Chryseobacterium indologenes Infection in an Immunocompromised Patient - A Rare Case Report

Shafeedha Rashbi Karakulangara[1], Rajan Joseph Payyappilly[2]

[1, 2] Department of Microbiology, Government Medical College, Kannur, Kerala, India.

PRESENTATION OF CASE

A 63-year-old male patient with diabetes mellitus, hypertension and chronic kidney disease who has been undergoing haemodialysis thrice weekly developed fever and shivering during haemodialysis for one week. He was doing haemodialysis from elsewhere and presented to nephrology department of our hospital with the same complaints. The patient had an intravenous catheter over left internal jugular vein, which was placed one month back from elsewhere for doing haemodialysis. He is a known case of diabetes mellitus and hypertension for the past ten years and on regular medications.

On examination, the patient was moderately built and nourished, pallor was present and icterus, cyanosis, clubbing, lymphadenopathy, oedema were absent. His respiratory, cardiovascular, central nervous and gastro intestinal system examinations were within normal limit. The patient was febrile (101°F). pulse rate - 98/min, blood pressure – 150/80 mmHg, respiratory rate - 20 cycles per minute, fasting blood sugar - 140 mg/dl, Hb – 9 mg%, WBC count - 5600/µL. On local examination, mild erythema was noted over his neck on intravenous catheter site of left internal jugular vein. Other investigations were within normal limit. Human immunodeficiency virus (HIV), HBsAg and hepatitis C virus (HCV) antibodies were negative. The urine and sputum cultures were done to rule out any genitourinary or respiratory system involvement. Both cultures yielded no pathogens.

The patient was treated with removal of internal jugular vein catheter, and a femoral vein catheter was placed. Blood and tip of intravenous catheter were sent to microbiology laboratory for culture and sensitivity testing. The patient was empirically started on intravenous antibiotic vancomycin.

Corresponding Author:
Dr. Shafeedha Rashbi Karakulangara,
Karakulangara House,
Panangatoor P.O., Tanur,
Malappuram-676302, Kerala, India.
E-mail: shafeedharashbi@gmail.com

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DIFFERENTIAL DIAGNOSIS

1. Intravenous access related infection
2. Respiratory tract infection
3. Urinary tract infection
4. Viral infection

PATHOLOGICAL DISCUSSION

In our laboratory, two blood culture samples which were taken one hour apart and the tip of intravenous catheter were received. Both blood cultures were loaded on BacT/ALERT system which showed turbidity after 48 hours. They were sub cultured into blood agar and MacConkey agar. On the next day, blood agar showed growth of smooth circular yellow pigmented colonies (see fig. 1). There was no growth on MacConkey agar.

The tip the of intravenous catheter was received in our laboratory in a sterile container. On microscopic examination, gram staining of secretions from catheter tip showed gram negative bacilli. It was cultured into blood agar and MacConkey agar. On the next day, the growth on the blood agar was same as that of the blood culture. There was no growth on MacConkey agar.

The colonies from the blood agar were processed. Gram staining of colonies showed gram negative bacilli (see fig. 2), which was non-motile, catalase and oxidase positive. Biochemical reactions were performed and their results are as follows. Oxidation fermentation reaction showed oxidative and non-fermentative pattern. On triple sugar iron agar - no fermentation. Urease and citrate tests were negative. On addition of 10 % KOH solution, colour of the colonies was changed from yellow to red, which indicates the presence of flexirubin pigment. Final identification and sensitivity of the isolate was done by VITEK-2 system. *Chryseobacterium indologenes* was isolated from all samples. It was sensitive to antibiotics such as amikacin, ciprofloxacin, levofloxacin, minocycline and resistant to imipenem, meropenem, ceftazidime, cefepime, cefoperazone-sulbactum, piperacillin-tazobactam, ticarcillin-clavulanic acid etc as shown in table 1. After getting antibiotic sensitivity result, the antibiotic intravenous amikacin was added. Then, condition of the patient improved and thereafter the fever on haemodialysis did not repeat. The patient was discharged after a period of one week. Blood culture done at the time of discharge was sterile. Currently, the patient is doing good and undergoing regular haemodialysis.

Following Criteria Were Used for Identification of the Organism

Gram Staining
Gram negative bacilli.

Colony Morphology on Blood Agar
Smooth circular yellow pigmented colonies

Motility Test
Non-motile.

Oxidase Test
Positive

Catalase Test
Positive.

Oxidation Fermentation Reaction
Oxidative and non-fermentative

Triple Sugar Iron Agar
Non-fermentative.

Urease Test
Negative.

Citrate Test
Negative.

On adding 10 % KOH solution. Colour of the colonies changed from yellow to red. VITEK-2 fully automated microbiological analyser: identified the growth as *Chryseobacterium indologenes*.

Sl. No.	Antibiotic	MIC	Interpretation
1	Ticarcillin-clavulanic acid	>= 128	R
2	Piperacillin-tazobactam	>= 128	R
3	Ceftazidime	>= 64	R
4	Cefoperazone-sulbactum	>= 64	R
5	Cefepime	>= 64	R
6	Aztreonam	>= 64	R
7	Imipenem	8	I
8	Meropenem	>= 16	R
9	Amikacin	<= 2	S
10	Gentamycin	>= 16	R
11	Ciprofloxacin	0.5	S
12	Levofloxacin	0.25	S
13	Minocycline	<= 1	S
14	Tigecycline	2	S
15	Colistin	>= 16	R
16	Trimethoprim-sulfamethoxazole	<= 20	S

Table 1. Antibiotic Sensitivity Pattern of Isolated Chryseobacterium Indologenes to Various Antimicrobial Agents Observed by Vitek-2 System

MIC- minimum inhibitory concentration, R- resistant, S- susceptible, I- intermediate.

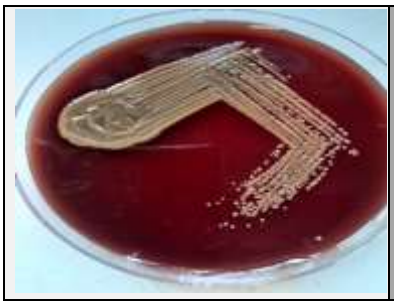

Figure 1. Yellow Colonies on Blood Agar

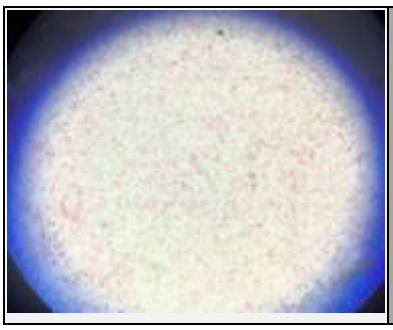

Figure 2. Gram Negative Bacilli on Gram Staining

DISCUSSION OF MANAGEMENT

The genus Chryseobacterium belongs to family Flavobacteriaceae. Chryseobacterium species are commonly distributed in soil and water.[1] In hospital environment, *Chryseobacterium indologenes* is commonly found in water systems and on humid surfaces which act as a reservoir of infection. It is resistant to chlorination and can be found in municipal water supplies.[2] Chryseobacterium species are gram negative, non-fermentative, aerobic, oxidase positive, catalase positive, non-motile bacillus.[3] Most common isolates of Chryseobacterium species are *Chryseobacterium meningosepticum*, *Chryseobacterium odoratum and Chryseobacterium multivorum. Chryseobacterium breve*, *Chryseobacterium indologenes*, *Chryseobacterium gleum*.[1] Earlier, *Chryseobacterium indologenes* was known as *Flavobacterium indologenes*. *Chryseobacterium indologenes* is not a common human pathogen.[3] The risk factors of *Chryseobacterium indologenes* infections in humans include prolonged hospitalisation, presence of intravascular catheters and implants, cancer, immunosuppression, prolonged antibiotic therapy, mechanical ventilation and intubation.[4,5]

Most of the previously reported cases of *Chryseobacterium indologenes* infections are nosocomial and commonly associated with presence of invasive equipment in immunocompromised patients or patients on long term broad spectrum antibiotic therapy.[3] It can cause serious infections in immunocompromised patients. It has been reported to cause invasive device associated infection leading to bacteraemia, ventilator associated pneumonia, meningitis, pyomyositis, keratitis, urinary tract infection, ocular infections, cellulitis, peritonitis, surgical and burn wound infections etc.[6] Intravascular access related infections are more common in initial weeks or months after insertion of central venous catheter or vascular prosthesis. Clinical significance of the organism is not well studied because this bacterium has not been frequently isolated from clinical samples.[3] But some cases are reported. Izaguirre et al.[2] reported a case of end stage renal disease on haemodialysis presented with multiple episodes of central line associated bloodstream infection (CLABSI) caused by *Chryseobacterium indologenes*. It was treated with removal of intra venous catheter and administration of intravenous antibiotic piperacillin-tazobactam based on sensitivity report.[2] Catheter associated urinary tract infection (CAUTI), caused by *Chryseobacterium indologenes* which responded well to antibiotic therapy are reported previously.[7,8] Respiratory system infections in immunocompromised patients caused by *Chryseobacterium indologenes* are also reported previously in India.[9,10]

In our case, the patient was an immunocompromised, undergoing haemodialysis regularly. He had an intravenous catheter over left internal jugular vein, which might have served as a route of entry of the organism to the body. The patient was doing haemodialysis from elsewhere and presented to nephrology out-patient department of our hospital when he developed the symptoms. After getting the results of culture and antibiotic sensitivity, the antibiotic amikacin was added to the treatment. The patient responded well to the treatment. Fever during haemodialysis subsided. This is the first time we are isolating *Chryseobacterium indologenes* in our department. Alert was given to clinicians regarding proper care and regular examination of intravenous catheters or accesses.

According to the report from SENTRY antimicrobial surveillance program, the most effective drugs against *Chryseobacterium indologenes* are quinolones (> 95 % susceptibility), trimethoprim-sulphamethoxazole (> 95 % susceptibility), piperacillin-tazobactam (> 90 %). susceptibility. Congruent with SENTRY antimicrobial surveillance program report, our isolated *Chryseobacterium indologenes* also showed sensitivity to quinolones and trimethoprim sulphamethoxazole. However, the organism was resistant to piperacillin- tazobactam.

Chryseobacterium species are not commonly isolated in human beings. The isolation of the organism from hospitalised patients indicates lack of proper infection control practices. The treatment of this organism is challenging because of unusual pattern of resistance compared to other gram-negative bacilli. They are often resistant to antibiotics including carbapenems, class A beta lactamases, class B carbapenem hydrolysing beta lactamases, and hence the treatment becomes difficult. It has protease activity which also contributes to its virulence.[7]

The commonly isolated non-fermenters from humans are Pseudomonas, Acinetobacter, Stenotrophomonas etc. Species level identification of other non-fermenting bacilli by conventional method is difficult. Development of automated culture systems, automated identification and sensitivity techniques have improved the identification of non-fermenters. *Chryseobacterium indologenes* is the pathogen to consider seriously in immunocompromised conditions, in the presence of invasive equipment, in prolonged hospitalisation and antibiotic therapy. Isolation of this rare pathogen indicates the inevitable need of proper infection control measures. Early diagnosis and antibiotic therapy are needed for its effective management.

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Disclosure forms provided by the authors are available with the full text of this article at jebmh.com.

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