Catheter-Related infection caused by Chromobacterium violaceum

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Abstract: Chromobacterium violaceum is a saprophytic bacterium found mainly in tropical and subtropical climates. C. violaceum rarely causes infection in human. Catheter-Related infection caused by C. violaceum is extremely rare. Here, we report the first case of closed thoracic drainage catheter-related infection due to C. violaceum in a 49-year-old male after a car accident. The patient was successfully treated with amikacin.
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1. Introduction

C. violaceum is a facultative anaerobe, motile, oxidase-positive, gram-negative bacillus. It was first described by Wooley in 1905[1]. The first human infection with C. violaceum was reported in Malaysia in 1927[2]. Chromobacterium violaceum widely distributed in soil and water in tropical and subtropical regions, human infection with this organism is rare. Catheter-Related infection caused by Chromobacterium violaceum is extremely rare. We report the first case of closed thoracic drainage catheter-related infection due to Chromobacterium violaceum in a 49-year-old male after a car accident, the patient was successfully treated with amikacin.

2. Case report

A 49-year-old male was taken to the emergency room of our hospital with multiple trauma due to a car accident. He had comminuted fracture and many bleeding wounds in the right lower limb. On admission, the patient's temperature was 36.0℃, his pulse was 137 beats/min, blood pressure was 106/70 mmHg, respiratory rate was 26 breaths/min. Computed tomography scan of chest showed left pneumothorax. Electrocardiograpy (ECG) and sonography of the abdomen were essentially normal. The initial clinical diagnoses were hemorrhagic shock, left pneumothorax and serious right lower limb injury. He was wheeled into an operating room for right above knee amputation and left closed thoracic drainage. Then an antimicrobial regime of 4 g/day of cefotiam was initiated to prevent infection for 3 days.

On day 10, the patient developed a fever of 38.0℃. By this time, computed tomography scan of chest showed left pneumothorax was disappear, his haemoglobin was 7.7g/dl, total white blood cell (WBC) count was 8,570/μl with 83.1% neutrophils, 8.1% lymphocytes and 7.8% monocytes, platelet count was 77,000/μl. C-reactive protein was 21 mg/L. Blood cultures were negative. The drainage catheter was removed, and secretion from the drainage port was light yellow, transparent and odourless, which was cultured. A positive result was recorded on the second day of incubation. The colony was colorless on blood agar and MacConkey agar plates. The causative microorganism was identified as a Gram-negative bacillus. On blood agar it showed beta hemolysis. The isolate was identified as C. violaceum by conventional biochemical test and API 20 NE and Vitek system (Table 1). Antibiotic susceptibility tests were performed by the disk diffusion method (Table 2). It was showed thatthe C. violaceum was susceptible to amikacin. Therefore, an antimicrobial therapy with 400 mg/day of amikacin was initiated immediately. The drainage port healed 12 days after receiving the antimicrobial therapy and he was discharged 1 week later. On follow up 4 months later the patient was still clinically well.

3. Discussion

C. violaceum is a saprophytic bacterium found mainly in tropical and subtropical climates. It is worth noting that the effects of global warming may increase, and the geographic distribution of this microorganism may change in the future. Most cases of infection by C. violaceum have been reported from the United States, Australia, Vietnam, Taiwan, Korea, India, Argentina, Brazil and Thailand[4-7]. It grows easily on nutrient agar (MacConkey agar and blood agar media with incubation at 30 to 45°C), producing distinctive smooth low convex colonies with a dark violet metallic sheen in the typical pigmented strain[8]. Despite it widely distributed in soil and water, human infection with this organism is rare. Catheter-Related infection caused by C. violaceum is extremely rare. To our knowledge, this is the first case of closed thoracic

drainage catheter-related infection due to C. violaceum.

TABLE 1. Biochemical characteristics of Chromobacterium violaceum isolates

Test	% of isolates positive*	Reaction of isolate
Gas from glucose	0	−
Violet pigmentation	91	−
Acid from:		
d-Glucose	100	+
d-Mannitol	0	−
d-Xylose	0	−
Lactose	0	−
Maltose	0	−
Sucrose	20	−
Catalase reaction	97	+
Oxidase reaction	67	+
Simmons citrate reaction	68	+
Urea hydrolysis	5	−
Nitrate reduction	97	+
Indole production	21	−
Triple sugar iron slant, acid	8	−
Triple sugar iron butt, acid	94	+
H2S production	0	−
Methyl red reaction	37	−
Voges-Proskauer reaction	0	−
Gelatin hydrolysis	86	−
Esculin hydrolysis	5	−
Lysine decarboxylase	0	−
Arginine dihydrolase	100	+
Ornithine decarboxylase	0	−
API 20 NE no.		5150555

*Data are from Weyant et al[3].

TABLE 2. Antibiotic susceptibilities of Chromobacterium violaceum isolates

Antimicrobial agent	Susceptibility of isolate*
Amoxicillin	R
Ampicillin-sulbactam	R
Ampicillin	R
Cefazolin	R
Cefotaxime	R
Ceftazidime	R
Cefepime	R
Cefoxitin	R
Ceftriaxone	R
Ciprofloxacin	R
Amikacin	S
Imipenem	R
Levofloxacin	R
Gentamicin	R
Tobramycin	R
Minocycline	S
Trimethoprim-sulfamethoxazole	S
Meropenem	R
Aztreonam	R

*R, resistant; S, susceptible; I, intermediate.

It is also worth noting that the clinical symptoms of C. violaceum infection may not occur immediately after specific exposure to water or soil; instead, they may occur 60 days after exposure. The clinical spectrum of C. violaceum infection is protean, including pneumonia, gastrointestinal infection, osteomyelitis, meningitis, urinary tract infection, localized cutaneous lesions, brain abscess, localized or metastatic abscesses, peritonitis, hemophagocytic syndrome, endocarditis, respiratory distress syndrome, and fulminant sepsis[9]. Diagnosis of C. violaceum infection is currently based on a culture of clinical specimens followed by subsequent biochemical identification. There is no available examination for a serological test[9]. A method for detecting C. violaceum by multiplex polymerase chain reaction were developed in 2006, but it has not been widely accepted to date[10]. C. violaceum is generally resistant to narrow, extended, and broad-spectrum β-lactam antibiotics, and antimicrobial susceptibility data on C. violaceum remain very limited because it is

rarely isolated from clinical specimens. Before 1990, the usual treatment for C. violaceum infection was chloramphenicol, trimethoprim-sulfamethoxazole, tetracycline, or aminoglycosides. However, ciprofloxacin and carbapenem became the predominant antimicrobial agents after 1990. In our case, it was resistant to ciprofloxacin, imipenem and meropenem, but was susceptible to amikacin, minocycline and trimethoprim-sulfamethoxazole. The patient was successfully treated with amikacin.

In conclusion, we report the first case of closed thoracic drainage catheter-related infection due to C. violaceum in a 49-year-old male after a car accident.

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