

LMG\_4337<sup>T</sup> (92.3% identity). On the basis of Clinical Laboratory Standards Institute guidelines (2), this similarity indicated a possible novel species.

The DPHL Microbiology Department's laboratory manager sent the organism to CDC's Special Bacteriology Reference Laboratory. Results identified the organism as *H. jordaniae*. Upon review of MicrobeNet at a later date, the organism was found to match *H. jordaniae* H5569\_con<sup>T</sup> by 98.9%.

*H. jordaniae* is a common environmental microbe, but it was implicated in this clinical case in a man in Delaware. The patient had symptoms characteristic of other pathogenic bacterial illnesses. Concern exists that slow-growing, gram-negative rods identified in blood culture could be potential bioterrorism agents. Humrighouse et al. (1) described how *Francisella tularensis* infection was suspected in 2 clinical cases that were actually *H. jordaniae* infections.

Humrighouse et al. (1) proposed the name *H. jordaniae* on the basis of an isolate received in 2010. Previously, 14 organisms identified at CDC were isolated from blood taken from men 39–78 years of age with symptoms including swelling of the lower extremities (2 patients), septicemia (3 patients), and bacteremia (1 patient). The symptoms of the patient we report mirrored those symptoms.

This discovery is important because it demonstrates that organisms conceived to be environmental in nature and suspected to have limited clinical implications are emerging as human pathogens. The ability to identify bacteria by sequencing (in this case, sequencing of the 16S rRNA gene) was necessary to identify *H. jordaniae* because clinical information on this pathogen is still limited.

### Acknowledgments

We would like to thank Daniel Bolon for technical support in this study and Gary Richards, Andrea Wojcik, Donna Sharp, and Delaware's Public Health Privacy Board for revising and editing this article.

G.H. received financial support for conducting testing that contributed to this article through a CDC Epidemiology and Laboratory Capacity grant (grant no. NU50CK000379-05-00).

### About the Authors

Mr. Hovan manages the Clinical Microbiology Department at the Delaware Division of Public Health Laboratory. His primary research interests are genomics and bioinformatics as they relate to public health.

Mr. Hollinger is lead technologist of a microbiology laboratory in a Delaware community hospital. His primary research interests are antibiotic resistance, molecular diagnostics in infectious disease, blood and tissue parasitic infections, and mycobacterial infections.

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Address for correspondence: Gregory Hovan, Delaware Division of Public Health Laboratory, 30 Sunnyside Rd, Dover, DE 19903, USA; email: [gregory.hovan@state.de.us](mailto:gregory.hovan@state.de.us)

## Molecular Typing and Antifungal Susceptibility of *Candida viswanathii*, India

Shamanth A. Shankarnarayan, Shivaprakash M. Rudramurthy, Arunaloke Chakrabarti, Dipika Shaw, Saikat Paul, Nandini Sethuraman, Harsimran Kaur, Anup K. Ghosh

Author affiliations: Postgraduate Institute of Medical Education and Research, Chandigarh, India (S.A. Shankarnarayan, S.M. Rudramurthy, A. Chakrabarti, D. Shaw, S. Paul, H. Kaur, A.K. Ghosh); Apollo Hospitals Enterprise, Chennai, India (N. Sethuraman)

DOI: <https://doi.org/10.3201/eid2410.180801>

We report invasive candidiasis caused by *Candida viswanathii* over 2 time periods during 2013–2015 in a tertiary care hospital in Chandigarh, India. Molecular typing revealed multiple clusters of the isolates. We detected high MICs for fluconazole in the second time period.

Invasive candidiasis is a life-threatening infection caused by various *Candida* species. Although *C. albicans* has been the predominant species causing invasive candidiasis, non-*albicans Candida* (NAC) species have emerged globally (1). *C. viswanathii*, a pathogen first isolated from the cerebrospinal fluid of a patient in 1959 (2), is rarely encountered, and only 17 cases have been reported worldwide (3). This agent has been isolated sporadically from animal and environmental sources (4–6).

We report on 23 cases of invasive candidiasis caused by *C. viswanathii* at a tertiary care center in Chandigarh, India, involving 7 case-patients during December 2013–April 2014

**Table.** In vitro antifungal susceptibility data of *Candida viswanathii* isolates from a tertiary care hospital in Chandigarh, India

Isolate	Antifungal agent	MIC, $\mu\text{g/mL}$			Geometric mean
		Range	MIC <sub>50</sub>	MIC <sub>90</sub>	
<i>C. viswanathii</i> 2013–2014, n = 7	Amphotericin B	0.03–0.25	0.25	0.25	0.16
	Itraconazole	0.03–0.5	0.125	0.25	0.09
	Fluconazole	0.125–1	1	1	0.41
	Voriconazole	0.03–0.5	0.5	0.5	0.14
	Micafungin	0.125	0.125	0.125	0.125
	Caspofungin	0.5	0.5	0.5	0.5
	Anidulafungin	0.5–1	0.5	1	0.67
	Posaconazole	0.0312–0.0625	0.0312	0.0625	0.03
<i>C. viswanathii</i> 2015, n = 16	Amphotericin B	0.06–0.25	0.125	0.25	0.14
	Itraconazole	0.03–1	0.25	0.25	0.12
	Fluconazole	0.5–64	64	64	29.34
	Voriconazole	0.03–8	1	2	0.76
	Micafungin	0.125	0.125	0.125	0.12
	Caspofungin	0.125–1	0.5	0.5	0.40
	Anidulafungin	0.125–1	0.5	1	0.52
	Posaconazole	0.0321–0.5	0.25	0.25	0.17

and 16 case-patients during December 2014–April 2015. In the first time period, all isolates were from blood, whereas in the second time period, the agent was isolated from pus (n = 5), blood (n = 5), cerebrospinal fluid (n = 3), and lung nodule, lung aspirate, and iliac fluid (n = 1 each).

Of the 23 patients, 16 were men and 7 were women. Six (26%) patients had neutropenia, and 18 (90%) had tuberculosis, pancreatitis, or chronic kidney disease. Eight (34.7%) patients acquired the infection after surgery. Twelve patients used indwelling devices: 3 (15%) had a central venous catheter, 4 (20%) an endotracheal tube, 3 (15%) a drainage catheter, and 2 (10%) a urinary catheter.

We screened the hospital environment and the hands of healthcare workers for a possible source of *C. viswanathii* infection during the second time period. We could not isolate *C. viswanathii* from any of those samples from a total of 46 workers and 57 different environmental sites.

Conventional methods failed to differentiate *C. viswanathii* and *C. tropicalis*. *C. viswanathii* assimilated sucrose and cellobiose but failed to assimilate trehalose and raffinose. *C. tropicalis* has a variable assimilation pattern for these sugars.

To identify the isolates, we performed matrix-assisted laser desorption/ionization time-of-flight mass spectrometry using MALDI-TOF MS, version 3 (Bruker Daltonik GmbH, Bremen, Germany) and sequenced the D1/D2 region of a large subunit of ribosomal DNA (7,8). Because we could not identify *C. viswanathii* using the MALDI-TOF MS version 3 database, we updated the database in-house by adding sequence-proved isolates of *C. viswanathii*. We identified the isolates with a log score of >1.8 by using the modified database. The rDNA sequence of the isolates showed 100% similarity with the type strain of *C. viswanathii* ATCC 22981 (GenBank accession no. NG\_054835.1) except for 1 isolate (99% similarity with type strain, accession no. MF682371). The molecular phylogenetic analysis revealed that 1 isolate (B-30815) had

1 nucleotide substitution (T to C), which was 1 of the 5 substitutions we observed in *C. pseudoviswanathii* while comparing it with *C. viswanathii* (9).

Amplified fragment-length polymorphism revealed a similarity coefficient of  $\geq 90\%$  of the isolates (online Technical Appendix Figure, <https://wwwnc.cdc.gov/EID/article/24/10/18-0801-Techapp1.pdf>) (7). The isolates from the first time period formed 2 clusters (clusters A and B); 1 isolate from the second period was also in cluster B. Isolates of the second time period had 3 major clusters (clusters C, D, and E) and had higher MICs for fluconazole.

We performed antifungal susceptibility testing for amphotericin B, fluconazole, itraconazole, voriconazole, posaconazole, caspofungin, anidulafungin, and micafungin by the microbroth dilution method recommended by the Clinical and Laboratory Standards Institute (10). After incubating the plates for 24 h at 37°C, we took a visual reading to determine the MICs. The isolates of the second time period had higher MICs (MIC<sub>50</sub> 64  $\mu\text{g/mL}$ , MIC<sub>90</sub> 64  $\mu\text{g/mL}$ ) for fluconazole compared with the isolates of the first period (MIC<sub>50</sub> 1  $\mu\text{g/mL}$ , MIC<sub>90</sub> 1  $\mu\text{g/mL}$ ). We also recorded higher MICs (MIC<sub>50</sub> 1  $\mu\text{g/mL}$ , MIC<sub>90</sub> 2  $\mu\text{g/mL}$ ) for voriconazole for the isolates of the second period (Table).

In conclusion, our study showed multiple clusters of *C. viswanathii* causing invasive infections in patients with neutropenia and chronic diseases at a single healthcare center in India. We could not trace the source of the agent. Conventional identification methods could not differentiate the isolates from those of *C. tropicalis*. The high MICs for fluconazole among the isolates from the second time period also raise concerns about possible antifungal resistance.

#### About the Author

Mr. Shankarnarayan is a PhD student in the Department of Medical Microbiology, PGIMER, Chandigarh, India. His doctoral focus is on evaluating the dynamics of invasive *Candida* infections among hospitalized patients.

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Address for correspondence: Anup K. Ghosh, Postgraduate Institute of Medical Education and Research, Medical Microbiology, 2nd Fl, Sector-12, Chandigarh, India; email: ak\_ghosh3@rediffmail.com, anupkg3@gmail.com

## Community-Acquired *Staphylococcus argenteus* Sequence Type 2250 Bone and Joint Infection, France, 2017

Josselin Rigaille, Florence Grattard, Sylvain Grange, Fabien Forest, Elie Haddad, Anne Carricajo, Anne Tristan, Frederic Laurent, Elisabeth Botelho-Nevers, Paul O. Verhoeven

Author affiliations: University Hospital of Saint-Etienne, Saint-Etienne, France (J. Rigaille, F. Grattard, S. Grange, F. Forest, E. Haddad, A. Carricajo, E. Botelho-Nevers, P.O. Verhoeven); Jean Monnet University, Saint-Etienne (J. Rigaille, F. Grattard, A. Carricajo, E. Botelho-Nevers, P.O. Verhoeven); International Centre for Infectiology Research, Lyon, France (A. Tristan, F. Laurent); French National Reference Centre for Staphylococci, Lyon (A. Tristan, F. Laurent)

DOI: <https://doi.org/10.3201/eid2410.180727>

We report a rare case of *Staphylococcus argenteus* bone and joint infection in a 9-year-old boy in France. His finger arthritis was complicated by osteitis 5 weeks later, which resulted in a secondary intervention. This case indicates the virulence of *S. argenteus*, an emerging pathogen whose clinical effects are poorly described.

*Staphylococcus argenteus* (formerly *S. aureus* clonal complex 75) is an emerging species in the *S. aureus* complex (1). Several studies reported sporadic cases of *S. argenteus* infections mainly in Asia, Oceania, and the Pacific Islands (2) but rarely in Europe (3). We report the clinical characteristics of a community-acquired bone and joint infection with *S. argenteus* in a child living in France.

At the end of July 2017, a 9-year-old boy with no unusual medical history or previous local trauma was hospitalized because of acute signs of infection of the third finger on his right hand. He was first seen in a local hospital and given an initial diagnosis of cellulitis (arthritis). Two days later, he was admitted to the emergency pediatric ward of a tertiary care hospital where a surgical joint exploration was performed and confirmed the diagnosis of arthritis associated with an abscess of the extensor tendon sheath (Table).

Surgical microbiological samples cultured on blood agar plates (aerobic conditions at 37°C for 24 h) grew a strain that was identified by matrix-assisted laser desorption/ionization time-of-flight mass spectrometry (Microflex LT, Bruker, France) as having log scores ranging from 1.39 to

# Community-Acquired *Staphylococcus argenteus* Sequence Type 2250 Bone and Joint Infection, France 2017

## Technical Appendix

**Technical Appendix Table.** Characteristics of reported cases of infection with *Staphylococcus argenteus*\*

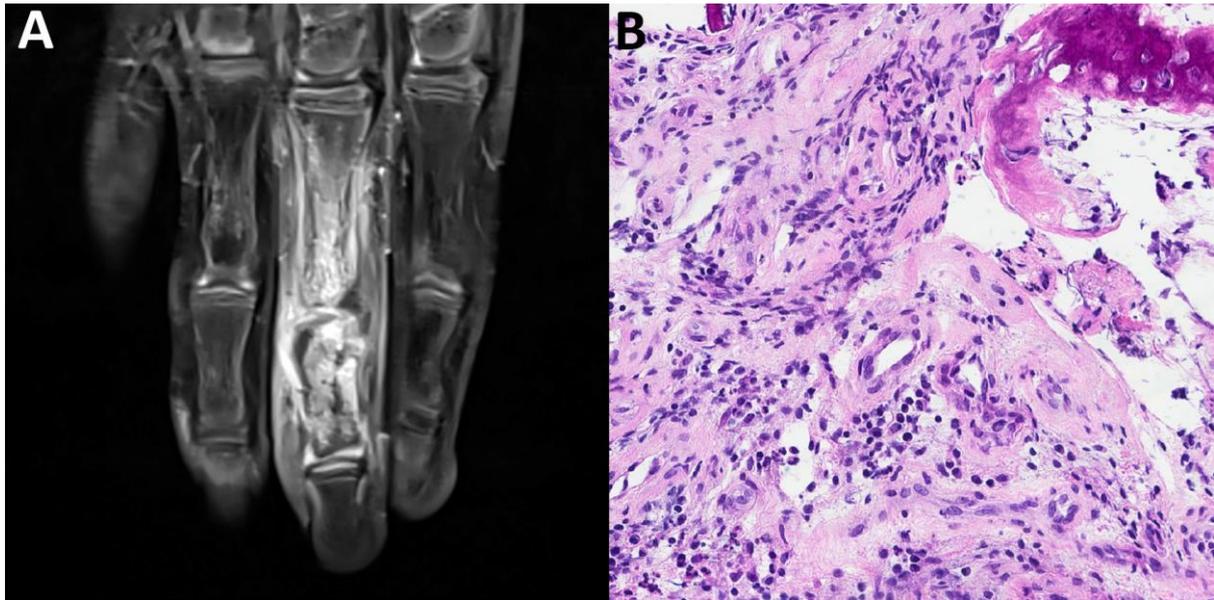
Reference	No. cases	Patients	Signs/symptoms	Diagnostic method	Bacterial strain characteristics	Treatment	Prognosis
Holt et al., 2011 (1)	1	Woman from Australia	Necrotizing fasciitis and bacteremia	WGS	Resistant to methicillin	Not described	Not reported
Dupieux et al., 2015 (2)	2	25-year-old woman	Pulmonary and bacteremia	Microarray, MLST	Susceptible to methicillin, positive for PVL	Amoxicillin/clavulanic acid, roxithromycin, ceftriaxone, spiramycin, oxacillin, clindamycin, linezolid	Recovered
		18-month-old child	Knee arthritis, bacteremia, and multiple pulmonary abscesses			Amoxicillin/clavulanic acid, gentamicin, clindamycin, linezolid, oxacillin, rifampin, polyvalent immunoglobulin	
Thaipadungpanit et al., 2015 (3)	10	270 in Thailand	2 with bacteremia; 7 with SST; 1 with osteomyelitis (2 healthcare-associated infections)	SNP	All resistant to methicillin; none positive for PVL	Not described	Same prognosis as <i>S. aureus</i> infections for death and illness
Chantratita et al., 2016 (4)	58	311 in Thailand	23 with bacteremia	PFGE, MLST	No strain resistant to methicillin; 15 strains positive for PVL	Not described	Same death rate as for <i>S. aureus</i> infections
Suzuki et al., 2017 (5)	2	Intoxicated 3 h after eating lunch	Food poisoning	WGS	Both strains produced SEB; no SCCmec elements	Not described	Not described
Wakabayashi et al., 2018 (6)	4 in 2014; 13 in 201	3 patients and 1 food handler in 2014; 12 patients and 1 food handler in 2015	Food poisoning	PFGE, MLST	All strains positive for SEB	Not described	Not described

Reference	No. cases	Patients	Signs/symptoms	Diagnostic method	Bacterial strain characteristics	Treatment	Prognosis
This study	1	9-year-old boy in France	Finger arthritis and osteomyelitis	Microarray	Susceptible to methicillin	Amoxicillin/clavulanic acid, ceftazolin, gentamicin, rifampin, fusidic acid, clindamycin, ofloxacin	Recovered

\*MLST, multilocus sequence typing; PFGE, pulsed-field gel electrophoresis; PVL, Panton-Valentine leukocidin; SCCmec, staphylococcal cassette chromosome mec; SEB, staphylococcal enterotoxin B; SNP, single-nucleotide polymorphism; SSTI, skin and soft tissue infection; WGS, whole-genome sequencing.

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**Technical Appendix Figure.** Community-acquired *Staphylococcus argenteus* sequence type 2250 bone and joint infection in a 9-year-old boy, France 2017. A) Fat-saturated, T1-weighted, magnetic resonance image after gadolinium injection in coronal plane of the right hand, showing evidence of osteitis at the base of middle phalanx up to cartilaginous growth plate of third finger with local necrosis at the time of infection. B) Infected bone tissue showing infiltration with numerous plasmacytes and lymphocytes on the left at the time of infection (hematoxylin and eosin stained, original magnification  $\times 100$ ).