Pathologic Quiz Case

A 13-Year-Old Boy With a 2-Day History of Fever, Vomiting, and Mental Status Changes

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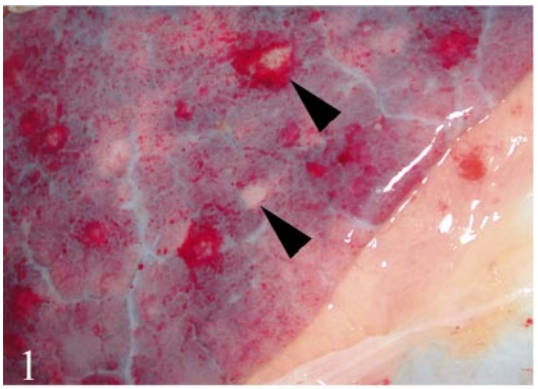
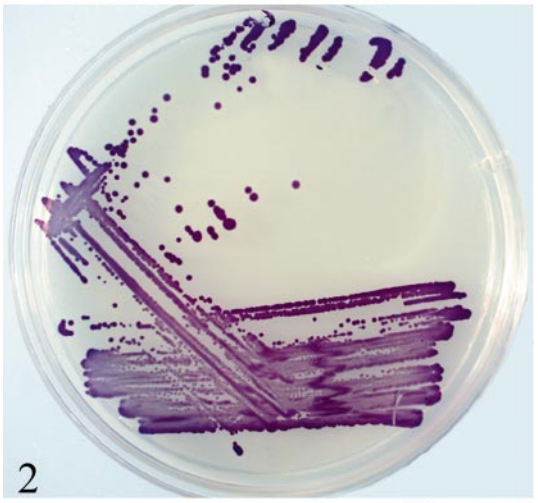
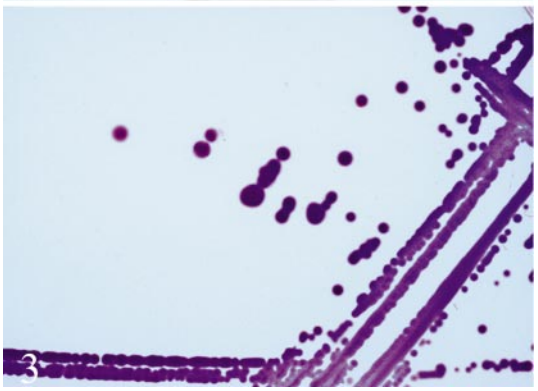
A 13-year-old boy with a history of vertebral, anus, tracheoesophageal, radial, and renal (VATER) association, including duodenal atresia, tracheal-esophageal fistula, and limb malformations, presented to a regional emergency department with fever, vomiting, and mental status changes. Physical examination revealed tachycardia, lethargy, cool extremities, and weak peripheral pulses. He was transferred to a tertiary-care hospital for management of possible meningitis with septic shock, where admission imaging studies showed bilateral patchy pneumonia and an enlarged spleen. No acute process was seen on a cranial computed tomography scan. Laboratory findings included lactic acidosis and elevated liver enzymes (aspartate aminotransferase, 459 U/L [7.65 μkat/L]; alanine aminotransferase 166 U/L [2.77 μkat/L]). In the pediatric intensive care unit, he responded well to fluid resuscitation but developed sudden bradycardia that progressed to asystole. He could not be resuscitated and died 6 hours after admission.

At autopsy, diffuse, small (approximately 0.1 cm), yellow-tan nodules were evident on the serosal surfaces and in the parenchyma of the lungs, liver, and spleen (Figure 1). Microscopic examination showed that all these sites were microabscesses, with extensive local infiltration by neutrophils. Cultures from the liver, lungs, and spleen grew organisms that developed violet colonies on nutrient agar after 1 day of incubation (Figures 2 and 3). The bacteria were gram negative, glucose positive, catalase positive, oxidase positive, and urea negative. No other organisms were isolated.

What is your diagnosis?







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Pathologic Diagnosis: *Chromobacterium violaceum* Bacteremia

Chromobacterium violaceum is a common facultative anaerobic, gram-negative rod found in the soil of tropical and subtropical climates. Human infection is rare, despite the organism's ubiquitous presence in soil. *Chromobacterium violaceum* is the only *Chromobacterium* species pathogenic in humans. Most infections occur in Brazil, Southeast Asia, and the southeastern United States, where the majority of the cases occur in Florida.[1] *Chromobacterium violaceum* infection typically occurs after exposure to contaminated soil or water through a break in the skin. The usual presentation consists of localized cellulitis, occasionally followed by lymphadenitis. However, the initial presentation may be bacteremia with multiple abscesses in the liver, lungs, and brain. Since the first human case was described in 1927, 62 cases have been reported in the English language literature; 24 of these patients survived, 32 died, and 6 had an unknown outcome. The typical interval between the onset of illness and death ranges from 3 days to 15 months, with a median survival of 15 days.

Patients with chronic granulomatous disease are particularly vulnerable to infection with *C violaceum*. Reports indicate that patients with abnormal nitroblue tetrazolium dye tests have recurrent infections with *C violaceum*. In 23 pediatric cases, 8 patients were known to have abnormal leukocyte function.[2] Our patient had no evidence of abnormal leukocyte function.

When plated on blood, MacConkey, or nutrient agar, *C violaceum* produces a pigment, violacein, which gives the colonies their distinctive purple color. Violacein has antibiotic properties that make it resistant to phagocytosis by protozoa. *Chromobacterium violaceum* also produces other antibiotics, such as aerocyanidin and aerocavin, which exhibit in vitro activity against both gram-negative and gram-positive bacteria. Two other bacteria produce violaceum (*Janthinobacterium lividum* and *Iodobacter fluviatilis*), but are not human pathogens, thus significantly narrowing the differential diagnosis.[3]

Biochemical Characteristics of *Chromobacterium violaceum*

Test	% Positive
Violet pigment	91
Acid from D-glucose	100
Acid from sucrose	20
Acid from other sugars	0
Catalase reaction	97
Oxidase reaction	67
Simmons citrate reaction	68
Urea hydrolysis	5
Nitrate reduction	97
Indole production	21
Hydrogen sulfide	0
Growth at 25°C	100
Growth at 42°C	85
Esculin hydrolysis	5
Lysine decarboxylase	0
Arginine dihydrolase	100
Ornithine decarboxylase	0
Growth in 0% sodium chloride nutrient broth	100
Growth in 6% sodium chloride nutrient broth	0

The biochemical identification and conformation of *C violaceum* are outlined in the Table. Nine percent of strains are nonpigmented and may be confused with *Vibrio* or *Aeromonas* species. However, nonpigmented *C violaceum* can be reliably differentiated from mimics by its sugar fermentation profile, lysine decarboxylase, and ornithine decarboxylase reactions.[4]

References

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