The First Report of *Sphingomonas yanoikuyae* as a Human Pathogen in a Child With a Central Nervous System Infection

To The Editors:

Sphingomonas spp. are aerobic, yellow-pigmented, glucose nonfermenting, Gram-negative bacterium and a rare cause of human infections.[1] Herein, we report a case of *Sphingomonas yanoikuyae* central nervous system infection in a child. This is the first report of *S. yanoikuyae* as a human pathogen to the best of our knowledge.

A 31-month-old male with a history of type 3 von Willebrand disease, decompressive craniectomy due to intracranial hemorrhage and tracheostomy was admitted to the hospital with fever and swelling in the skin flap area. The computed tomography revealed hydrocephalus, and a shunt operation was planned via neurosurgery. Before surgery, magnetic resonance imaging was performed and revealed a collection compatible with subdural empyema with an approximate diameter of 3.5 cm. Therefore, abscess drainage and external ventricular drain placement were performed. Cerebral spinal fluid (CSF), blood and abscess cultures were negative. On the 58th day of hospitalization, he had a fever, and *S. yanoikuyae* was isolated from the CSF culture. It was sensitive to meropenem, tobramycin and amikacin. Treatment was switched to meropenem. However, his CSF cultures grew recurrent *S. yanoikuyae*, and intrathecal amikacin was added to his treatment. After 14 days of meropenem and 5 days of intrathecal amikacin treatment, his CSF culture became sterile. Total meropenem therapy was discontinued after 28 days.

In our case, all the cultures, identification and antimicrobial susceptibility tests were done according to European Committee on Antimicrobial Susceptibility Testing criteria. The CSF samples were inoculated into the VersaTREK blood culture bottles (TREK Diagnostic Systems, Cleveland, OH). The bottles became positive within 24 hours of initial incubation. On Gram-stained smears from the culture-positive bottles, the organisms appeared as Gram-negative bacteria. Yellow-pigmented colonies were seen after an overnight blood agar medium subculture from positive blood bottles. The identification of bacteria was done by conventional methods and VITEK MS (bioMérieux, France). Vitek-MS is using matrix-assisted laser desorption ionization-time of flight mass spectrometry technology for species identification based on the protein composition of microbial cells. Kirby Bauer disc diffusion method and VITEK 2 automated system (bioMérieux) were used to determine antibiotic susceptibility.

Sphingomonas spp. are commonly observed in the natural environment and rarely in hospitals.[2–4] The organism can be found in medical devices, contaminated fluid and respirators in the hospital.[4] It can cause infections as pneumonia, intravascular catheter-related infections, skin and soft tissue infections, urinary tract infections and meningitis.[1–4]

Little is known about the *S. yanoikuyae* susceptibility pattern. In one study, the antimicrobial susceptibilities of 86 different strains of *Sphingomonadaceae* were tested, and colistin resistance was observed to be intrinsic.[5] Bayram et al[3] reported that the most effective antibiotics to *Sphingomonas paucimobilis* infections were fluoroquinolones, carbapenems, trimethoprim/sulfamethoxazole, and the most resistant pattern identified against third generation cephalosporins.

In conclusion, our case is the first report of *S. yanoikuyae* as a human pathogen. Due to this specimen's limited antimicrobial susceptibility data, it is challenging for clinicians to treat this rare bacteria. We recommend raising awareness of this rare organism associated with nosocomial infection, especially in patients with indwelling intravascular devices.

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Crimean-Congo Hemorrhagic Fever Mimicking Multisystem Inflammatory Syndrome in Children Associated With COVID-19: A Diagnostic Challenge

To the Editors:

Crimean-Congo hemorrhagic fever (CCHF), which is endemic in our country, is a zoonotic disease characterized by fever and hemorrhage that may be severe and even fatal. The primary transmission route to humans is tick bite; however, other forms of transmission are also reported including direct contact with blood or other bodily fluids of infected animals, nosocomial and vertical transmission.[1] The clinical diagnosis of CCHF is difficult to establish because symptoms are nonspecific in the prehemorrhagic phase of the disease and laboratory findings are similar to other childhood infectious diseases.[1,2] Here, we report two cases

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with fever, elevated inflammatory markers, and multisystem organ involvement initially considered as multisystem inflammatory syndrome in children (MIS-C), but subsequently diagnosed with CCHF—highlighting the diagnostic challenge in distinguishing MIS-C from other infectious diseases. To our knowledge, no CCHF cases misdiagnosed as MIS-C have been reported to date.

Case 1

A 9-year-old boy was referred to our clinic with a preliminary diagnosis of MIS-C because of persisting fever, abdominal pain, conjunctivitis and increasing levels of acute phase reactants despite intravenous antibiotic treatment. His mother had been diagnosed with coronavirus disease-2019 (COVID-19) 2 months prior to admission. On admission, he had tachycardia (130 beats/min), conjunctivitis and maculopapular rash. His laboratory examination revealed lymphocytopenia, thrombocytopenia and elevated levels of liver function tests, troponin, pro-brain natriuretic peptide (pro-BNP) and inflammatory markers including procalcitonin (Table 1). Although all MIS-C criteria were met, CCHF diagnosis was also suspected, despite lack of tick bite, since the patient had progressively decreasing platelet count, and had a history of living in an endemic area and his family was engaged in animal husbandry. Polymerase chain reaction (PCR) test for CCHF was positive, and the patient was treated and discharged without any complications.

TABLE 1. Clinical and Laboratory Findings of Patients

	Case 1	Case 2
Demographics		
Age, years	9	15
Gender	Male	Male
Presenting symptoms		
Fever (duration)	Yes (4 days)	Yes (3 days)
Abdominal pain	Yes	Yes
Vomiting	Yes	Yes
Diarrhea	Yes	Yes
Headache	No	Yes
Nonpurulent conjunctivitis	Yes	Yes
Rash	Maculopapular rash	Malar rash
Admission laboratory findings		
White blood cell count ($\times 10^3/\mu L$)	3.49	2.33
Absolute lymphocyte count (/μL)	730	460
Absolute neutrophil count (/μL)	2630	1410
Hemoglobin (g/dL)	14.3	15
Platelet count (/μL)	43,000	130,000
Ferritin (normal range: 6–40 ng/mL)	20,880	1940
D-dimer (normal range: 0–550 ng/mL)	18,100	2150
CRP (normal range: 0–4 mg/L)	78	37
LDH (normal range:140–260 IU/L)	787	455
Albumin level (g/dL)	2.9	4.6
AST/ALT (U/L)	120/115	98/68
Procalcitonin (< 0.5 ng/mL)	8	Not performed
Troponin (< 0.05 ng/mL)	0.08	0.03
Pro-BNP (< 71 pg/mL)	160	Not performed
Imaging results		
Abdominal ultrasound	Normal	Hepatosplenomegaly
Echocardiogram	Mitral regurgitation	Normal
Organ system involvement		
Cardiovascular	✓	No
Respiratory	No	No
Gastrointestinal	✓	✓
Hematologic	✓	✓
Renal	No	No
Neurologic	No	No
Dermatologic	✓	✓
SARS-CoV-2 RT-PCR	Negative	Negative
SARS-CoV-2 antibody	Negative	Negative
History of COVID-19 exposure	Yes	Yes
CCHF-related characteristics		
History of tick bite	No	No
History of close contact with animals	Yes	Yes
CCHF PCR	Positive	Positive
Treatment	Ribavirin	Ribavirin

ALT indicates alanine aminotransferase; AST, aspartate aminotransferase; BNP, brain natriuretic peptide; CCHF, Crimean-Congo hemorrhagic fever; COVID-19, coronavirus disease 19; CRP, C-reactive protein; LDH, lactate dehydrogenase; MIS-C, multisystem inflammatory syndrome; RT-PCR, reverse transcriptase polymerase chain reaction; SARS-CoV-2, severe acute respiratory system coronavirus 2.

Case 2

A 15-year-old boy was referred to our hospital with a preliminary diagnosis of MIS-C because of having fever, conjunctivitis, gastrointestinal symptoms, elevated inflammatory markers and history of exposure to his father who had documented COVID-19 infection three months ago. On admission, he had fever, bilateral conjunctivitis, and malar rash. Laboratory analysis revealed lymphocytopenia and thrombocytopenia in addition to elevated inflammatory markers (Table 1). Detailed questioning revealed that he had a history of close contact with animals; however, history of tick bite was not present. On the following days, his fever persisted and platelet count continued to decrease. CCHF PCR was positive and he was treated successfully.

To conclude, similar to MIS-C, clinical manifestations of CCHF include fever, headache, myalgia, rash, conjunctivitis, abdominal pain, nausea, vomiting and diarrhea.[1,3] Detailed patient history and differential diagnosis are important to avoid unnecessary treatment and protect healthcare providers since infection control measures are essential in CCHF. Our two cases highlight that CCHF should be ruled out when evaluating possible MIS-C, even in the absence of tick bite history, especially in patients with progressive decline in platelet count, those living in endemic areas, and those with a history of close contact with animals.

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