Candida auris identification during the COVID-19 Pandemic in Critically Ill Patients: a Single Centre Experience

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BACKGROUND

Fungal infections are known cause of poor outcome in Intensive Care Units (ICU).(1) *Candida auris* is the first fungal pathogen to be considered a threat to global health and concerning features, capable of generating nosocomial-ICU outbreaks, are multidrug resistance, high transmissibility, difficulty in identification and eradication.(2-3)

METHODS

To describe our experience with colonization/infection of *C.auris* among critically ill patients, we analysed a subgroup of patient over a period of 9 months (July 2021-March 2022) admitted to 'Città della Salute e della Scienza' university hospital – Turin – Italy.

Surveillance cultures (urine culture, tracheal aspirate, rectal swab) are performed weekly. *C.auris* was not routinely sought, except for patients with previous contiguity with infected/colonized cases.

RESULTS

A total of 8 patients presented colonization (6) or infection (2) from *C.auris* (**Table 1**). The fungal pathogen was cultured from different sites: skin (7 isolates), urine (2 isolates), respiratory tract (1 isolate), blood (1 isolate).

Median time from admission to first detection is 24 days, with 100% of patient having critical illness requiring mechanical ventilation. All 8 patients received broad-spectrum antibiotic therapy for bacterial infections before identification of *C.auris*; 5/8 patients (62.5%) had prior antifungal exposure (with 4/5 of them having previous colonization of other Candida species); 7/8 patients (87.5%) received steroids; 3/8 patients used immunomodulatory drugs (37.5%); 6/8 patients (75%) had severe COVID-19 illness prior to *C.auris* identification.

Only two cases (25%) were treated with antifungals as *C.auris* related infections (1 patient for fever of unknown origin and persistent urinary tract isolation; 1 patient with candidemia after respiratory tract long-term colonization in tracheostomy).

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

ID	Sex, Age	Hospital stay (days)	ICU stay (days)	Death	Comorbidities	COVID-19	Site of isolation (1)	Site of isolation (2)	Antimicrobial susceptibility	Subsequent infection type	Antifungal treatment for *C. auris*	Mechanical ventilation	Steroids	Immuno-modulatory agents	Previous Broad-spectrum ATB	Previous antifungal tp	Other infections
1	M 44	47	35	Yes	autoimmune disease, respiratory disease, smoker	No	skin	skin	Amphotericin B, Echinocandin Itraconazole	Colonization	No	Yes	Yes	Yes	Yes	Yes	CAP S. marcescens PJP
2	F 58	35	31	No	smoker, HTA	No	urine	skin	Echinocandin	Colonization	No	Yes	No	No	Yes	No	VAP P. aeruginosa, S. marcescens
3	M 64	>100	35	No	n/a	Yes	skin			Infection	Yes - Anidulafungin	Yes	Yes	No	Yes	No	VAP M. morgani BSI CR-KP/E.faecalis
4	M 64	16	14	Yes	respiratory disease, smoker, HTA, DMNID	Yes	skin			Colonization	No	Yes	Yes	No	Yes	Yes	VAP A.baumannii + KP BSI E.faecium VRE CAPA
5	F 49	25	22	Yes	respiratory disease, HTA, DMNID, autoimmune disease	Yes	skin			Colonization	No	Yes	Yes	No	Yes	No	VAP A.baumannii + KP ESBL
6	M 57	28	27	Yes	autoimmune disease	Yes	urine		Echinocandin	Colonization	No	Yes	Yes	Yes	Yes	Yes	VAP HHV6/P. aeruginosa BSI C. albicans
7	F 55	>100	>100	No	HTA, haemathological disease, malignancy	Yes	respiratory tract	blood	All antifungals found resistant	Infection	Yes - Anidulafungin, Ambisome	Yes	Yes	Yes	Yes	Yes	VAP CR-KP BSI C.albicans
8	F 58	66	65	No	respiratory disease, HTA, DMNID, autoimmune disease	Yes	Skin		All antifungals found resistant	Colonization	No	Yes	Yes	No	Yes	Yes	VAP MRSA BSI CR-KP

ICU, Intensive Care Unit; ATB, Antibiotics; TP, Therapy; HTA, Arterial Hypertension; DMNID, Diabetes Mellitus Non Insulin Dependent; CAP, Community Acquired Pneumonia; VAP, Ventilator Associated Pneumonia; BSI, Blood Stream Infections; CAPA, COVID-19 Associated Pulmonary Aspergillosis; PJP, *Pneumocystis jiroveci* Pneumonia. KP, Klebsiella pneumoniae; CR-KP, Carbapenem-Resistant *K. Pneumonia*e; MRSA, Methicillin Resistant *Staphylococcus* aureus; ESBL, Extended Spectrum Beta-Lactamase; VRE, Vancomycin Resistant *Enterococcus*; HHV6, *Human herpesvirus 6*.

CONCLUSIONS

Infection control measures remain essential in critically ill patients. The clinical burden of superinfections in severe COVID-19 patients, widely defined, must increasingly include the growing impact of fungal infections, among which new pathogens such as *C.auris* must be adequately considered.

REFERENCES

1.Garcia-Bustos V, MD. Cabanero-Navalon MD, Ruiz-Saurì A et al. What Do We Know about *Candida auris*? State of the Art, Knowledge Gaps, and Future Directions.Microorganisms. 2021 Oct 19;9 (10): 2177

2.Hanson BM, Dinh AQ, Tran TT et al. *Candida auris* Invasive Infections during a COVID-19 Case Surge. Antimicrob Agents Chemother. 2021 Sep 17;65 (10):e0114621

3.Magnasco L, Mikulska M, Giacobbe DR et al. Spread of Carbapenem-Resistant Gram-Negatives and *Candida auris* during the COVID-19 Pandemic in Critically Ill Patients: One Step Back in Antimicrobial Stewardship? Microorganisms. 2021 Jan 3;9(1):95