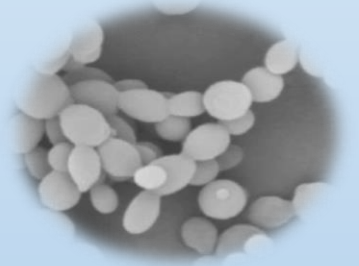




Candida auris (*Candidozyma auris*) Epidemiyolojide Güncel Durum

Doç. Dr. Esma ERYILMAZ EREN
SBÜ Kayseri Şehir Eğitim ve Araştırma Hastanesi
Enfeksiyon Hastalıkları ve Klinik Mikrobiyoloji Anabilim Dalı
13.05.2025



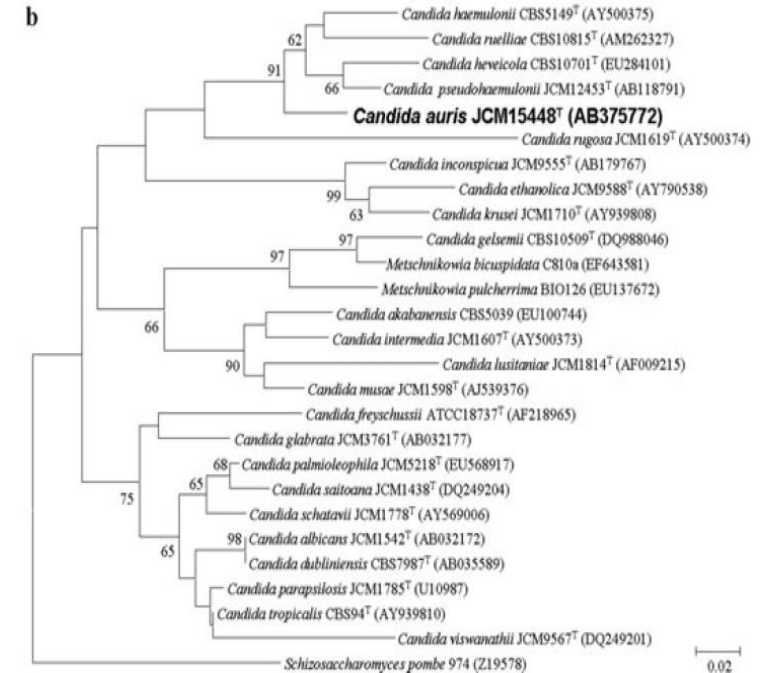
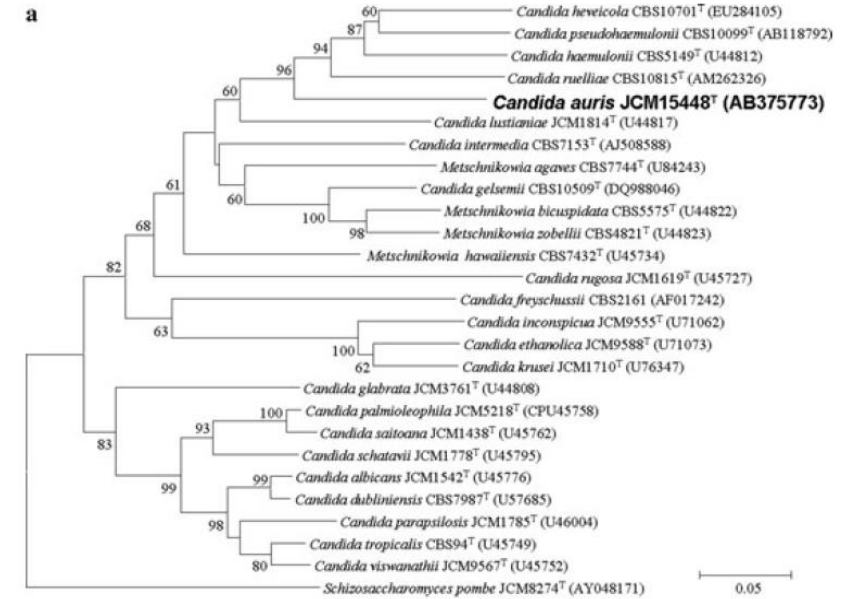
ORIGINAL ARTICLE

Candida auris sp. nov., a novel ascomycetous yeast isolated from the external ear canal of an inpatient in a Japanese hospital

Kazuo Satoh^{1,2}, Koichi Makimura^{1,3}, Yayoi Hasumi¹, Yayoi Nishiyama¹, Katsuhisa Uchida¹ and Hideyo Yamaguchi¹

Candida auris

- 2009 yılında Japonya'da
- 70 yaşında bir hastadan
- Eksternal otit etkeni olarak izole edildi



Candida haemulonii and Closely Related Species at 5 University Hospitals in Korea: Identification, Antifungal Susceptibility, and Clinical Features

Mi-Na Kim,¹ Jong Hee Shin,^{4,6} Heungsup Sung,¹ Kyungwon Lee,² Eui-Chong Kim,³ Namhee Ryoo,⁷ Jin-Sol Lee,^{4,6} Sook-In Jung,⁵ Kyung Hwa Park,⁵ Seung Jung Kee,^{4,6} Soo Hyun Kim,^{4,6} Myung Geun Shin,^{4,6} Soon Pal Suh,^{4,6} and Dong Wook Ryang^{4,6}

¹Department of Laboratory Medicine, Ulsan University College of Medicine, ²Department of Laboratory Medicine, Yonsei University College of Medicine, and ³Department of Laboratory Medicine, Seoul National University College of Medicine, Seoul, Departments of ⁴Laboratory Medicine and ⁵Internal Medicine, Chonnam National University Medical School, and ⁶Brain Korea 21 Project, Center for Biomedical Human Resources at Chonnam National University, Gwangju, and ⁷Department of Laboratory Medicine, Keimyung University Medical School, Daegu, Republic of Korea

- 2004-2006 yılları arasında, Kore'deki 5 hastanede
- 23 hastadan (8 fungemi hastası ve 15 kronik otitis media hastası)
- *C. haemulonii*'ye fenotipik benzerlik gösteren, flukonazole dirençli alışılmadık maya izolatları elde edildi

First Three Reported Cases of Nosocomial Fungemia Caused by *Candida auris*[▽]

Wee Gyo Lee,¹ Jong Hee Shin,^{2*} Young Uh,³ Min Gu Kang,¹ Soo Hyun Kim,²
 Kyung Hwa Park,⁴ and Hee-Chang Jang⁴

Department of Laboratory Medicine, Ajou University School of Medicine, Suwon, South Korea¹; Department of Laboratory Medicine, Chonnam National University Medical School, Gwangju, South Korea²; Department of Laboratory Medicine, Yonsei University Wonju College of Medicine, Wonju, South Korea³; and Department of Internal Medicine, Chonnam National University Medical School, Gwangju, South Korea⁴

- Üç kandidemi suşu *C.auris* olarak tanımlandı
- İlk invaziv enfeksiyon

VOL. 49, 2011

CANDIDA AURIS FUNGEMIA 3141

TABLE 1. Results of identification and antifungal susceptibility testing for 6 isolates from 3 patients with *C. auris* fungemia^a

Patient	Isolate no.	Isolation date (mo/day/yr)	Identification result ^b			Antifungal MIC (μg/ml)					
			D1/D2 domain and ITS sequence analysis	Vitek 2 YST	API 20C	AMB	FLU	ITR	VOR	Casp	Mica
1	1	12/14/1996	<i>Candida auris</i> (100)	<i>Candida haemulonii</i> (99)	<i>Rhodotorula glutinis</i> (99.9)	0.5	128	2	1	0.06	0.03
	2	12/20/1996	<i>C. auris</i> (100)	<i>C. haemulonii</i> (99)	<i>R. glutinis</i> (99.9)	0.5	128	2	1	0.06	0.03
2	3	03/23/2009	<i>C. auris</i> (100)	<i>C. haemulonii</i> (99)	<i>R. glutinis</i> (99.9)	1	8	0.25	0.06	0.06	0.03
	4	03/31/2009	<i>C. auris</i> 100)	<i>C. haemulonii</i> (99)	<i>R. glutinis</i> (99.9)	1	8	0.25	0.125	0.06	0.03
3	5	08/03/2009	<i>C. auris</i> (100)	<i>C. haemulonii</i> (99)	<i>R. glutinis</i> (99.9)	1	2	0.125	0.03	0.06	0.03
	6	08/09/2009	<i>C. auris</i> (100)	<i>C. haemulonii</i> (99)	<i>R. glutinis</i> (99.9)	0.5	2	0.125	0.03	0.06	0.03

^a Abbreviations: Casp, caspofungin; Mica, micafungin.

^b Numbers in parentheses are the probability of correct identification (%).

EMERGING INFECTIOUS DISEASES®

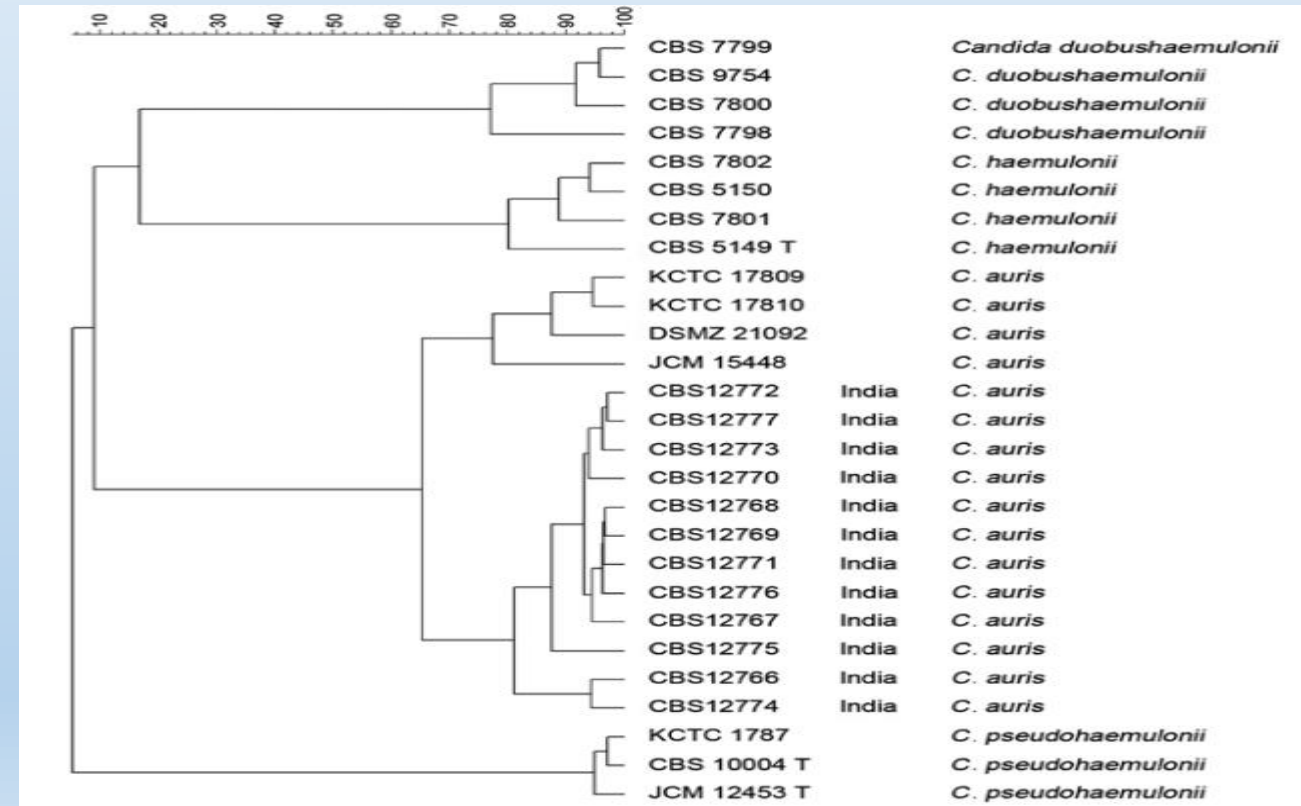
Volume 19, Number 10—October 2013

Dispatch

New Clonal Strain of *Candida auris*, Delhi, India

Anuradha Chowdhary✉, Cheshta Sharma, Shalini Duggal, Kshitij Agarwal, Anupam Prakash, Pradeep Kumar Singh, Sarika Jain, Shallu Kathuria, Harbans S. Randhawa, Ferry Hagen, and Jacques F. Meis

- 2009-2011 arasında, iki hastanede 12 kandidemi izolatu
- Flukonazole dirençli



Volume 20, Number 7—July 2014

Letter

Candida auris—Associated Candidemia, South Africa

- 2014 Güney Afrika
- 4 hastadan kandidemi etkeni

Table. Identification and antifungal susceptibility results of 4 *Candida auris* isolates from 4 male patients with candidemia, South Africa, October 2012–October 2013*

Isolate ID	Patient age, y	Hospital unit	Vitek-2 YST†	API 20C AUX†	DNA sequence analysis‡	MIC								
						AMB	FLX	VRC	POS	ITC	5FC	CAS	MFG	AFG
208	85	High-care	<i>C. haemulonii</i>	<i>Rhodotorula glutinis</i>	<i>C. auris</i>	1	>256	0.5	0.03	0.12	0.12	0.25	0.06	0.25
209	60	Medical ICU	<i>C. haemulonii</i>	<i>R. glutinis</i>	<i>C. auris</i>	0.5	>256	1	0.06	0.12	0.12	0.12	0.06	0.12
224	73	Burn	<i>C. haemulonii</i>	<i>R. glutinis</i>	<i>C. auris</i>	1	>256	2	0.06	0.25	0.12	0.25	0.12	0.25
293	27	Trauma ICU	<i>C. haemulonii</i>	<i>R. glutinis</i>	<i>C. auris</i>	1	64	0.25	0.015	0.06	0.06	0.03	0.06	0.06

First report of *Candida auris* in America: Clinical and microbiological aspects of 18 episodes of candidemia

Belinda Calvo ^a, Analy S.A. Melo ^b, Armindo Perozo-Mena ^c,
 Martin Hernandez ^d, Elaine Cristina Francisco ^b, Ferry Hagen ^{e,f},
 Jacques F. Meis ^{e,f}, Arnaldo Lopes Colombo ^{b,*}



Figure 1 AFLP dendrogram of 18 *C. auris* isolates from Venezuela and the reference strains *C. auris* JCM15448, *C. haemulonii* CBS5149 and *C. pseudohaemulonii* JCM12453.

Table 2 *In vitro* antifungal activity of 5 antifungal drugs tested against 18 *C. auris* isolates by the CLSI broth micro-dilution method.

Antifungal	*MIC ₅₀	**MIC ₉₀	Range	***GM
Amphotericin B	1	2	1–2	1.414
5-Fluorocytosine	0.5	0.5	0.5	0.5
Fluconazole	>64	>64	>64	>64
Voriconazole	4	4	4	4
Anidulafungin	0.125	0.125	0.06–0.125	0.125

*MIC₅₀ and **MIC₉₀ are MIC values able to inhibit 50% and 90% of all strains, respectively.

***GM represents geometric mean; MIC values are expressed as µg/ml.



First hospital outbreak of the globally emerging *Candida auris* in a European hospital

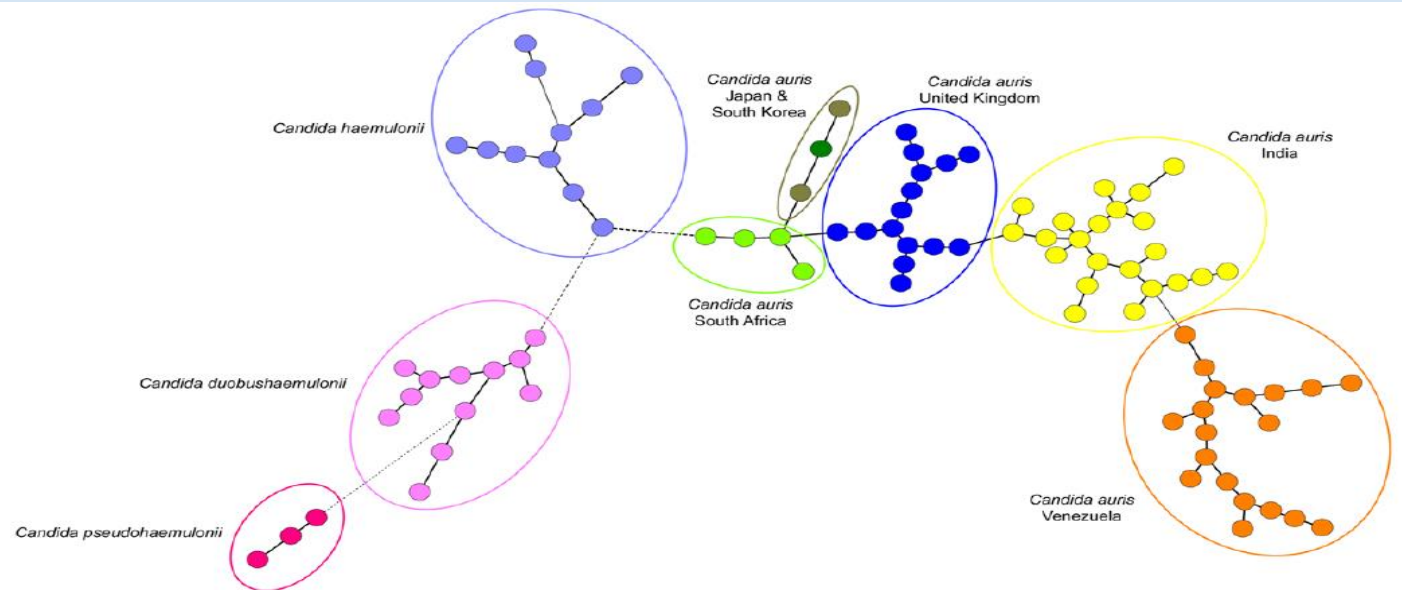
Silke Schelenz^{1,3*}, Ferry Hagen², Johanna L. Rhodes³, Alireza Abdolrasouli³, Anuradha Chowdhary⁴, Anne Hall¹, Lisa Ryan¹, Joanne Shackleton¹, Richard Trimlett⁵, Jacques F. Meis^{2,6}, Darius Armstrong-James^{1,3} and Matthew C. Fisher³

Nisan 2015 ile Temmuz 2016 arasında Londra'daki bir kardiyo-toraksik merkezde devam eden bir *C. auris* salgını

- 50 vaka

Table 1 Clinical manifestations of *C. auris* in patients

Clinical manifestation of <i>C. auris</i> cases	Percent (total number)
Colonization only	56 % (n = 28/50)
Candidaemia episodes (one patient had two episodes)	18 % (n = 9/50)
Possible sternal wound infection (culture positive and clinical signs of infection)	6.3 % (n = 3/50)
Possible urinary catheter infection (culture positive before and after catheter change and response to antifungal treatment)	2 % (n = 1/50)
Possible vascular line tip infection (positive line tip culture treated empirically with antifungal agent)	14 % (n = 7/50)
Presumed invasive candidiasis of unknown focus of infection	4 % (n = 2*/50)



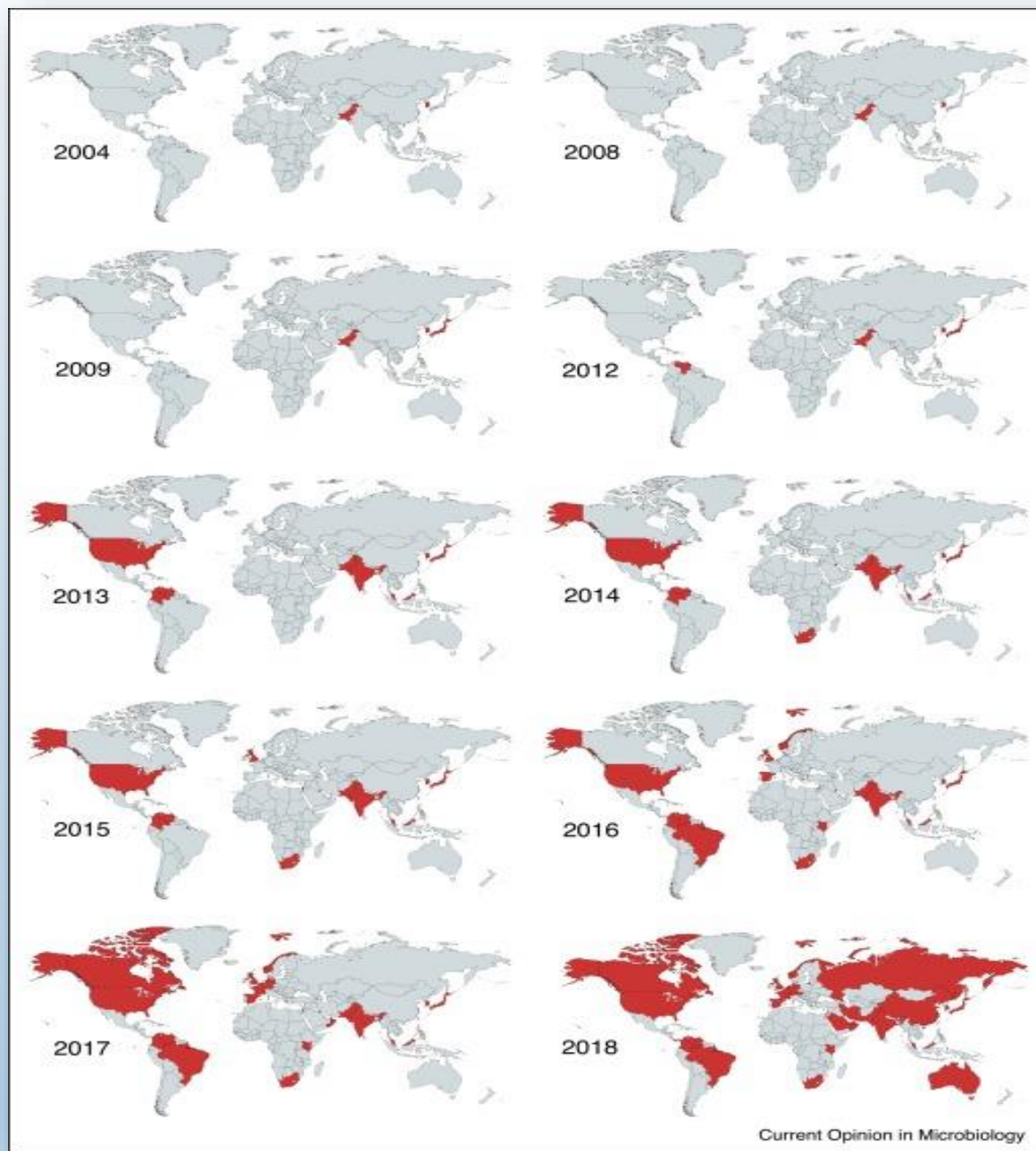
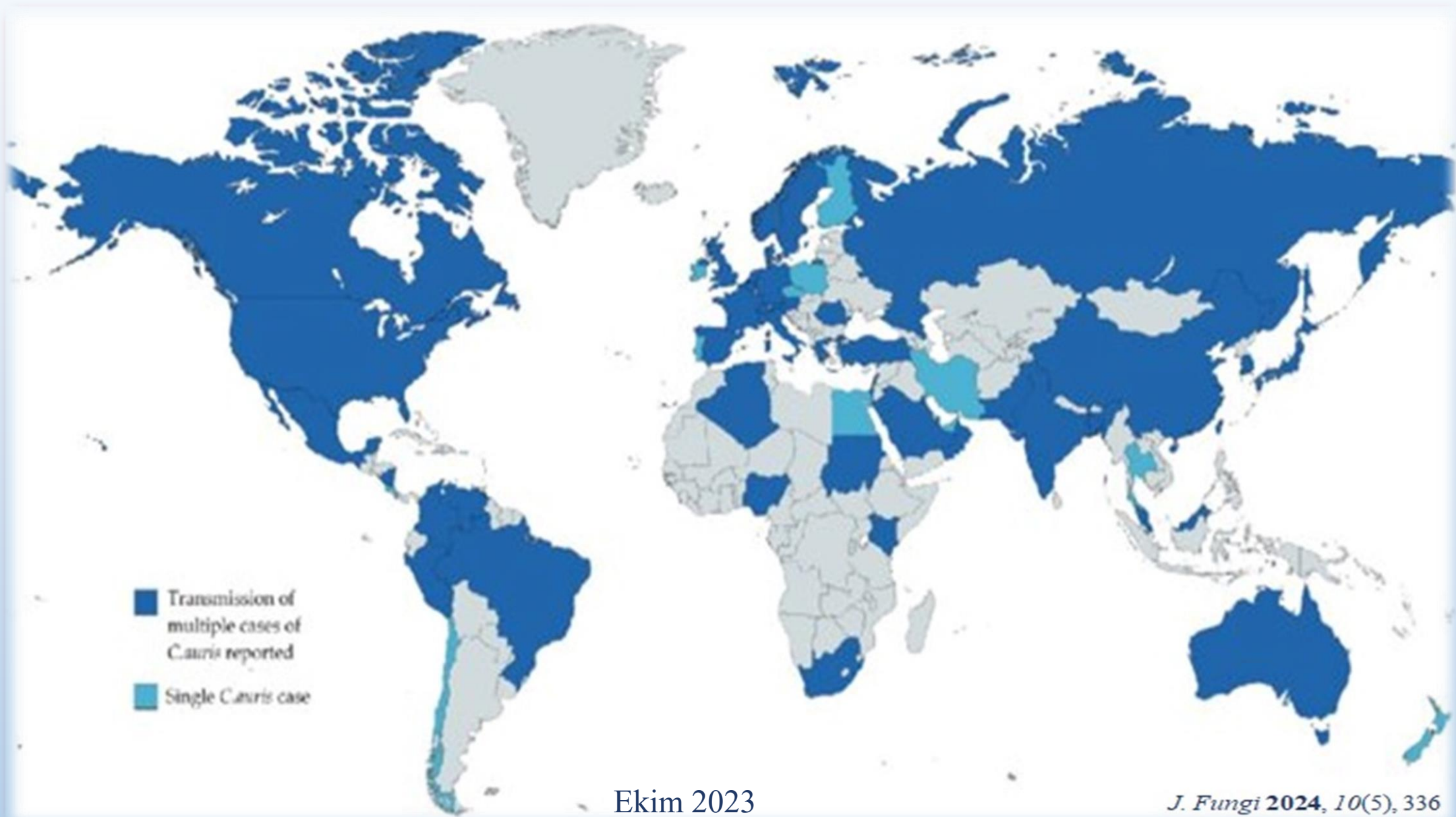


Fig. 1. WHO fungal priority pathogens list (WHO FPPL)





Ekim 2023

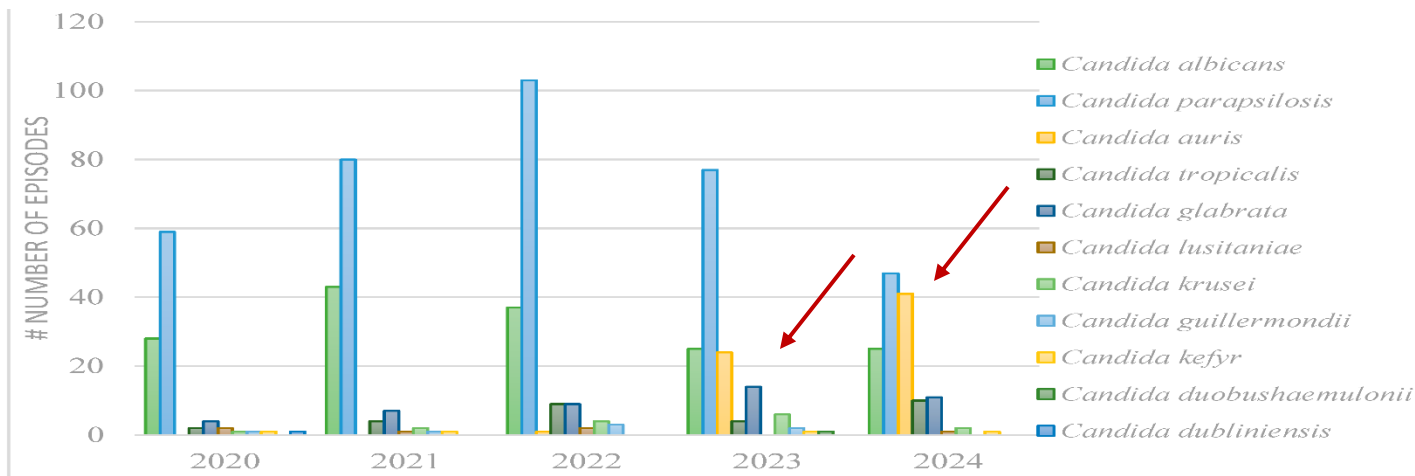
J. Fungi **2024**, *10*(5), 336

Communication

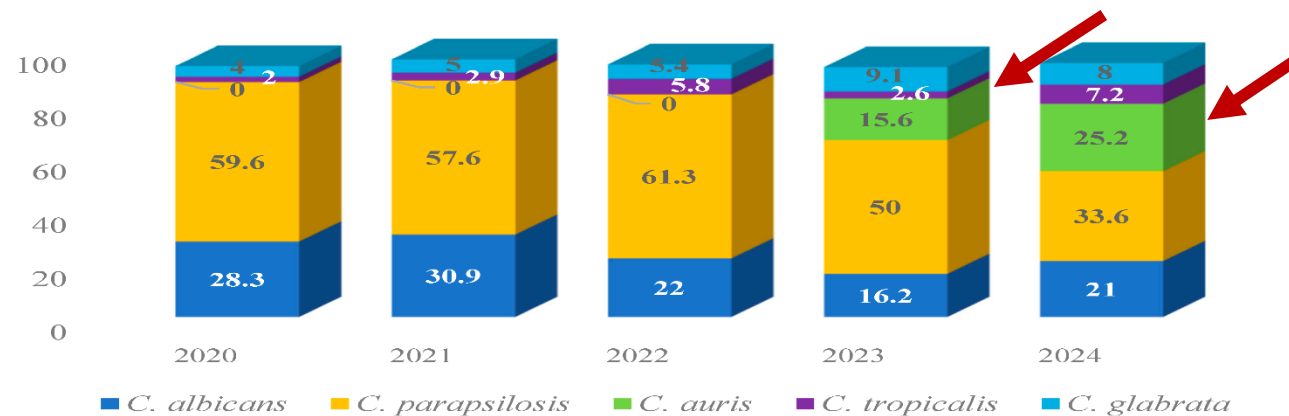
Changing Epidemiology of *Candida* spp. Causing Bloodstream Infections in a Tertiary Hospital in Northern Greece: Appearance of *Candida auris*

Athina Pyrpasopoulou ^{1,2,*} , Charalampos Zarras ³ , Eleni Mouloudi ⁴, Georgios Vakalis ², Argyro Ftergioti ² , Dimitrios Kouroupis ¹, Anastasia-Izampella Papathanasiou ², Elias Iosifidis ⁵ , Stella Goumperi ², Charis Lampada ⁵, Maria Terzaki ¹  and Emmanuel Roilides ^{2,5}

A



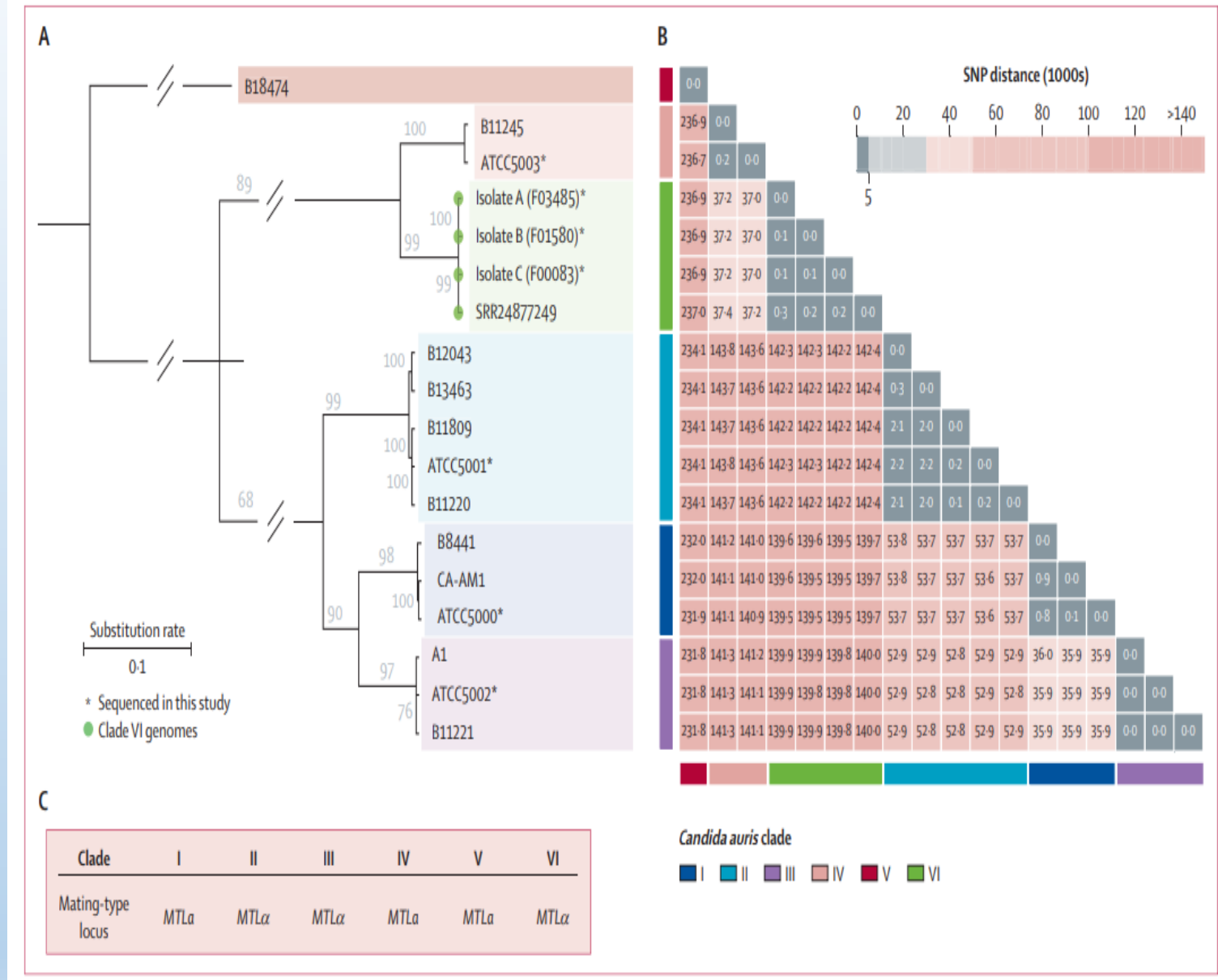
B

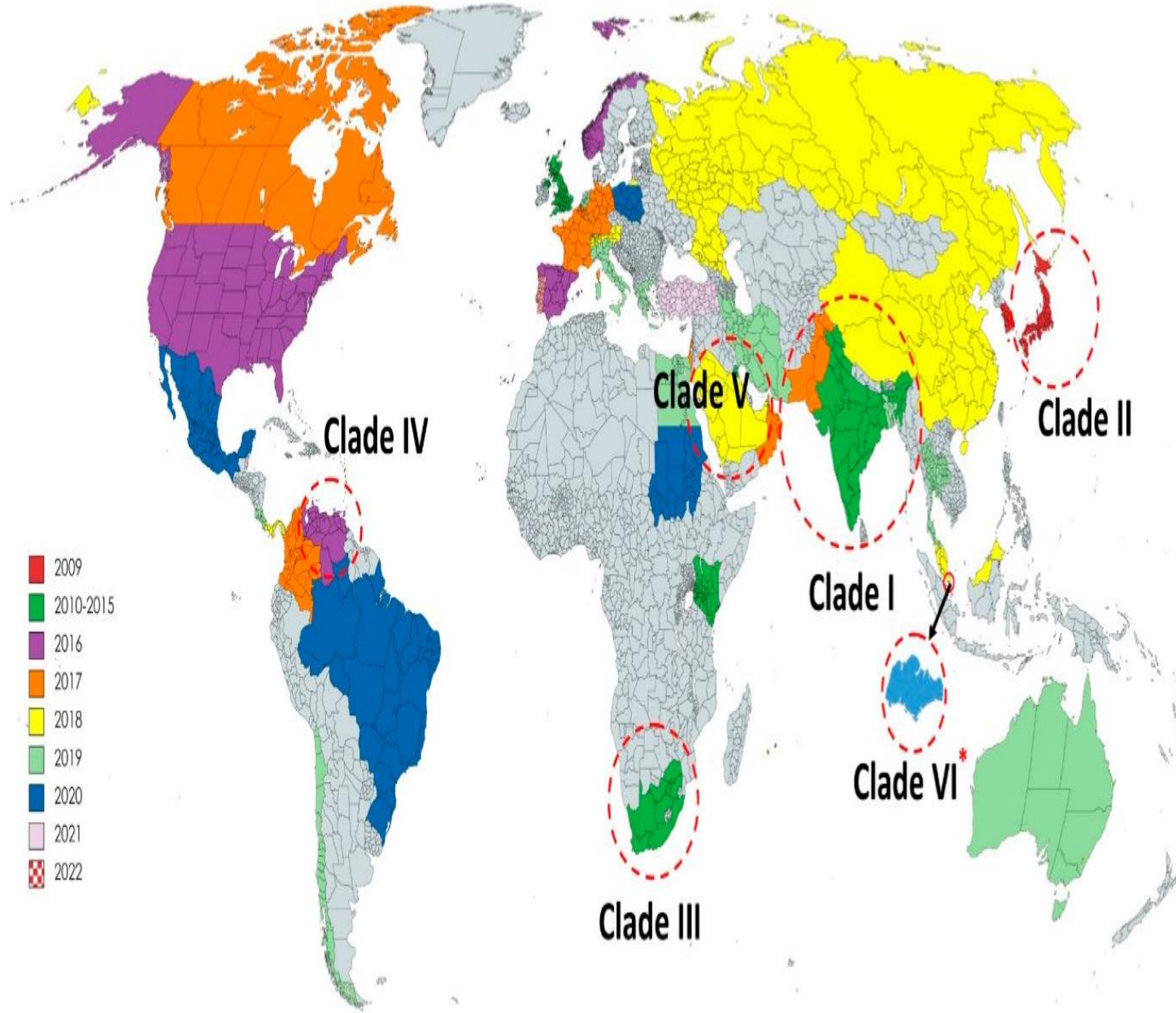


- 1 Ocak 2020 ile 15 Ekim 2024 tarihleri arasında toplam 657 kandidemi atağı
- 2023'te 25/154 (%15,6) ve 2024'te 30/119 *C. auris*

*Genomik analizler, C. auris'in aynı anda birkaç kıtada **altı ayrı klad** ile ortaya çıktığını göstermekte*

- Klad I (Güney Asya)
- Klad II (Doğu Asya)
- Klad III (Afrika)
- Klad IV (Güney Amerika)
- Klad V (İran)
- Klad-VI (Singapur-Bangladeş)





- İnvaziv enfeksiyonlarda
- Nozokomiyal geçişte
- Büyük ölçekli hastane salgınlarında çoğunlukla **Klad I, III ve IV** etken
- **Klad II** bugüne dek sadece kulak enfeksiyonlarından izole edilmiş ve antifungal ilaçlara daha duyarlı
- **Klad II ve V** ile salgın bildirilmemiş

Türkiye'den vakalar

Indian Journal of Medical Microbiology 39 (2021) 228–230

Original Research Article

***Candida auris* Fungemia and a local spread taken under control with infection control measures: First report from Turkey**

Ahmet Furkan Kurt^a, Mert Ahmet Kuskucu^b, Ilker Inanc Balkan^a, Ayse Baris^c, Zeynep Yazgan^b, Ayşe Serife Oz^b, Ayse Istanbulu Tosun^d, Bilgul Mete^{a,*}, Fehmi Tabak^a, Gokhan Aygun^b

^a Istanbul University-Cerrahpasa, Cerrahpasa School of Medicine, Department of Infectious Diseases and Clinical Microbiology, Istanbul, Turkey

^b Istanbul University-Cerrahpasa, Cerrahpasa School of Medicine, Department of Medical Microbiology, Istanbul, Turkey

^c Health Sciences University, Hamidiye Sisi Etilal Educating and Training Hospital, Department of Medical Microbiology, Istanbul, Turkey

^d Istanbul Medipol University, Medical Faculty, Department of Medical Microbiology, Istanbul, Turkey



- İstanbul
- 81 yaş, kadın
- Kardiyovasküler cerrahi sonrası YBÜ takipli
- Fungemi *Candida spp.*
- MALDI-ToF ile tanımlanan *Candida auris*

CASE REPORT / OLGU SUNUMU

DOI: 10.4274/mjima.galenos.2021.2021.48
Mediterr J Infect Microb Antimicrob 2021;10:48
Erişim: <http://dx.doi.org/10.4274/mjima.galenos.2021.2021.48>



The Second Case of *Candida auris* Candidemia from Turkey: An Impending Threat to the Global Health

Türkiye'den İkinci *Candida auris* Sepsisi Olgu Sunumu: Küresel Sağlık için Yaklaşan Bir Tehdit

• Leyla TEKE¹, • Elif SARGIN ALTUNOK², • Döndü GENÇ MORALAR³

¹University of Health Sciences Turkey, Gaziosmanpaşa Training and Research Hospital, Clinic of Microbiology, Istanbul, Turkey

²University of Health Sciences Turkey, Gaziosmanpaşa Training and Research Hospital, Clinic of Infectious Diseases and Clinical Microbiology, Istanbul, Turkey

³University of Health Sciences Turkey, Gaziosmanpaşa Training and Research Hospital, Clinic of Anesthesiology and Reanimation, Istanbul, Turkey

- İstanbul
- 18 yaş, erkek
- Beyin tümörü, trakeostomi ve gastrostomi
- Pnömoni ile yatış
- >3 ay sonra kateter ilişkili KDE
- VITEK-2 sistemi tarafından *Cryptococcus laurentii*
- MALDI-ToF ile tanımlanan *Candida auris*

Türkiye İstanbul'dan Bildirilen Üç *Candida auris* Olgusu

Three *Candida auris* Case Reports from Istanbul, Turkey

Selda KÖMEÇ¹(ID), Nilgiz
Abdurrahman GÜLMEZ¹(ID)

Türkiye'de İlk COVID-19 Pozitif *Candida auris* Fungemi Olgusu

First Case of COVID-19 Positive *Candida auris* Fungemia

Yasemin BÖLÜKBAŞI¹(ID), Go
Mert Ahmet KUŞKUCU³(ID), At
Ali AĞAÇFİDAN¹(ID), Figen E.



Türk Mikrobiyol Cemiy Derg 2023;53(1):47-54
doi:10.54453/TMCD.2023.81894

Olgu Sunumu / Case Report

İzmir'den İlk *Candida auris* İzolasyonu: Amputasyon İle Sonuçlanan Polimikrobiyal Diyabetik Ayak Enfeksiyonu

First *Candida auris* Infection Case from İzmir: Polymicrobial Diabetic Foot
Infection Resulting in Amputation

Kübra Kulaklı^{*○}, Nazlı Arslan^{**○}, Onur Gürsan^{***○}, Aydan Özkütük^{*○}

* Dokuz Eylül Üniversitesi, Tıp Fakültesi, Tıbbi Mikrobiyoloji Anabilim Dalı, İzmir, Türkiye

** Dokuz Eylül Üniversitesi, Sağlık Bilimleri Fakültesi, Tıbbi Mikrobiyoloji Anabilim Dalı, İzmir, Türkiye

*** Dokuz Eylül Üniversitesi, Tıp Fakültesi, Anesteziyoloji ve Reanimasyon Anabilim Dalı, İzmir, Türkiye

Atıf/Cite as: Kulaklı K, Arslan N, Gürsan O, Özkütük A. İlk *Candida auris* izolasyonu. Türk Mikrobiyol Cemiy Derg 2023;53(1):47-54.

Olgu Sunumu (Case Report)

KSU Medical Journal 2025;20(1): 91-95

Türkiye'de *Candida auris* Kandidemisi: Anadolu'da İlk Olgu

Candida auris Candidemia in Türkiye: First Case in Anatolia

Filiz ORAK¹, Damla GÜLDEREN², Yavuz ORAK³, Hafize ÖKSÜZ³

¹ Sütçü İmam Üniversitesi, Tıp Fakültesi, Tıbbi Mikrobiyoloji Anabilim Dalı, Kahramanmaraş, Türkiye

² Necip Fazıl Devlet Hastanesi, Tıbbi Mikrobiyoloji, Kahramanmaraş, Türkiye

³ Kahramanmaraş Sütçü İmam Üniversitesi Tıp Fakültesi, Anesteziyoloji ve Reanimasyon Anabilim Dalı, Kahramanmaraş, Türkiye



Detection, Screening, and Antifungal Susceptibility of the Current Threat *Candida auris*: A Tertiary Hospital Experience

✉ Neslihan Arıcı¹, ✉ Nilgün Kansak¹, ✉ Rıza Adaleti¹, ✉ Seniha Şenbayrak², ✉ Sebahat Aksaray³

¹Department of Medical Microbiology, University of Health Sciences Türkiye, Haydarpasa Numune Research and Training Hospital, Istanbul, Türkiye

²Department of Infectious Diseases and Clinical Microbiology, University of Health Sciences Türkiye, Haydarpasa Numune Research and Training Hospital, Istanbul, Türkiye

³Department of Medical Microbiology, University of Health Sciences Türkiye, Hamidiye Medical Faculty, Istanbul, Türkiye

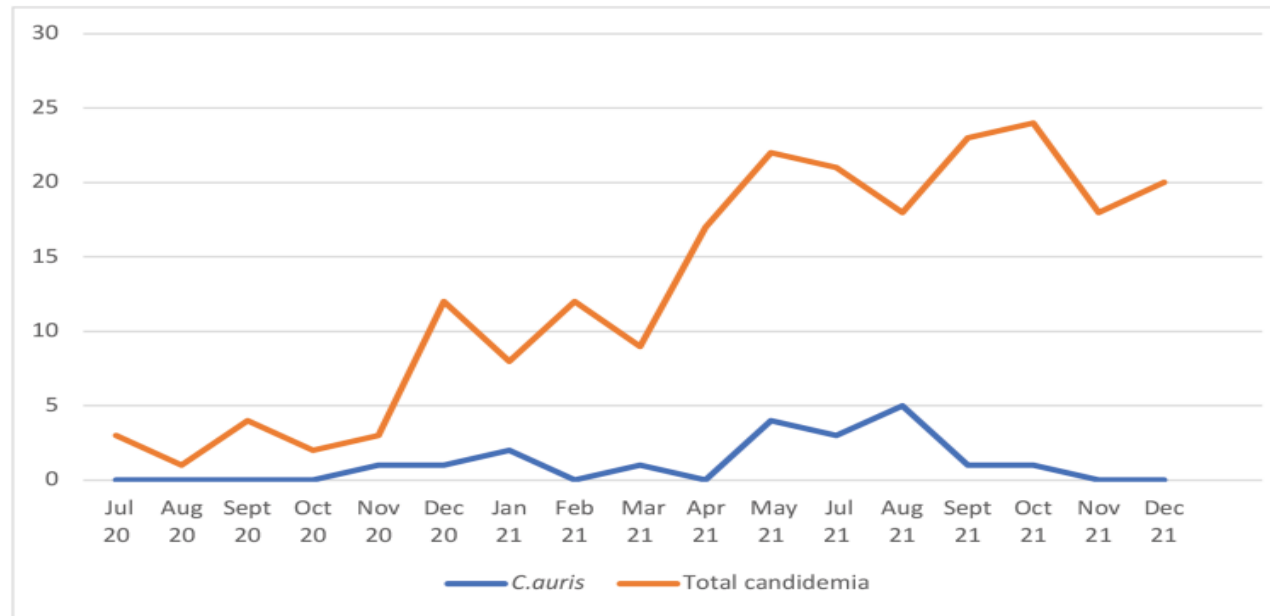
Table 1. Characteristics of *C. auris* infected or colonized patients

Patient	Sex Age	Initial Diagnosis	Hospital Stay (days)	ICU Stay (days)	Mechanical Ventilation	Site of Isolation	Comorbidities	Previous Surgery	Previous Broad- Spectrum AB	Previous Antifungal	Immunomodulatory Agents	Pre/co- infection	Antifungal treatment	Outcome
1	Female 61 y	Bacterial pneumoniae	73	73	73	Blood culture	Psoriasis, Encephalopathy	No	Meropenem Teicoplanin	No	Methotrexat (45 days)	UTI: <i>VRE+K.pneumoniae</i> <i>VAP: A.baumannii</i> <i>BSI: K. pneumoniae</i>	No*	Dead
2	Female 75 y	Cholangio- sepsis	35	22	8	Catheter	HT, CRF	No	Piperacillin- Tazobactam Meropenem Teicoplanin	No	No	<i>BSI: P. aeruginosa</i> <i>BSI: VRE+ A.baumannii</i>	No*	Dead
3	Male 62y	Acute pancreatitis	14	0	No	Blood culture	DM, HT	No	Sefepim Piperacillin- Tazobactam Meropenem	No	No	<i>BSI: E.coli</i>	No (treatment rejection)	Discharge
4	Female 24y	Candidal septicemia	25	25	No	Blood culture	VWM, PEG	No	Meropenem	Yes (Flucanazol 4 days)	No	<i>BSI: Candida tropicalis</i>	Yes (Anidulafungin 3 days)	Transferred
5	Male 61y	Bacterial pneumoniae	7	7	No	Skin screening	CRF	Aortic aneurysm	Meropenem Teicoplanin Polimiksin B	No	No	<i>VAP: K. pneumoniae +A.baumannii</i>	No (colonisation)	Dead
6	Female 70y	Septicemia	47	47	47	Skin screening	HT, PEG	Aortic dissection	Daptomisin Meropenem Polimiksin B	No	No	<i>BSI: P.stuartii</i> <i>BSI: S.aureus (MSSA)</i>	No (colonisation)	Transferred

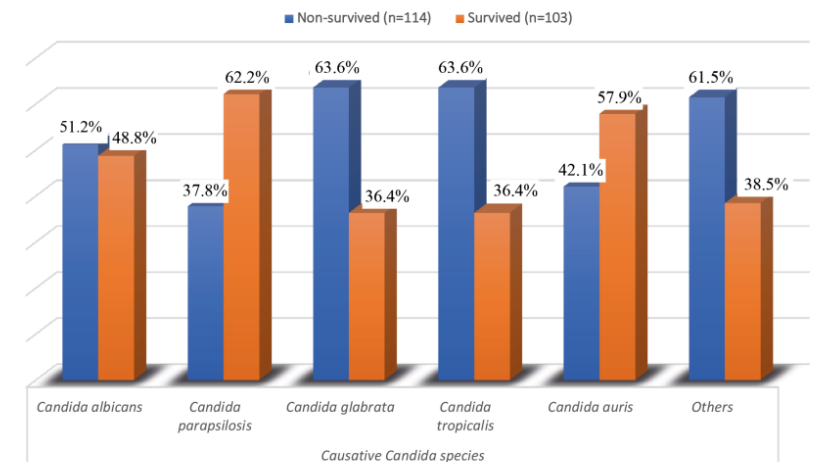
*The patients died before antifungal therapy was started. ICU: Intensive care unit; HT: Hypertension; CRF: Chronic renal failure; DM: Diabetes mellitus; VWM: Vanishing white matter; PEG: Percutaneous endoscopic gastrostomy; UTI: Urinary tract infection; VAP: Ventilator-associated pneumoniae; BSI: Blood stream infection; VRE: Vancomisin Resistant Enterococcus; AB: Antibiotic; MSSA: Methicillin sensitive *S. aureus*.

Analysis of candidemia cases in a city hospital during the COVID-19 pandemic

O. OZALP¹, S. KOMEC², M. UNSEL³, A. GUNDUZ¹, O. ALTUNTAS AYDIN¹



- 2020-2021 17 aylık dönem
- *C.auris* tüm suşların %9'u

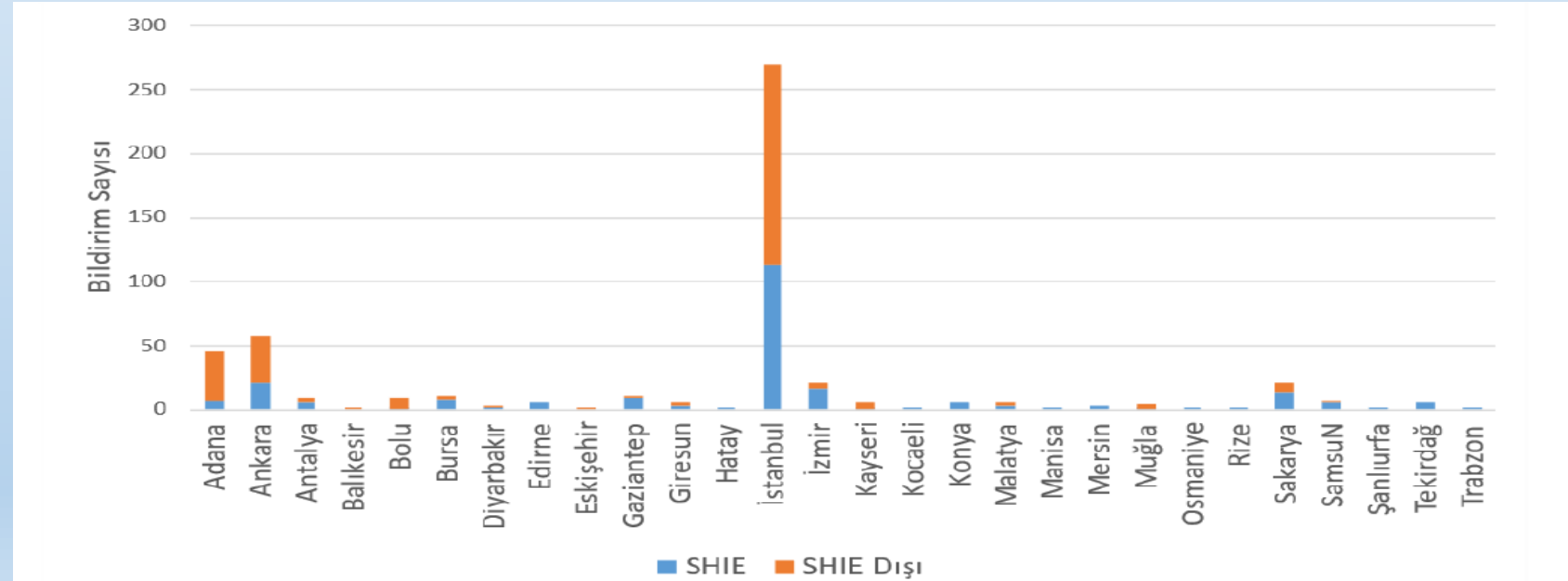




T.C. SAĞLIK BAKANLIĞI
HALK SAĞLIĞI
GENEL MÜDÜRLÜĞÜ

SAĞLIK HİZMETLERİNDE CANDIDA AURIS

- 1 Eylül – 31 Kasım 2024
- Toplam 116 hastaneden 515 *C.auris*
- 237'si SHİE ve 278'i SHİE dışı

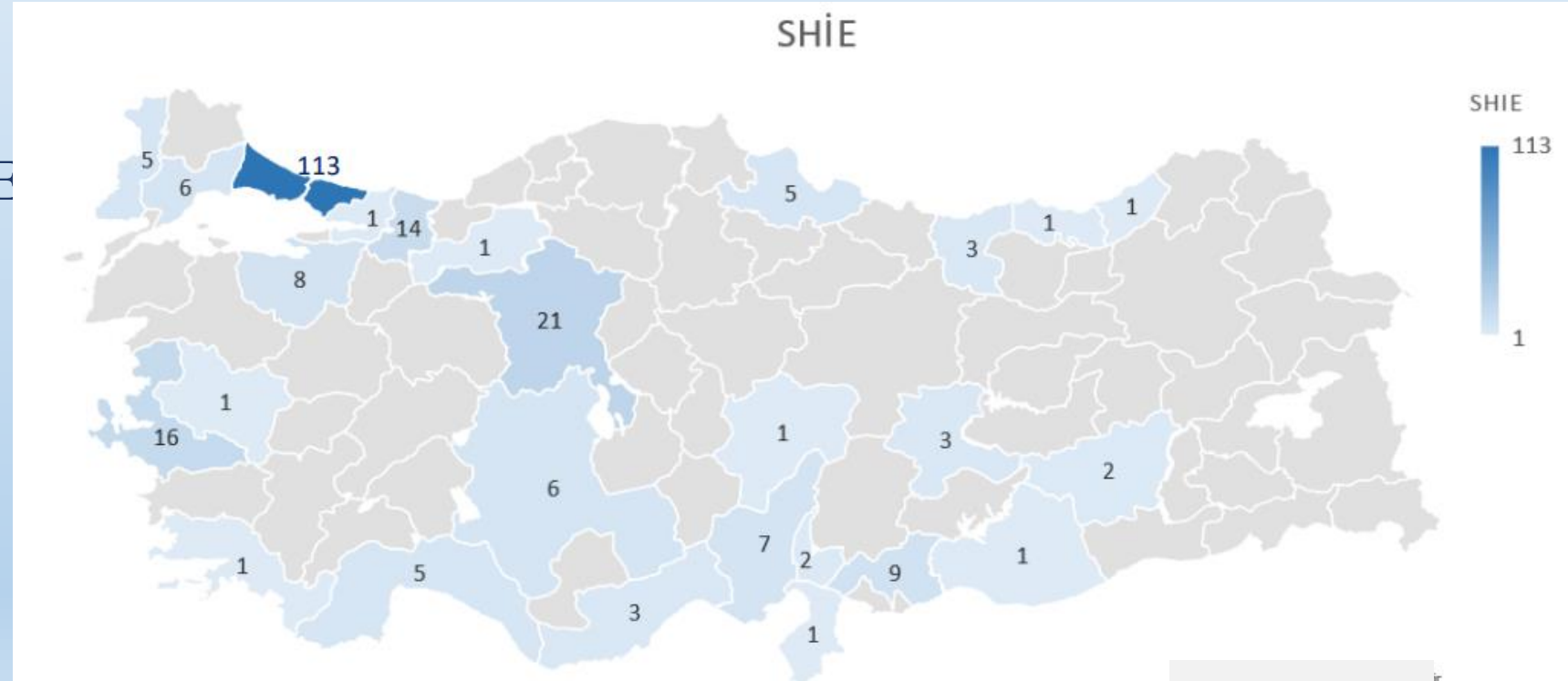




T.C. SAĞLIK BAKANLIĞI
HALK SAĞLIĞI
GENEL MÜDÜRLÜĞÜ

SAĞLIK HİZMETLERİNDE CANDIDA AURIS

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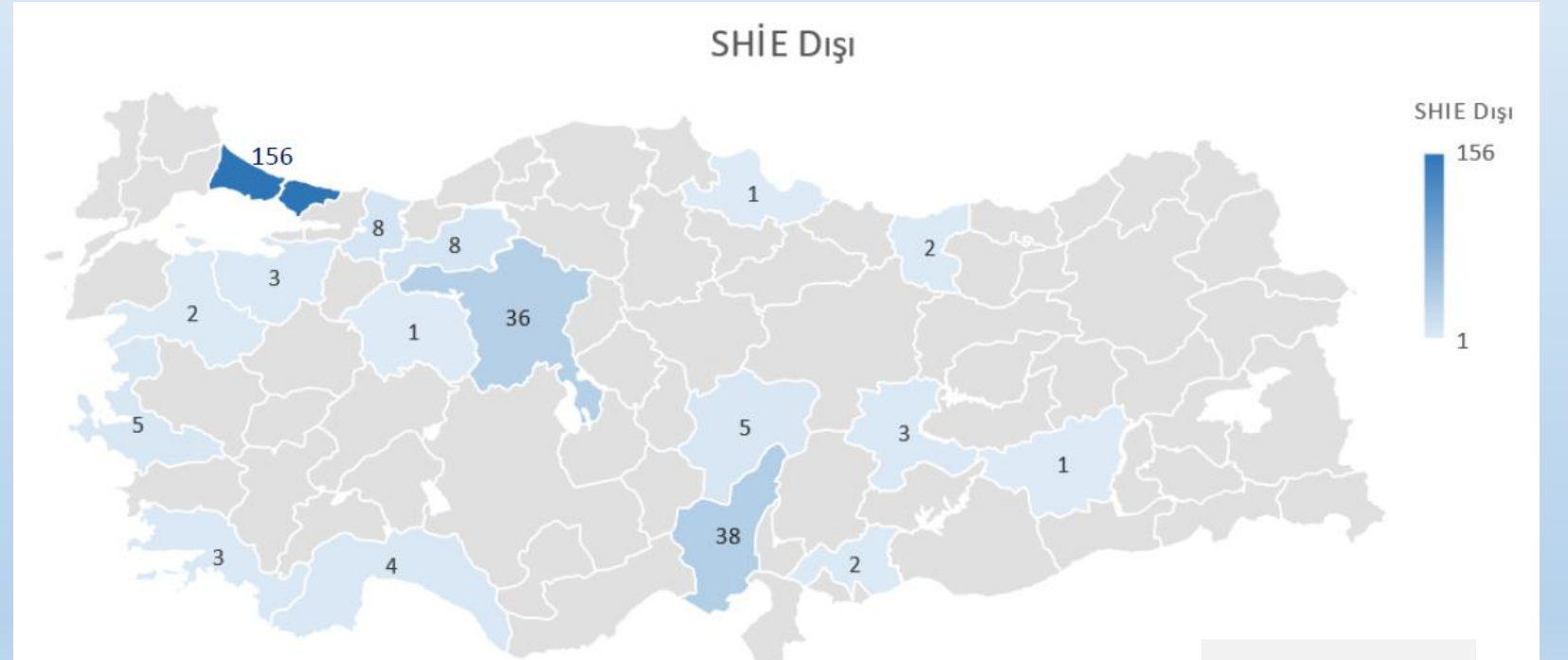




T.C. SAĞLIK BAKANLIĞI
HALK SAĞLIĞI
GENEL MÜDÜRLÜĞÜ

SAĞLIK HİZMETLERİNDE CANDIDA AURIS

- 1 Eylül – 31 Kasım 2024
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515 *C.auris*
- 237'si SHİE ve 278'i SHİE
dışı



ORIGINAL ARTICLE

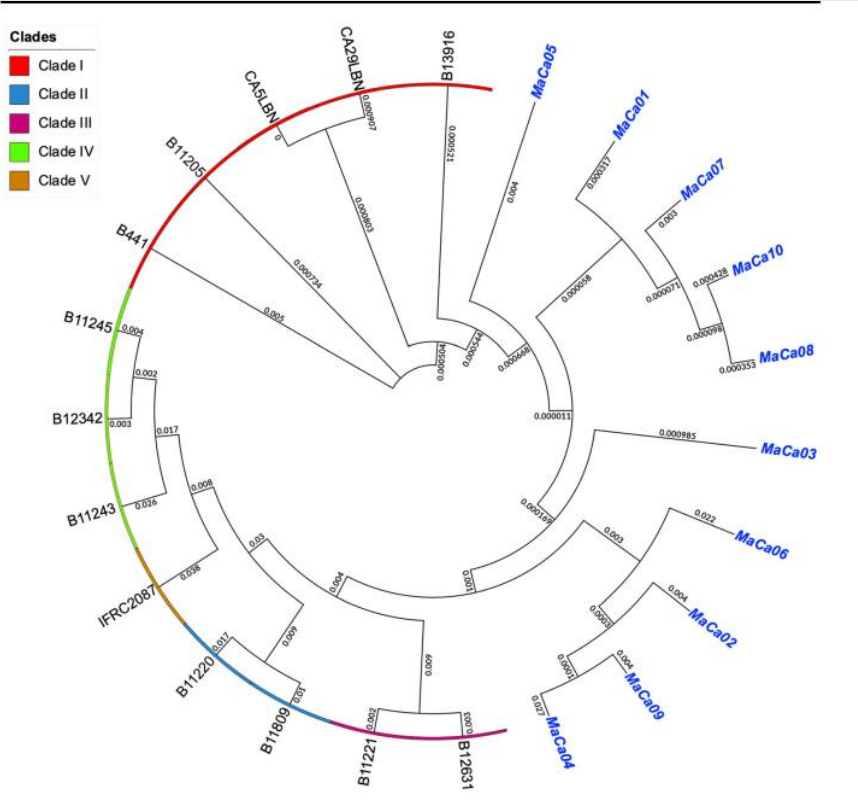
Nosocomial infection of *C. auris* in COVID-19 Intensive Care Unit in Türkiye and Phylogenetic Analysis of Isolates

Buket Erturk Sengel  · Berkay Yekta Ekren · Elvan Sayin · Elif Tukenmez Tigen · Aytan Seydaliyeva · Nilgun Cerikcioglu · Ismail Cinel · Volkan Korten · Ugur Sezerman · Zekaver Odabasi

Table 1 The characteristic features of the patients, drug information, and significant dates

Patient	Age	Sex	Comorbidities	Broad-spectrum antibiotic use ^a	Day to candidemia ^b	<i>C. auris</i> colonization	First blood culture ^c	Treatment drug/date	Time to death (day) ^d
P1	59	F	HT, DM	Yes	30	–	11 Feb	A /15 Feb	8
P2	73	F	HT	Yes	4	–	23 Mar	–	3
P3	61	M	HT, CAD	Yes	18	02 Apr, wound	05 Apr	–	1
P4	68	M	HT	Yes	19	–	16 Apr	A /18 Apr	23
P5	76	F	–	Yes	21	–	21 May	–	1
P6	64	M	–	Yes	52	12 May, urine	30 May	–	0
P7	83	M	HT, COPD	Yes	14	–	01 Jun	A /04 Jun	15
P8	63	M	HT, DM, COPD, Morbid obesity	Yes	25	28 May, skin	03 Jun	A /28 May	2
P9	50	F	HT, DM	Yes	72	07 Jun, urine	08 Jul	A /11 Jul	26
P10	75	M	HT, ALL	Yes	20	14 Aug, urine	18 Aug	V /14 Jul AB /27 Jul A /20 Aug	15

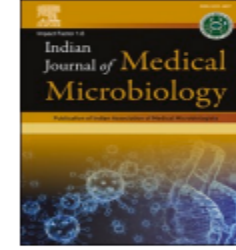
Tüm suşlar Klad 1



Original Research Article

Evaluation of the first *Candida auris* isolates reported from Türkiye in terms of identification by various methods and susceptibility to antifungal drugs

Gonca Erkose Genc^{a,*}, Ilvana Caklovica Kucukkaya^a, Selda Komec^b, Ilke Toker Onder^c, Oyku Toptas^d, Leyla Teke^e, Deniz Turan^f, Gokhan Aygun^g, Dolunay Gulmez^c, Sevtap Arikan Akdagli^c, Zayre Erturan^a



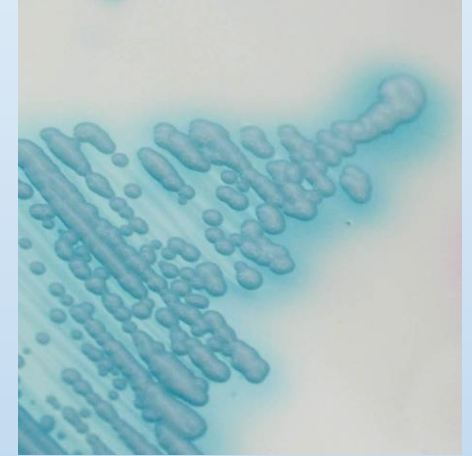
- Tüm suşlar Klad 1'e yakın (N-asetil glikozamin gibi biyokimyasal özellikler)
- 1 ve 2 diğer suşlardan farklı olarak benzer asimilasyon profillerine ve antifungal ilaçlara duyarlılığa sahip
- Ksilitol negatif olmalı

Table 2Minimum inhibitory concentration values (mg/L) of *Candida auris* strains.

Isolate	Fluconazole	Itraconazole	Voriconazole	Posaconazole	Amphotericin B	Anidulafungin	Micafungin
1	64	>8	>8	2	0.5	0.5	0.03
2	64	>8	>8	2	1	0.5	0.03
3	>64	0.03	0.5	0.015	1	0.5	0.125
4	64	0.015	0.5	0.015	1	0.5	0.125
5	64	0.015	0.5	0.015	1	0.5	0.125
6	64	0.015	0.5	0.015	1	0.5	0.125
7	64	0.03	0.25	0.015	1	0.5	0.25

Mikrobiyoloji

- Sabouraud dekstrozu agarda beyaz, krem rengi, düzgün, pürüzsüz koloniler
- Çeşitli ticari kromojenik besiyerlerinde kolonileri soluk mor, açık pembe (CHROMagar™ *Candida*, Paris, Fransa) veya mavi (CHROMagar™ *Candida* Plus, Paris, Fransa) renkli
- Siklohekzimide duyarlı
- Pseudohif oluşturabilir



Mikrobiyoloji

Biyofilm

- Standart laboratuvar ortamında *C.albicans*'a göre biyofilm yükü düşük
- Sentetik tasarlanmış aksiller ortamda on kat daha fazla hücresel yük içeren, çok katmanlı biyofilm
- Yüksek tuz konsantrasyonu, yağ asitleri gibi bileşenler ve kuruma gibi stres koşullarına karşı *C. albicans*'a göre daha dayanıklıdır

Kliniklerde Önemi

- Temas ile hızlı yayılıyor
- Kolonizasyona çok yatkın
- Yüzeylerde kolonize oluyor
- Vücutta farklı anatomik bölgelerde kolonize oluyor
 - Eller, avuçlar, parmak uçları
 - Aksilla, kasıklar, gastrointestinal sistemin ve genitoüriner sistemin mukozal yüzeyleri ile solunum yolu (orofarinks, burun) ve dış kulakta
 - Santral venöz kateterler ve trakeostomi çevresinde kolonize olabilir

Kliniklerde Önemi

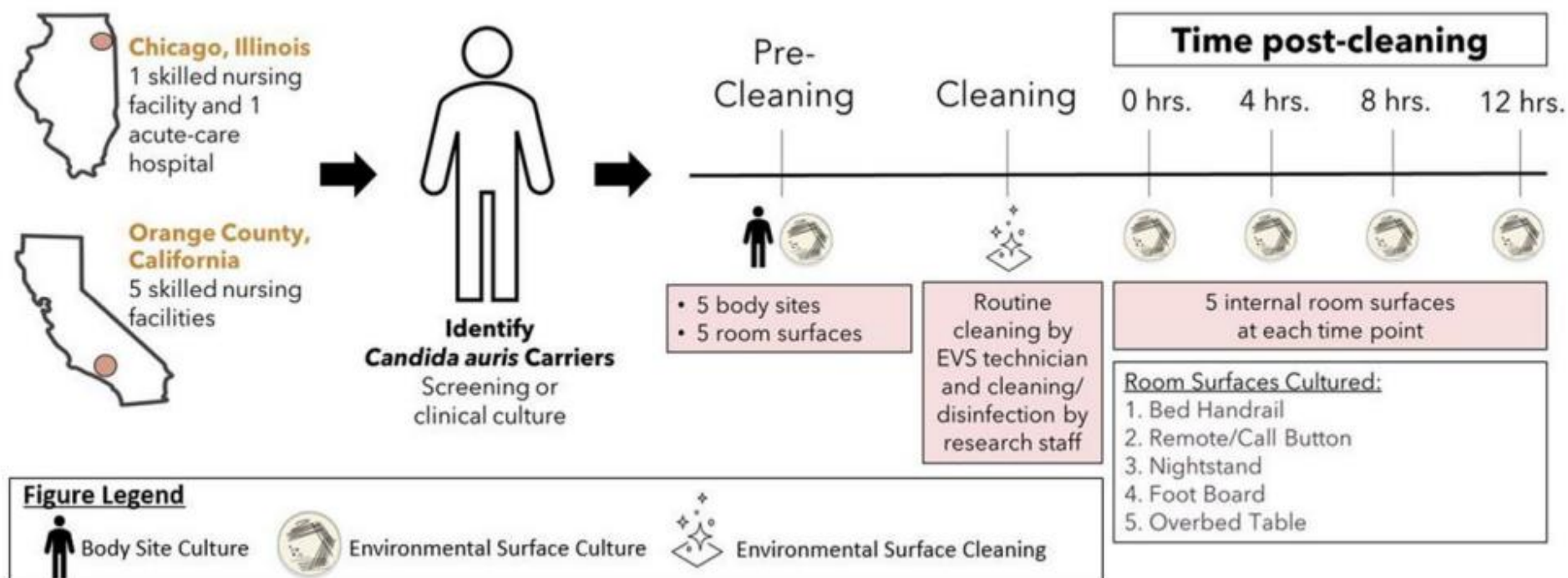
- *Hasta* veya yüzeyle temastan en az 4 saat sonra kolonize olabilir
- Hastaneye kabulden 48 saat kadar sonra invaziv enfeksiyon oluşturabilir
- Kolonizasyon uzun süre devam edebilir
- Hastanede yatışı devam eden bazı hastalarda kolonizasyonun bir yıldan fazla sürebilir
- *C. auris* ile kolonize olan hastalarda, taburcu olduktan sonra sekizinci ayda taşıyıcılığın devam ettiği vakalar bildirilmiştir

Kliniklerde Önemi

- *C. auris*'in çevresel kontaminasyonu ile hastanın kolonize vücut bölgelerinin sayısı ile paralel
- *C. auris* ile enfekte veya kolonize hastaların çevresinden, temizlik-dezenfeksiyon sonrası **dördüncü saatte** *C. auris* tekrar izole edilebilir
- İn-vitro çalışmalara göre, *C. auris* kuru veya nemli yüzeylerde 7-28 gün canlı kalabilir

Rapid Environmental Contamination With *Candida auris* and Multidrug-Resistant Bacterial Pathogens Near Colonized Patients

Sarah E. Sansom,^{1,a} Gabrielle M. Gussin,^{2,a} Michael Schoeny,³ Raveena D. Singh,² Hira Adil,⁴ Pamela Bell,¹ Ellen C. Benson,¹ Cassiana E. Bittencourt,⁵ Stephanie Black,⁴ Maria Del Mar Villanueva Guzman,¹ Mary Carl Froilan,¹ Christine Fukuda,¹ Karina Barsegyan,² Ellen Gough,^{1,c} Meghan Lyman,⁶ Jinal Makhija,^{1,c} Stefania Marron,¹ Lydia Mikhail,⁷ Judith Noble-Wang,⁸ Massimo Pacilli,^{4,c} Robert Pedroza,² Raheeb Saavedra,² D. Joseph Sexton,⁶ Julie Shimabukuro,⁵ Lahari Thotapalli,¹ Matthew Zahn,⁷ Susan S. Huang,^{2,b} and Mary K. Hayden^{1,b,c}

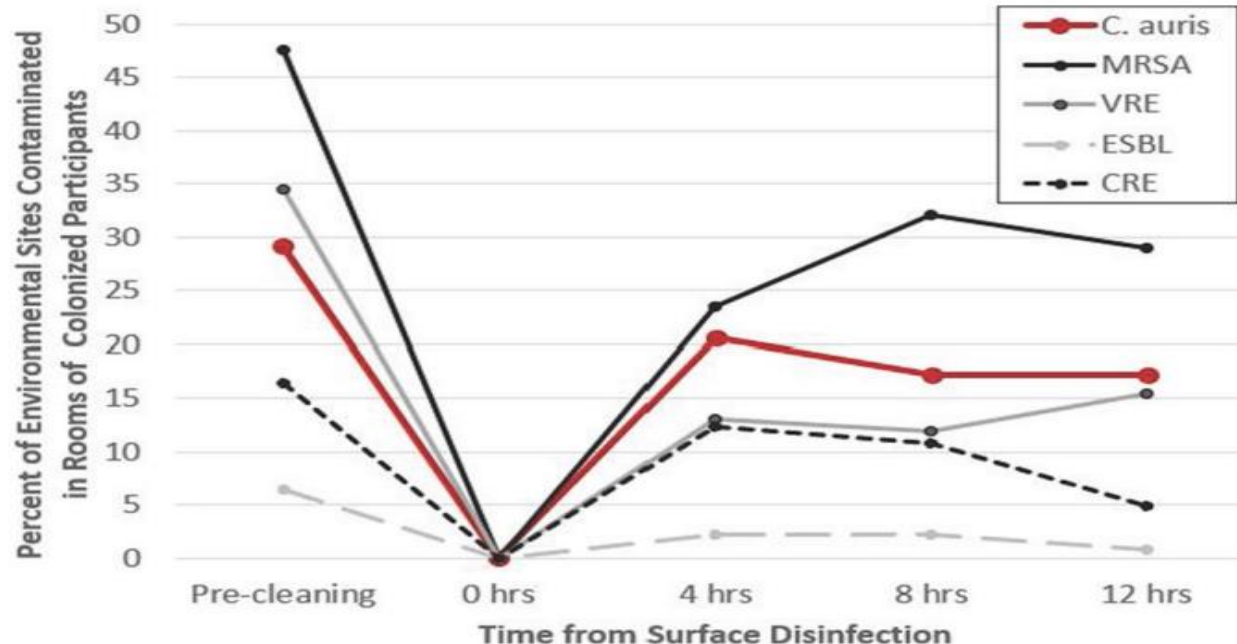


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A

Body Sites	Culture Detection, n (%)				
	<i>C. auris</i>	MRSA	VRE	ESBL	CRE
Nares	29 (71)	12 (29)	n/a	n/a	n/a
Axillae	23 (56)	8 (20)	16 (39)	15 (37)	11 (27)
Inguinal Grooves	22 (55)	7 (17)	19 (44)	14 (34)	14 (34)
Rectum	16 (39)	6 (15)	17 (41)	6 (15)	17 (41)



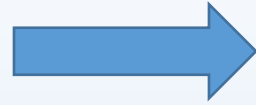
- *C. auris* kontaminasyonu dezenfeksiyondan önce oda yüzeylerinin %32,2'sinde (66/205)
- Dezenfeksiyondan 4 saat sonra oda yüzeylerinin %20,5'inde (39/190) tespit edildi
- *C. auris* ile kolonize olmuş daha fazla sayıda vücut bölgesi, yüksek kontaminasyon riski ile ilişkili

Klinik Önemi

C. auris insidansının yüksek olduğu coğrafi bölgelerde kolonizasyon oranlarının %2,5 ila %33,9 arasında

- *C. auris* kolonizasyonu için risk faktörleri
 - Uzun süre hastane ve yoğun bakımda yatış
 - Uzun süre geniş spektrumlu antibiyotik kullanımı
 - İnvaziv aletlerin sık kullanılması
 - Yetersiz sürveyans olarak belirlenmiştir

Kolonizasyon



İnvaziv Enfeksiyon

Infect Dis Ther (2022) 11:1149–1160
<https://doi.org/10.1007/s40121-022-00625-9>

ORIGINAL RESEARCH

***Candida auris* Candidemia in Critically Ill, Colonized Patients: Cumulative Incidence and Risk Factors**

Federica Briano · Laura Magnasco · Chiara Sepulcri · Silvia Dettori ·
Chiara Dentone · Malgorzata Mikulska · Lorenzo Ball · Antonio Vena ·
Chiara Robba · Nicolò Patroniti · Iole Brunetti · Angelo Gratarola · Raffaele D'Angelo ·
Vincenzo Di Pilato · Erika Coppo · Anna Marchese · Paolo Pelosi · Daniele Roberto Giacobbe  ·
Matteo Bassetti

- Yoğun bakım ünitelerinde 157 hastada *C. auris* kolonizasyonu
- Kandidemi %17, diğer invaziv enfeksiyonlar %10
- 7 hastada (%26) geç tekrarlayan ikinci bir atak, 4'ü 30 gün içinde öldü
- *C. auris* kolonizasyonunun ilk tespitinden sonraki 60 günde *C. auris* kandidemisi geliştirme kümülatif riski %25'ten fazla
- Birden fazla bölgede kolonizasyon, *C. auris* kandidemisinin gelişimi ile doğrudan ilişkili (OR:9.45, p:0.027)

İnvaziv Enfeksiyon

- Uzun süreli hastane yatışı (özellikle YBÜ’lerde)
- Mekanik ventilasyon
- Santral-venöz kateter
- İdrar sondası
- Uzun süreli geniş spektrumlu antibiyotik kullanımı ve antifungal tedaviler
- Altta yatan hastalıklar (akciğer hastalığı, malignite, kronik böbrek hastalığı, diabetes melitus)
- Damar ameliyatı veya son 30 gün içinde geçirilmiş ameliyatlar
- Hematopoietik kök hücre nakli
- Solid organ nakli
- Glukokortikoid kullanımı
- Nötropeni

Comparison of risk factors and outcomes of *Candida auris* candidemia with non-*Candida auris* candidemia: A retrospective study from Pakistan

Muneeba Ahsan Sayeed , Joveria Farooqi , Kauser Jabeen , Syed Faisal Mahmood ✉

Medical Mycology, Volume 58, Issue 6, August 2020, Pages 721–729,
<https://doi.org/10.1093/mmy/myz112>

<i>C. auris</i> (n=38)	Other (n=101) <i>C. albicans</i> (n=38) <i>C. tropicalis</i> (n=38) <i>C. parapsilosis</i> (n=27)
Cerrahi öyküsü	
Antifungal kullanımı %37	%1
Önceki MDR bakteri izolasyonu	
Kandidemi kaynağı %89 SVK	%46 SVK
%62,6 mortalite	%52,5 mortalite

Mortalite

- Mortalite oranları deęişken
- %29-70*
- Dięer kandidemi etkenleri ile benzer mortalite oranları**
- Hastaların alt hastalıkları
 - Sepsis
 - Diyabet
 - Kronik Böbrek Hastalığı
 - Pnömoni
- 24 saatten uzun süre YBÜ'de kalma
- İnvaziv işlemler özellikle SVK
- Coęrafi bölgeler

Kim HY, et al. Med Mycol. 2024;62(6):myae042.

Alvarez-Moreno CA et al. Fungi (Basel). 2023;9(4):430.

Mortalite

Comparing the virulence of four major clades of *Candida auris* strains using a silkworm infection model: Clade IV isolates had higher virulence than the other clades

Sanae Kurakado ✉ , Yasuhiko Matsumoto ✉ , Takashi Sugita

Medical Mycology, Volume 61, Issue 11, November 2023, myad108,

Klad tiplerine göre değişken olabilir

C. auris inokülasyonundan 21 saat sonra en yüksek ölüm oranı, Klad IV'te (>%80)

Factor	Factor	AOR	95% CI	P-value
Age group	Age group			
<65 years	<65 years	Ref		
≥65 years	≥65 years	4.267	1.194 – 15.248	0.026 **
Gender	Indwelling catheter			
Male	Single catheter	Ref		
Female	Multiple catheters	29.529	5.522 – 157.898	<0.001 **
Indwelling catheter	ICU admission >24 hours in the last 90 days			
Single catheter	No	Ref		
Multiple catheters	Yes	7.749	1.432 – 41.925	0.017 **
Site of Candida isolation	Intubation in the last 90 days			
Axillary	No	Ref		
Groin	Yes	29.076	4.921 – 171.810	<0.001 **
Urine	CKD			
Other fluids/Site	No	Ref		
ICU admission >24 hours in the last 90 d	Yes	4.031	0.828 – 19.632	0.084
Intubation in the last 90 days				
Antibiotics in the last 90 days				
Antifungal in the last 90 days				
Type 2 diabetes				
HbA1c (mean ± SD)				
Hypertension				
CKD				
CVD				
Immunocompromised				

TABLE 3: Multivariate regression analysis to determine the prognostic factors of mortality (n=59)

0.2 (07.1%)0.2 (06.1%)1.000

34 merkez, 15 Nisan 2024-15 Ekim 2024, 162 hasta, %56 mortalite

	Outcome at day 30	N	Percentiles			P*
			25th	Median	75th	
Age	Survived	71	52.00	63.00	72.0	0.047
	Died	91	58.00	68.00	75.0	
Charlson Comorbidity Index	Survived	71	2.00	4.00	6.0	0.136
	Died	91	3.00	4.00	6.0	
Highest body temperature (C°)	Survived	71	37.00	37.80	38.4	0.471
	Died	91	37.00	38.00	38.5	
MAP	Survived	71	80.00	89.50	100.0	0.298
	Died	91	75.00	85.00	100.0	
SOFA Score	Survived	71	2.00	5.00	8.0	0.001
	Died	91	5.00	8.00	10.0	
WBC	Survived	71	6910.0	11150.0	16670.0	0.617
	Died	91	6200.0	11600.0	16000.0	
Platelet	Survived	71	115000.0	179000.0	321000.0	0.001
	Died	91	64000.0	120000.0	200000.0	
CRP level (mg/dL)	Survived	71	12.10	60.00	168.0	0.256
	Died	91	18.00	75.00	180.0	
PCT	Survived	62	.23	.59	3.6	0.013
	Died	81	.50	1.36	4.8	

34 merkez, 15 Nisan 2024-15 Ekim 2024, 162 hasta, %56 mortalite

		Outcome at day 30				P*
		Survived (n=71)		Died (n=91)		
		n	%	n	%	
Gender	Female	36	49,3	37	50,7	0.202
	Male	35	39,3	54	60,7	
Treatment	Adequate empirical tx	8	44,4 ^a	10	55,6 ^a	0.041
	Culture guided tx	46	43,8 ^a	59	56,2 ^a	
	Inadequate tx	1	9,1 ^b	10	90,9 ^b	
	No AST data	16	57,1 ^a	12	42,9 ^a	
Antifungals	Micafungin	33	53,2 ^a	29	46,8 ^a	0.037
	Caspofungin	27	45,8 ^a	32	54,2 ^a	
	Anidulafungin	9	37,5 ^{ab}	15	62,5 ^{ab}	
	Amphotericin-B	1	33,3 ^{ab}	2	66,7 ^{ab}	
	Fluconazole	0	0,0 ^b	7	100,0 ^b	
	Voriconazole	1	25,0 ^{ab}	3	75,0 ^{ab}	
	No antifungal	0	0,0 ^b	3	100,0 ^b	
Central venous catheter	Yes	56	39,2	87	60,8	0.001
Total parenteral nutrition	Yes	25	36,2	44	63,8	0.093
ICU Stay	Yes	51	37,5	85	62,5	0.001
Prior hemodialysis	Yes	6	24,0	19	76,0	0.030
Previous abdominal surgery	Yes	4	20,0	16	80,0	0.022
Weakened immune system	Yes	15	36,6	26	63,4	0.280
Diabetes mellitus	Yes	29	47,5	32	52,5	0.459
Confirmed bacterial Infections	Yes	39	40,6	57	59,4	0.322
Deep-seated Candidal caomplications	Yes	4	30,8	9	69,2	0.322
Use of antibacterials	Yes	59	43,4	77	56,6	0.794

- Uygun antifungal ilaçlara yetersiz erişim (OR=11.258)
- Santral venöz kateterlerin varlığı (OR=3.581)
- Yoğun bakımda kalma (OR=6.148)
- Abdominal cerrahi (OR=5.077;
- Derin yerleşimli kandida komplikasyonları (OR=4.546)
- Azalmış trombosit sayıları (OR=1.004)

Antifungal Direnç

Flukonazole karşı yüksek oranlarda direnç

Azol Direnci

- Lanosterol 14-alfa-demetilaz (Lanosterol-Ergosterol) enzimini kodlayan ERG11 geninde nokta mutasyonlar ile ilaç hedefinde yapısal değişiklikler
- ERG 11 aşırı ekspresyonu
- İlacı dışa atım pompaları (MDR, CDR1 aşırı ekspresyonu)

Antifungal Direnç

Ekinokandin Direnci

- Beta (1,3) D-glukansentazı kodlayan FKS1 ve FKS2 gen mutasyonu

Amfoterisin B direnci

- ERG6 sterol metiltransferaz genindeki mutasyonu (?)
- Ekinokandinler tedavide ilk sırada önerilmekte ancak yanıt alınamazsa

Amfoterisin B'ye geçiş düşünülmeli

Antifungal Direnç

Chen et al. BMC Infectious Diseases (2020) 20:827
<https://doi.org/10.1186/s12879-020-05543-0>

BMC Infectious Diseases

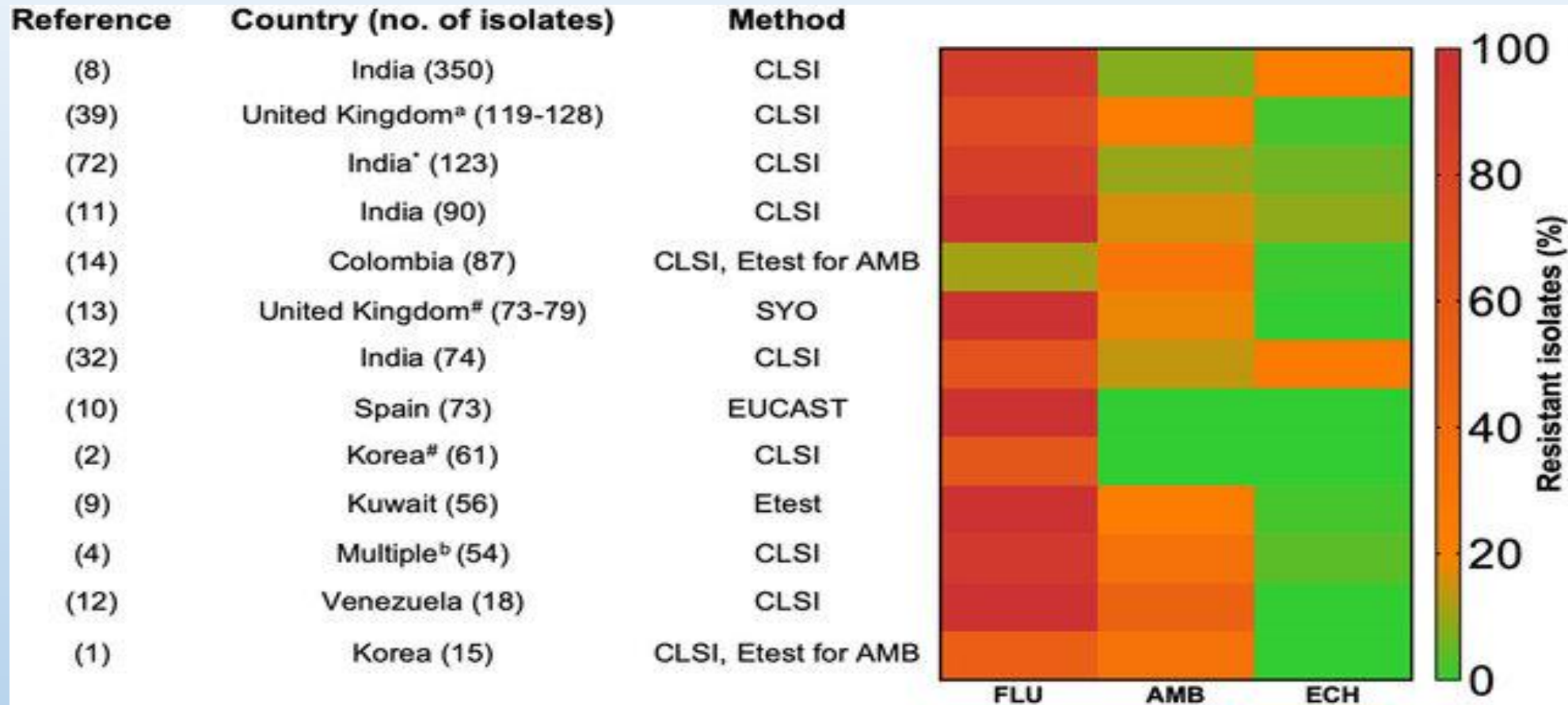
Is the superbug fungus really so scary? A systematic review and meta-analysis of global epidemiology and mortality of *Candida auris*

Jingjing Chen^{1,2,3†}, Sufei Tian^{1,2,3†}, Xiaoxu Han^{1,2,3†}, Yunzhuo Chu^{1,2,3}, Qihui Wang^{1,2,3}, Baosen Zhou⁴ and Hong Shang^{1,2,3*} 



- 33 ülkeden veri içeren 67 çalışma, 4.000'den fazla *C. auris* vakası-metaanaliz
- Flukonazole (%91), amfoterisin B'ye (%12), kaspofungine (%12), mikafungin'e (%0,8) ve anidulafungine (%1,1) oranında direnç

Antifungal Direnç



Antifungal Direnç

- Flukonazole direnç tüm bölgelerde yüksek düzeyde
- Ekinokandin veya Amfoterisin B'ye karşı direnç bölgeler arası değişiklik gösterebilir
- Ekinokandinler çoğu hasta için birinci basamak tedavi olarak önerilse de, MİK'ler coğrafyaya ve salgına göre değişmekte

Worsening Spread of *Candida auris* in the United States, 2019 to 2021

Authors: Meghan Lyman, MD , Kaitlin Forsberg, MPH , D. Joseph Sexton, PhD , Nancy A. Chow, PhD, MS, Shawn R. Lockhart, PhD , Brendan R. Jackson, MD, MPH , and Tom Chiller, MD, MPHTM  | [AUTHOR, ARTICLE, & DISCLOSURE INFORMATION](#)

Year or Region	Azoles [†]	Amphotericin B [‡]	Echinocandins [§]
Year			
2018 (<i>n</i> = 463)	372 (80.3)	151 (32.6)	2 (0.4)
2019 (<i>n</i> = 1006)	787 (78.2)	242 (24.1)	14 (1.4)
2020 (<i>n</i> = 1294)	1109 (85.7)	331 (25.6)	15 (1.2)
Region^{//}			
Mid-Atlantic (<i>n</i> = 135)	133 (98.5)	115 (85.2)	4 (3.0)
Mountain (<i>n</i> = 25)	24 (96.0)	1 (4.0)	0 (0.0)
Northeast (<i>n</i> = 1051)	1046 (99.5)	468 (44.5)	22 (2.1)
Southeast (<i>n</i> = 172)	170 (99.4)	9 (5.2)	0 (0.0)
West (<i>n</i> = 556)	553 (99.5)	17 (3.1)	1 (0.2)

Antifungal Direnç

Antifungal Drugs	Tested	MIC Values (n, %)								
		≤0.03	0.06-0.12	0.2-0.5	1	2	4	8	16	≥32
FLU	135	-	1, 0.7%	-	2, 1.5%	-	-	1, 0.7%	14, 10.4%	69, 51.1%
CAS	133	-	25, 18.8%	47, 35.3%	8, 6%	2, 1.5%	3, 1.5%	7, 5.3%	-	1, 0.75%
MICA	126	19, 15.1%	38, 30.2%	16, 12.7%	2, 1.6%	9, 7.1%	2, 7.1%	-	-	-
ANI	76	4, 5.3%	23, 30.3%	6, 7.9%	3, 3.9%	1, 1.3%	1, 1.3%	2, 2.6%	-	-
AMB	134	1, 0.7%	2, 1.5%	8, 6%	1, 8.2%	19, 15.4%	10, 14.2%	15,11.2%	5, 3.7%	15, 11.2%
VORI	62	1, 1.6%	16, 25.8%	16, 25.8%	10, 16.1%	4, 6.5%	3, 6.5%	5, 8.1%	1, 1.6%	4, 6.5%
ITC	26	1, 3.8%	14, 53.8%	3, 11.5%	2, 7.7%	1, 3.8%	1, 3.8%	-	3, 11.5%	1, 3.8%
POS	22	3, 13.6%	-	-	-	-	-	-	-	-
5FC	52	-	13, 25%	4, 7.7%	17, 32.7%	-	1, 1.9%	1, 1.9%	-	13, 25%

Antifungal drug	Tentative MIC breakpoints** (µg/mL)
Amphotericin B	≥ 2
Fluconazole	≥ 32
Itraconazole	N/A
Posaconazole	N/A
Voriconazole	N/A
Anidulafungin*	≥ 4
Caspofungin*	≥ 2
Micafungin*	≥ 4
Flucytosine	N/A

Flukonazol %9
Kaspofungin %91
Mikafungin %99
Anidulafungin %97
Amfoterisin B %37
DUYARLI idi *

**Erdem H, et al. Managing candida auris fungemias: the results of A prospective and international study. Antimicrob Agents Chemother, In Press*
***Candida auris antifungal susceptibility testing, CDC. Eriřim tarihi:10.05.2025*

Antifungal agents		Fosmanogepix	Ibrexafungerp	Olorofim	Opelconazole	Rezafungin
Pathogens						
	<i>Aspergillus calidoustus</i>					
	<i>Aspergillus fumigatus</i>					
	Azole-resistant <i>A. fumigatus</i>					
	<i>Aspergillus flavus</i>					
	<i>Aspergillus lentulus</i>					
	<i>Aspergillus nidulans</i>					
	<i>Aspergillus niger</i>					
	<i>Aspergillus terreus</i>					
	<i>Aspergillus tubingensis</i>					
	<i>Cunninghamella</i>					
	<i>Lichtheimia</i>					
	<i>Mucor</i>					
	<i>Rhizopus</i>					
	<i>Fusarium spp.</i>					
	<i>Alternaria alternata</i>					
	<i>Cladosporium spp.</i>					
	<i>Paecilomyces variotii</i>					
	<i>Purpureocillium lilacinum</i>					
	<i>Scopulariopsis spp.</i>					
	<i>Rasamsonia spp.</i>					
	<i>Scedosporium spp.</i>					
	<i>Lomentospora prolificans</i>					
	<i>Candida albicans</i>					
	<i>Candida auris</i>					
	<i>Candida dubliniensis</i>					
	<i>Candida glabrata</i>					
	<i>Candida krusei</i>					
	<i>Candida lusitanae</i>					
	<i>Candida parapsilosis</i>					
	<i>Candida tropicalis</i>					
	<i>Cryptococcus gattii</i>					
	<i>Cryptococcus neoformans</i>					
	<i>Trichosporon asahii</i>					
	<i>Exophiala dermatitidis</i>					
	<i>Malassezia furfur</i>					
	<i>Pneumocystis jirovecii</i>					
	<i>Blastomyces dermatitidis</i>					
	<i>Coccidioides immitis</i>					
	<i>Histoplasma capsulatum</i>					
	<i>Fonsecaea pedrosoi</i>					
	<i>Madurella mycetomatis</i>					
	<i>Talaromyces marneffe</i>					
	<i>Phialophora verrucosa</i>					

Legend	
	Potent activity
	Variable activity
	No activity
	Unknown / currently investigated

Sonuç

- *C. auris* hızlı kolonize olmakta
- Yayılım hızı yüksek
- Vakalar artarak devam etmekte
- İnvaziv kandidemi için risk faktörleri ve mortalite, *C.auris* dışı kandidemiler ile benzer
- Flukonazol direnci önemli
- Bölgesel Klad tipleri ve antifungal duyarlılık oranları bilinmeli

- Teşekkürler