were seen. The CSF was inoculated on blood agar, MacConkey agar, and chocolate agar and incubated at 37°C in CO₂ environment. After overnight incubation, white to yellow nonhemolytic colonies of 2 to 4 mm diameter, smooth, convex with entire border were obtained (Fig. 1). The organism grown was Gram-negative bacilli that were nonmotile, catalase, and oxidase positive. The oxidative fermentative (OF) test of Hugh and Leifson yielded oxidative reaction. Light-yellow colonies were also obtained/observed in peptone water medium. The isolate was put on Vitek-2 compact automated system (BioMerieux, France) for identification. The isolate was identified as *C. indologenes* (98%, excellent identification). Antimicrobial susceptibility testing was done by Vitek-2 automated system. Antibiotic sensitivity testing intermediate (I) for gentamicin, levofloxacin, and tigecycline and susceptibility was not observed against any of the antibiotics. The resistant pattern of the antibiotics was perceived against amikacin, ampicillin-sulbactam, cefepime, ceftazidime, ceftriaxone, ciprofloxacin, imipenem, meropenem, piperacillin-tazobactam, piperacilin, tetracycline, ticarcillin, tobramycin, and trimethoprim sulfamethoxazole. The patient was further put on levofloxacin and gentamicin for 10 days. Fever subsided within 3 days of starting of the antibiotics and the patient gradually improved and follow-up of CSF culture after 10 days of antibiotic therapy did not yield any growth.

DISCUSSION

The genus *Chryseobacterium*, formerly known as *flavobacterium*, was first defined in 1994.³ The six species of the genus *Chryseobacterium* that are more commonly isolated from clinical specimen are *C. meningosepticum*, *C. odoratum*, *C. multivorum*, *C. breve*, and group 11b *Chryseobacterium* spp,

which includes *C. indologenes* and *C. gleum*.⁴ *Chryseobacterium* are exogenous human pathogens and are found in the water systems, surface of equipment, and wet medical devices within the hospital.⁴ We attempted a review of all the reported cases of *C. indologenes* in India (Table 1).

Strains of *Chryseobacterium* are rarely reported in infection among immunocompetent adults and this account for only 1 to 2% of Gram-negative bacilli isolated from clinical samples. It was earlier isolated in urine as well as CSF samples, which led to the cause of meningitis in neonatal patients.^{5,6} The predisposing factors reported in world literature are the immunocompromised status including malignancy, neutropenia, diabetes, organ transplant, steroid use, malnutrition, and ongoing dialysis may predispose to infection.⁷ The world literature cites the indwelling devices responsible for colonization, such as, respirators, endotracheal or tracheostomy tubes, mist tents, humidifiers, incubators for newborn, and syringes.⁸

CONCLUSION

Chryseobacterium indologenes should be considered as a potential pathogen that could be isolated in the presence of artificial shunt or in indwelling devices and implants in human individuals.

CLINICAL SIGNIFICANCE

Chryseobacterium indologenes, a rarely found microorganism, plays a vital role in the onset of infection, which may be further identified and treated with effective antibiotics.

ACKNOWLEDGMENT

Authors would like to be thankful to Dr. Ram Manohar Lohia Institute of Medical Sciences where the present study was conducted.

COMPLIANCE WITH ETHICAL STANDARDS

The procedures were part of a study whose ethical clearance was issued by Institutional ethics committee and the relatives/guardians of the subject were explained the implications and purpose of the study. Written and informed consent were obtained from the parents of the patient for publication of this case report and any accompanying images. The authors have no potential conflict of interest. The disclosure of potential conflict of interest in the prescribed format has been obtained from all the authors.

Table 1: Cases of Chryseobacterium indologenes nationally

Sl. no.	Study	Year and journal	Age/Gender	Presenting complaint	Infection site	Treatment	Associate condition	Course of disease	Drug resistance pattern
1	Endocarditis due to <i>Chryseobacterium meningosepticum</i> . Bomb K, Arora A, Trehan N.	Indian J Med Microbiol 2007 Apr;25(2): 161-162	58-year-old, Male	Non-ST myocardial infarction (MI) and acute left ventricular failure, with a past history diabetes mellitus (DM) and anterior wall myocardial infarct (AWMI)	Blood	Piperacillin-tazobactam, Ciprofloxacin and Rifampicin	Intraaortic balloon catheter (IABC)	Patient expired as he developed left ventricular failure with cardiogenic shock	Ampicillin-sulbactam, Ticarcillin-clavulanic acid, ticarcillin, piperacillin, cefepime, imipenem, ceftazidime, gentamicin, amikacin, and ciprofloxacin
2	<i>Chryseobacterium meningosepticum</i> bacteremia in diabetic nephropathy patient on hemodialysis. Dias M, Prashant K, Pai R, Scaria B.	Indian J Nephrol 2010 Oct;20(4): 203-204	37-year-old, Male	Known stage V diabetic nephropathy and complaints of decreased urine output, low-grade fever, and puffiness of face and pedal edema for 1 week	Blood	Vancomycin and Cefazidime	None	Sterile blood culture reported after	Ampicillin, amoxycylav, aminoglycosides, imipenem, meropenem
3	<i>Chryseobacterium indologenes</i> bacteremia in a preterm baby. Sudharani V, Asiya, Saxena NK.	Indian J Med Microbiol 2011 Apr-Jun;29(2): 196-198	36-weeks-old baby	Delayed cry and meconium-stained liquor for 1 week	Blood	Cefoperazone-sulbactam	None	Improved within 48 hours	Extended-spectrum penicillins, first-generation and second-generation cephalosporins, ceftriaxone, aztreonam, ticarcillin-clavulanate, chloramphenicol, erythromycin, aminoglycosides, imipenem, and meropenem for production of a class B carbapenem-hydrolyzing enzyme
4	<i>Elizabethkingia meningosepticum</i> : An emerging cause of septicemia in critically ill patients. Sarma S, Kumar N, Jha A, Baveja U, Sharma S.	J Lab Physicians 2011 Jan-Jun;3(1): 62-63	60-year-old, Female	Hepatic encephalopathy	Blood	Teicoplanin, Meropenem, and Fluconazol		Died	Ampicillin/Sulbactam, Piperacillin/Tazobactam, Ceftriaxone, Cefipime, Cefoperazone/Sulbactam, Imipenem, Meropenem, Amikacin, Gentamicin, Tobramycin, and Colistin.
5	Urinary tract infection by <i>Chryseobacterium indologenes</i> . Bhuyar G, Jain S, Shah H, Mehta VK.	Indian J Med Microbiol 2012 Jul-Sep;30(3): 370-372	19 years old, Female	Intermittent abdominal pain	Urine	Piperacillin-tazobactam	Malicot's catheter	Sterile urine culture after 10 days	Norfloxacin, ciprofloxacin, ceftazidime, cefotaxime, imipenem, aztreonam, gentamicin, amikacin, tobramycin, colistin, and polymyxin

(Contd...)

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Sl. no.	Study	Year and journal	Age/Gender	Presenting complaint	Infection site	Treatment	Associate condition	Course of disease	Drug resistance pattern
6	Nebulizer-induced superinfection and sepsis with <i>Chryseobacterium indologenes</i> in a postoperative patient with <i>Acinetobacter baumannii</i> pneumonia: A case report and review Padmaja K, Lakshmi V, Sreekanth Y, Gopinath R.	Int J Infect Control 2012;8(2)	35-years-old, Female	Jejunal perforation and underwound jejunal bypass. In the postoperative period, she developed fever, bilateral crepitations with worsening respiratory distress which progressed to acute respiratory distress syndrome (ARDS)	Tracheal aspirate and Blood	Ciprofloxacin and cotrimoxazole	Central venous catheter	Condition was improved and repeat blood cultures resulted to be sterile	Betalactams, piperacillin-tazobactam, and aminoglycosides
7	<i>Elizabethkingia meningoseptica</i> : An emerging pathogen causing meningitis in a hospitalized adult trauma patient. Tak V, Mathur P, Varghese P, Misra MC.	Indian J Med Microbiol 2013 Jul-Sep;31(3): 293-295	23-year-old, Male	Earlier patient met an accident, which led to severe head injury and had right frontotemporal contusion and intraventricular hemorrhage leading to posttraumatic hydrocephalus. After 19 days he turned up with complain of high grade fever of 1 week and GCS score E ₂ V ₁ M ₄ .	CSF	Piperacillin-tazobactam, vancomycin, and cotrimoxazole	None	After 21 days repeat CSF culture was sterile	Ampicillin-sulbactam, ticarcillin, ceftazidime, ceftriaxone, cefepime, cefoperazone-sulbactam, cefepime-sulbactam, tetracycline, chloramphenicol, imipenem, meropenem, amikacin, gentamycin, tobramycin, ciprofloxacin, levofloxacin, and colistin
8	<i>Elizabethkingia meningoseptica</i> : An unusual cause for septicemia. Swain B, Rout S, Otta S, Rakshit A.	JMM Case Rep 2014;2	58-year-old, Male	Abdominal pain for 9 days, followed by high grade fever and abdominal distension for 7 days.	Peritoneal aspirate	Cefoperazone-sulbactam and ciprofloxacin	None	Patient died because of Septicemia	Imipenem
9	<i>Myroides odoratus</i> and <i>Chryseobacterium indologenes</i> : Two rare isolates in the immunocompromised. Deepa R, Venkatesh KG, Parveen JD, Banu ST, Jayalakshmi G.	Indian J Med Microbiol 2014 Jul-Sep;32(3): 327-330	45-year-old, Male	Abdominal distension and swelling in both legs for 1 month, fever, and oliguria for 1 week	Ascitic fluid				Aminoglycosides and aztreonam
10	Neonatal meningitis and sepsis by <i>Chryseobacterium indologenes</i> : A rare and resistant bacterium. Eshwara VK, Sasi A, Munim F, Purkayastha J, Lewis LE, Mukhopadhyay C.	Indian J Pediatr 2014 Jun;81(6): 611-613	6-days old, Female	Lethargic and multi focal clonic seizures. Later developed hydrocephalus	Blood and CSF	Ciprofloxacin and Co-trimoxazole	None	Recovered	Ampicillin, ampicillin-sulbactam, ceftazolin, ceftriaxone, cefepime, aztreonam, meropenem. Colistin, amikacin, and gentamicin

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