

# After Brain Tumor Surgery: Catheter-Related Bacteremia of *Chryseobacterium indologenes* Development in Central Nervous System of An Infancy. A Case Report

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## Summary

40-day male infant has admitted to the hospital by family. He has a complaint including lack of suction, vomiting, decreased of movements and continuous sleep about a week of ongoing. Brain computed tomography recognized a mass (with hyperdense hemorrhage) in the posterior fossa and right cerebellar hemisphere. Therefore, the patient was operated (external ventricular drainage + paramedian incision through suboccipital craniotomy + tumor excision + hematoma excision and duraplasty). Cerebrospinal fluid culture obtained from external ventricular drainage revealed *C. indologenes* with multiple drug resistance. Ciprofloxacin+Trimetoprim-Sulfamethoxosal combined treatment was administration to the patient. There was not reproduction in cerebrospinal fluid samples at the 14th day. According to the pathology report, the patient was diagnosed with low-grade astrocytoma. The patient was referred to a hospital with a pediatric hematology-oncology department.

**Keywords:** Antimicrobial agent; Brain; *C. indologenes*; Infant

## Introduction

*Chryseobacterium indologenes* are commonly found in soil and water [1-3]. It is known that the infection to the patient is usually through medical devices (respirator, intubation tubes, humidity devices, newborn incubators etc.). These medical devices are commonly used in hospitals [1-6]. When the devices are contaminated, they may cause disease especially in neonates and immunosuppressive [3,6-12]. Although it is generally known to cause diseases such as pneumonia, it is rarely known to cause disease in the central nervous system [12-15]. *C. indologenes* have a limited spectrum of antimicrobial susceptibility [14]. For this reason, it is known that deciding the antibiotic to be used in treatment is a risky situation. Therefore, there is no complete consensus on the management of *C. indologenes* infection. In this study, we presented a patient who developed *C. indologenes* infection in the central nervous system after brain tumor operation and treated with Trimetoprim-Sulfamethoxosal (TPM-SMX) and Ciprofloxacin.

## Case Report

40-day male infant has admitted to the hospital by family. He has a complaint including lack of suction, vomiting, decreased of movements and continuous sleep about a week of ongoing. In physical examination of the patient was measured as weight: 4 kg (<3p), height: 54cm (3-10p) and head circumference: 43 cm (>2 SD). The posterior fontanel was 1x1x1,5 cm open and anterior fontanel was 3x3x4 cm (wider than normal and bulging). General condition of the patient was poor (suction difficulty, hypoactive, prone to sleep, pale skin and conjunctiva, strabismus in eyes, decreased search-capture reflexes and deep tendon reflexes). In radiological examination; Brain computed tomography (CT) found a mass (with hyperdense hemorrhage) in posterior fossa and right cerebellar hemisphere (diameter: 3x3). Additionally, irregular lesions, dilatation and hydrocephalus in brain ventricles were observed. Cranial magnetic resonance imaging (MRI) revealed a nodular lesion exhibiting intensive contrast enhancement in the center in the right cerebral hemisphere and a cystic lesion exhibiting peripheral contrast enhancement on with-contrast sections and a lesion exhibiting peripheral hyperintensity (hemorrhagic areas) on T1 and T2 sequences. In cardiology examination of the

patient; there was detected a 2/6 systolic murmur on the left side and fourth intercostal area of the sternum. Pulse was rhythmic but it was tachycardia. Hemogram parameters were measured as RBC 2.168.000 /mm<sup>3</sup>, HGB 6.4 g/dl, HTC 17.9%, WBC: 8790 /ul. Biochemistry parameters were measured as Urea: 23 mg/dl, Creatinine: 0.4 mg/dl, Albumin: 3.4 g/dl, AST: 31 U/L, ALT: 17 U/L, Na: 119 mmol/l, N: 3.8 mmol/l, PT: 15.3 sec, APTT: 24 sec, INR: 1.22. Due to the patient's low hematocrit level and HTC level performed to replacement treatment. Because of increased intracranial pressure (cerebrospinal fluid (CSF)), it was drained by ventricular puncture. Although it was performed ventricular puncture, hydrocephalus of the patient was not healing. Therefore, patient was operated (external ventricular drainage + paramedian incision through suboccipital craniotomy + tumor excision + hematoma excision and duraplasty) by neurosurgeon. In postoperative MRI (for control) confirmed total excision of the mass, evacuation of hematoma and no additional pathology. CSF taken from external ventricular drainage was measured as glucose: 10 mg/dl and protein: 149 mg/dl. At direct microscopy revealed 300 / mm<sup>3</sup> polymorphonuclear leukocyte (PMNL). Antibioqram test requested from CSF sample. Empirical treatment was started (vancomycin: 15 mg/kg, 4 doses/day + Ceftriaxone: 50 mg/kg, 2 doses/day). CSF culture obtained from external ventricular drainage revealed *C. indologenes* with multiple drug resistance. Therefore, the treatment (Vancomycin + Ceftriaxone) was stopped (Table 1).

CSF Culture Result	Antibiogram Name	Sensitive	(MIC) Value
	Piperacillin	Sensitive	≤4
<i>C. indologenes</i>	Ciprofloxacin	Sensitive	0.25
	Trimethoprim/Sulfamethoxazole	Sensitive	≤1/19
	Piperacillin/Tazobactam	Sensitive	≤4/4

Sample: CSF; MIC: Minimal Inhibitor Concentration  
**Table 1:** CSF with antibiograms

As a result of the antibiogram test, *C. indologenes* was susceptible to Ciprofloxacin, Trimethoprim and Sulfamethoxazole. Therefore, Ciprofloxacin (10 mg/kg, 2 doses/day) + TMP-SMX (10 mg/kg, 2 doses/day) combined treatment was started to the patient. There was not reproduction in CSF samples. Therefore, external drainage was removed. Due to normalization (decreased fever, negative infection parameters and improvement of general condition) of the patient was stopped at the 14<sup>th</sup> day (Table 2).

Histochemical Study	Immunohistochemical/Immunofluorescent Study		Result
PAS	GFAP	Partially Cellular and spider-shaped staining observed.	<i>Low-grade astrocytoma</i>
	Ki-67	Very rare staining	
	p53	Negative	
	VT1	Positive	
	EMA	None	
	IDH1	None	
	LCA	None	
	CD34	None	
	Synaptophysin	None	

**Table 2:** Pathology report

According to the pathology report, the patient was diagnosed with “*low-grade astrocytoma*”. The patient was referred to a hospital with a pediatric hematology-oncology department.

## Discussion

*C. indologenes* are common in nature (soil, water etc.) but it is not known in human flora [1]. It can sometimes cause disease in humans [2]. *C. indologenes* is generally cause disease in people with impaired health status (immunosuppression, neutropenia, chronic disease, etc.), neonates and long-term antibiotic users [4,5]. It may contaminate to medical devices (respiratory devices, humidifiers and intubation tubes, etc.) and contaminates other medical devices (catheters and prosthetic valves, etc.) in hospital [6]. When infected, it can cause various diseases (pneumonia, cholecystitis, peritonitis, catheter-related bacteremia, cellulitis and primary bacteremia, etc.) [12-15]. The aim of this case report is on the CNS, which rarely causes disease [6-12]. *C. indologenes* have a limited spectrum of antimicrobial susceptibility. For example, bacteria are known to be resistant to β-lactam group antimicrobial agents (including carbapenems and aztreonam). aminoglycosides, chloramphenicol, linezolid and glycopeptides are known to be inadequate in the treatment of this infection [1,15]. Therefore, treatment to patient may be risky. *C. indologenes* is sensitive to new generation quinolones (Garenoxacin, Gemifloxacin, Levofloxacin (sensitivity: %≥95), TMP-SMX (sensitivity: %95), piperacillin, tazobactam (sensitivity %90), Ciprofloxacin, Cefepime, Ceftazidime, Piperacillin, Rifampin (sensitivity: %85). According to the results of this study, new generation quinolones and TMP-SMX are treatment to the most effective antimicrobial agents in *C. indologenes* infection [1,15]. Antibiotic susceptibility test results of *C. indologenes* isolated from CSF were found to be consistent

with these data. For this reason, it was considered appropriate to use Ciprofloxacin and TMP-SMX combined treatment for 14 days. As a result of the treatment (14<sup>th</sup> day), there was no growth in the sample taken from CSF. For this reason, it was removed the external drainage catheter. It was reported that when *C. indologenes* growth was detected in patients with external shunt implantation, it would not be possible to recover with antibiotic treatment unless catheter was removed [15].

## Conclusion

*C. indologenes* can be transmitted through devices in treatment of the patient. We believe that one of the best treatment options for treating central nervous system infection caused by *C. indologenes* is the combined treatment of TMP-SMX and Ciprofloxacin. It should be noted that this infectious agent can be found in the hospital environment and contaminates the devices, especially through water. It should be noted that it can be transmitted in a period before or after surgery through devices. It should be noted that this situation may adversely affect prognosis, patient well-being and quality of service. For this reason, we believe that the samples taken during the treatment of patients with risk factors should be antibiogram and the treatment should be arranged accordingly.

## Author Contributions

OS, OA, BIH, KS and TM were actively involved in contributed to conception and design, contributed to interpretation, drafted the manuscript and write-up.

## Declaration of Conflicting Interests

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