This case illustrates the need to better define the geographic extent and modes of transmission of this debilitating disease so that primary control measures can be identified. In addition, health workers must be provided with the training and tools to diagnose and treat *M. ulcerans.* Research into a point-of-care diagnostic test is needed so that timely treatment can minimize disability and costs to the family.

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About the Author

Ms. Turner is a family nurse practitioner living and working in Dakar, Senegal. Her background includes trauma and pediatric primary care in high-income and low-income countries.

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Address for correspondence: Grace Anne Turner, 1609 Watkins St, Lake Charles, LA 70601, USA; email: gaturner@gmail.com

Management of Patients with *Candida auris* Fungemia at Community Hospital, Brooklyn, New York, USA, 2016–2018[1]

Jenny YeiSol Park,[2] Nicole Bradley,[3] Steven Brooks, Sibte Burney, Chanie Wassner

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Candida auris is an emerging fungus that can cause invasive infections. It is associated with high mortality rates and resistance to multiple classes of antifungal drugs and is difficult to identify with standard laboratory methods. We describe the management and outcomes of 9 patients with *C. auris* fungemia in Brooklyn, New York, USA.

Candida auris is an emerging fungus that can cause invasive infections associated with high mortality rates and is often resistant to multiple classes of antifungal drugs. Risk factors for infection include nursing home exposure; invasive devices, such as tracheostomy tubes or percutaneous endoscopic gastrostomy tubes; immunocompromised status; and use of broad-spectrum antimicrobial drugs (*1*). On the basis of limited data available, echinocandins are recommended as initial therapy for *C. auris* infection (*2*). We review the management of 9 case-patients who had *C. auris* fungemia at a 300-bed community hospital, attached to a 450-bed nursing home, in Brooklyn, NY, USA. There have been 9 occurrences of C. *auris* fungemia at this institution since 2016.

Our case series demonstrates the complex patient population at risk for invasive infection with *C. auris*. Patients infected were generally >70 years of age and had multiple chronic concurrent conditions (Appendix Table, https://wwwnc.cdc.gov/EID/article/25/3/18-0927-App1.pdf). Most patients came from nursing homes, and more than half had invasive devices, such as tracheostomies or

Author affiliation: Kingsbrook Jewish Medical Center, Brooklyn, New York, USA

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[2]Current affiliation: State University of New York Downstate Medical Center, Brooklyn, New York, USA.

[3]Current affiliation: St. John's University College of Pharmacy and Health Sciences, Queens, New York, USA.

percutaneous endoscopic gastrostomy tubes, placing them at high risk for infection at baseline.

In addition, each patient had a recent history of broad-spectrum antimicrobial drug use; many had concomitant resistant organisms isolated and received concomitant antimicrobial drug therapy during their *C. auris* treatment course. The most common antimicrobial drugs used were meropenem, polymyxin B, and vancomycin. Common bacteria isolated were *Acinetobacter* sp., *Pseudomonas aeruginosa,* and *Klebsiella pneumoniae.* Four patients were admitted to the medical intensive care unit; 2 had prolonged stays in the medical intensive care unit before development of candidemia.

The time from hospitalization to initial infection with *C. auris* varied among the patients. Approximately 60% of the patients came to the hospital with positive blood cultures on day 1, and fungemia developed in the remaining patients after prolonged hospitalization. Most patients had documented clearance of their blood cultures within 3–5 days of initial isolation. However, 1 patient had a second episode of *C. auris* fungemia several weeks after he was initially given treatment and documented to have clearance of blood cultures.

All patients were given micafungin as first-line therapy for an average duration of 22 days. The most common dose used was 100 mg/day of intravenous micafungin. Two of the 9 patients required liposomal amphotericin B after failing to respond to micafungin therapy. Both of these patients remained persistently febrile while receiving micafungin monotherapy; 1 was the patient with 2 episodes of *C. auris* fungemia. The average duration of amphotericin B was 19 days. The in-hospital mortality rate was 22%. Of the 7 patients who were discharged, 43% were discharged to a palliative care service. The average duration of hospitalization for these patients was 65 days.

Limited information is available on interpretation of MIC data for *C. auris* because the Clinical Laboratory Standards Institute (https://clsi.org) does not have breakpoints specific for *C. auris*. Antifungal susceptibility data were determined for each of the patients included in this case series (Appendix Figure). All antifungal susceptibility tests were performed by the Wadsworth Laboratory, the New York State Department of Health Reference Laboratory (https://www.wadsworth.org). Most susceptibility information was not available throughout the course of treatment. Given difficult identification of the organism by using standard laboratory techniques, timely identification and antimicrobial susceptibility information continues to be a challenge when managing patients with invasive *C. auris* (*3*).

All isolates were markedly resistant to fluconazole, and ≈40% were resistant to liposomal amphotericin B (Appendix Figure). This second finding is of particular concern because liposomal amphotericin B is the recommended second-line agent for management of *C. auris* in the setting of micafungin failure. On the basis of the resistance patterns at this hospital, patients who failed monotherapy with micafungin had lisposomal amphoterin B added rather than switching therapy completely.

We encourage clinicians treating *C. auris* infections to consider combination therapy with micafungin plus liposomal amphotericin B in patients who fail monotherapy with micafungin. Laboratory limitations mean that timely identification and susceptibility testing of *C. auris* might not always be possible, and clinicians might often have to defer to local or national epidemiology trends to make the most up-to-date decisions. It is essential to notify the department of health of new cases of infection with *C. auris* as soon as possible and to educate healthcare personnel to help minimize spread. Clinicians should focus on identifying and minimizing risk factors for acquisition of *C. auris* and prevention of spread through enhanced infection control procedures.

About the Author

At the time of this study, Dr. Park was a pharmacy resident in the Department of Pharmacy, Kingsbrook Jewish Medical Center, Brooklyn, NY. She is currently an infectious disease resident at the State University of New York Downstate Medical Center, Brooklyn, NY. Her primary research interest is assessing the appropriate use of antimicrobial drugs and associated long-term outcomes.

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Address for correspondence: Jenny YeiSol Park, Department of Pharmacy, State University of New York Downstate Medical Center, Brooklyn, NY 11203, USA; email: j.park0405@gmail.com

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Management of Patients with *Candida auris* Fungemia at Community Hospital, Brooklyn, New York, USA, 2016–2018

Appendix

Appendix Table. Characteristics for 9 case-patients during management of *Candida auris* fungemia at community hospital, Brooklyn, New York, USA, 2016–2018*

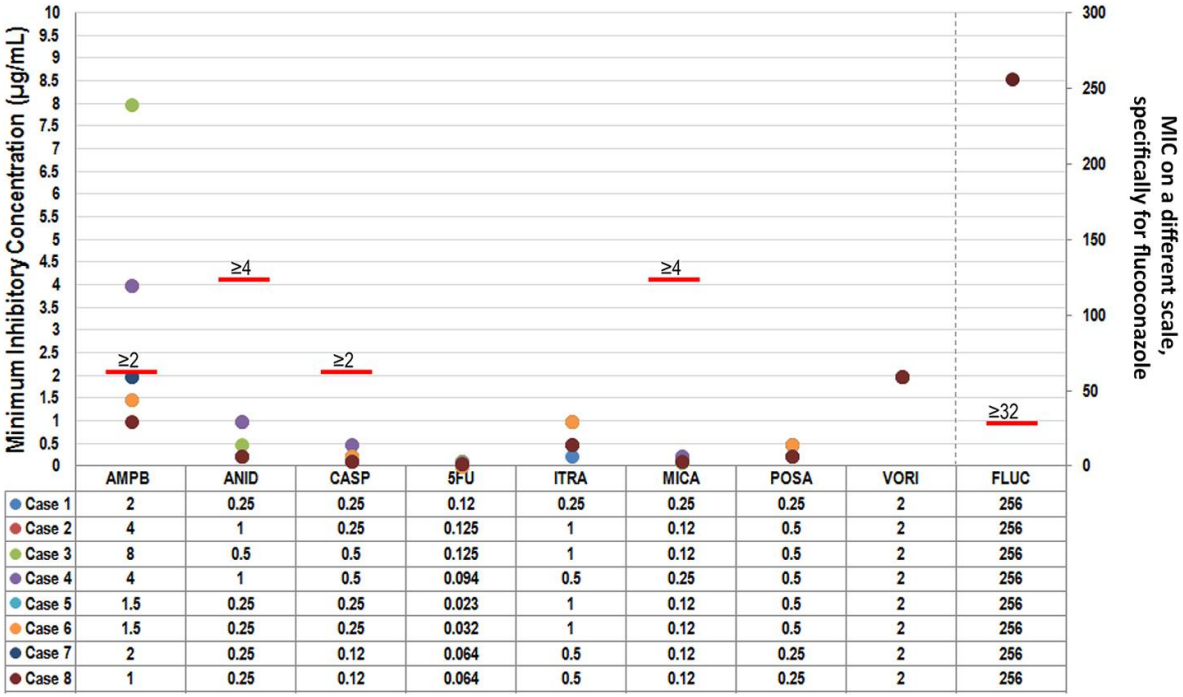
Case-patient	Age, y/sex	Medical history	Admitted from nursing home	Presence of invasive device	Recent broad-spectrum antimicrobial drug
Baseline demographics					
1	80/F	Hypertension, diabetes, atrial fibrillation, multiple myeloma, respiratory failure	Yes	No	Yes
2	73/M	Hyperlipidemia, diabetes, congestive heart failure, chronic kidney disease, atrial fibrillation, stage IV decubitus ulcer	Yes	Yes; tracheostomy	Yes
3	75/F	Hypertension, diabetes, asthma, hyperthyroidism, congestive heart failure, dementia, anoxic encephalopathy, end stage renal disease (hemodialysis)	Yes	Yes; tracheostomy, PEG tube	Yes
4	54/F	Seizures, adrenal insufficiency, colon cancer	No	No	Yes
5	66/M	Hypertension, hyperlipidemia, chronic kidney disease, diabetes	Yes	No	Yes
6	79/M	Hypertension, coronary artery disease, end stage renal disease (hemodialysis), decubitus ulcer, stroke, breast cancer	Yes	Yes; PEG tube	Yes
7	72/M	Diabetes, hypertension, multiple myeloma (actively receiving chemotherapy)	No	No	Yes
8	78/M	Pneumococcal meningitis (1 mo earlier), respiratory failure status posttracheostomy and PEG placement, seizures, atrial fibrillation	Yes	Yes; tracheostomy, PEG tube	Yes
9	73/F	Hypertension, dementia, schizophrenia, stage IV decubitus ulcer	Yes	Yes; PEG tube	Yes

Case-patient	Location at time of *C. auris* isolation	Concomitant positive cultures and antimicrobial drug therapy	Site of *C. auris* isolation/day of positive culture/day of first negative culture	*C. auris* treatment course	Outcome
Clinical course					
1	General medicine	Sputum: *Proteus mirabilis, Pseudomonas aeruginosa*; wound: ESBL *Escherichia coli*; pneumonia/infected wound: aztreonam, polymyxin B, vancomycin	Blood (+)/hospital day 1; blood (–)/hospital day 4	Intravenous micafungin, 100 mg/d x 28 d	Discharged to nursing home on hospital day 50

Case-patient	Age, y/sex	Medical history	Admitted from nursing home	Presence of invasive device	Recent broad-spectrum antimicrobial drug
2†	Intensive care unit	Sputum: *Acinetobacter calcoacticus, P. aeruginosa*; wound: *Klebsiella pneumoniae, P. aeruginosa*; pneumonia/infected decubitus ulcer: meropenem, gentamicin, polymyxin B, vancomycin	Blood (+)/hospital day 1; blood (–)/hospital day 2 Urine (+)/hospital day 39 Blood (+)/hospital day 69; blood (+)/hospital day 70; blood (–)/hospital day 73	Intravenous micafungin, 100 mg/d x 26 d Intravenous micafungin, 100 mg/d x 10 d plus intravenous liposomal amphotericin B, 4 mg/kg/d x 15 d Intravenous liposomal amphotericin B, 4 mg/kg/d x 4 d (until patient died)	Died on hospital day 73
3	General medicine	Sputum: *P. aeruginosa*, *Stenotrophomonas. maltophilia*; pneumonia: meropenem, vancomycin.ceftazidime, trimethoprim/sulfamethoxazole	Blood (+)/hospital day 27; blood (–)/hospital day 33	Intravenous micafungin, 100 mg/d x 12 d (as empiric treatment for suspected invasive candidiasis on hospital days 11–23) Intravenous micafungin, 100 mg/d x 9 d initiated after positive blood culture on hospital day 27 and continued until patient died	Died on hospital day 38
4	Intensive care unit	Urine: *K. pneumoniae*; no concomitant antimicrobial drugs given	Blood (+)/hospital day 100; blood (–)/hospital day 103	Intravenous micafungin, 100 mg/d x 19 d	Discharged to nursing home on hospital day 161
5	Intensive care unit	Sputum: *A. baumannii*; pneumonia: meropenem , vancomycin, polymyxin B	Sputum/hospital day 30: positive for *C. albicans*; Blood (+)/hospital day 45: positive for *C. auris*; blood (–)/hospital day 49	Intravenous micafungin, 100 mg/d (as empiric treatment for suspected invasive candidiasis hospital days 30–44) Intravenous micafungin dose increased to 150 mg/d in setting of positive blood culture for *C. auris* on hospital day 45; intravenous liposomal amphotericin B, 5 mg/kg/d added on to micafungin hospital day 60 because of persistent leukocytosis and febrile episodes; antifungal drugs discontinued after 30 d of micafungin and 19 d of liposomal amphotericin B	Discharged to nursing home for palliative care on hospital day 81
6	General medicine	Two weeks before admission: blood: ESBL *K. pneumonia*; bacteremia: meropenem	Blood (+)/hospital day 1; blood (–)/hospital day 3	Intravenous micafungin, 100 mg/d x 14 d	Discharged to nursing home on hospital day 22
7	General medicine	Cultures: none; pneumonia: cefepime	Blood (+)/hospital day 1; blood (–)/hospital day 3	Intravenous micafungin, 150 mg/d x 14 d	Discharged home on hospital day 28
8	Nursing home (attached to hospital)	Sputum: ESBL *K. pneumoniae, P. aeruginosa*; blood: *A. baumanii*; pneumonia: cefepime, meropenem, vancomycin	Blood (+)/nursing home day 21; blood (–)/nursing home day 22	Intravenous micafungin, 150 mg/d x 18 d	Discharged to outside nursing home with palliative care on day 70

Case-patient	Age, y/sex	Medical history	Admitted from nursing home	Presence of invasive device	Recent broad-spectrum antimicrobial drug
9	Intensive care unit	Cultures: not available; septic shock: vancomycin and cefepime; vancomycin and meropenem	Blood(+)/hospital day 4; blood (–)/unavailable	Intravenous micafungin, 100 mg/d x 14 d	Discharged to nursing home with palliative care after completion of therapy. Hospital day of discharge was unavailable

*ESBL, extended-spectrum β-lactamase; IV, intravenous; PEG, percutaneous endoscopic gastrostomy.
†Case-patient 2 was initially given micafungin for 26 d for *C. auris* fungemia. On hospital day 36, the patient remained persistently febrile. Therefore, he was empirically given micafungin. On hospital day 39, his urine culture showed *C. auris* and amphotericin B was subsequently added to micafungin therapy. Combination therapy was continued for 7 days at which time micafungin was discontinued and the patient continued to receive amphotericin B for 8 additional days. On hospital days 69 and 70, blood cultures were again positive for *C. auris*. The patient was then given amphotericin B until he died.



	AMPB	ANID	CASP	5FU	ITRA	MICA	POSA	VORI	FLUC
Case 1	2	0.25	0.25	0.12	0.25	0.25	0.25	2	256
Case 2	4	1	0.25	0.125	1	0.12	0.5	2	256
Case 3	8	0.5	0.5	0.125	1	0.12	0.5	2	256
Case 4	4	1	0.5	0.094	0.5	0.25	0.5	2	256
Case 5	1.5	0.25	0.25	0.023	1	0.12	0.5	2	256
Case 6	1.5	0.25	0.25	0.032	1	0.12	0.5	2	256
Case 7	2	0.25	0.12	0.064	0.5	0.12	0.25	2	256
Case 8	1	0.25	0.12	0.064	0.5	0.12	0.25	2	256

Appendix Figure. Antifungal susceptibility data for 8 case-patients during management of *Candida auris* fungemia at community Hospital, Brooklyn, New York, USA, 2016–2018. Red horizontal bars indicate MIC breakpoints per guidance of the Centers for Disease Control and Prevention (Atlanta, GA, USA). Tentative MIC breakpoints are not available for some antifungal agents included. AMPB, amphotericin B; ANID, anidulafungin; CASP, caspofungin; 5FU, 5-fluorouracil; ITRA, itraconazole; MICA, micafungin; POSA, posaconazole; VORI, voriconazole; FLUC, flucoconazole.