Effect of Dry Hydrogen Peroxide on *Candida auris* Environmental Contamination

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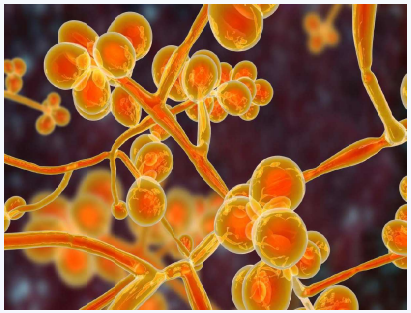


BACKGROUND

- *Candida auris*, (*C. auris*), is an emerging pathogen which exhibits broad antimicrobial resistance
- *C. auris* causes highly morbid infections
- Reported cases increased 318% in 2018 when compared to the average number of cases reported in 2015 to 2017.
- Local increases of *C. auris* showed prolonged survival on surfaces where standard disinfectants may not achieve adequate disinfection.
- Persistent patient colonization and constant environmental recontamination posed an infection risk that may be mitigated by no touch disinfection systems.
- Dry Hydrogen Peroxide (DHP) technology is designed to provide continuous and automated delivery of DHP to reduce the microbial contamination in the hospital setting.
- Previous studies have demonstrated significant reductions in microbial bioburden within hospital environments.

OBJECTIVES

- Assess the presence of *C. auris* environmental contamination in multiple clinical areas (both patient and healthcare worker).
- Evaluate the efficacy of continuous dry hydrogen peroxide (DHP™) exposure on *C. auris* environmental contamination.
- Identify if a statistically significant association is identified between the absence of *C. auris* and the presence of the Synexis' DHP, and trend to the reduction of *C. auris* cases.

METHODS

- Conducted in a large tertiary care center where multiple patients were identified as either infected or colonized with C. auris.
- DHP-emitting systems were installed in the ventilation systems dedicated to the Adult Burn Intensive Care and Children's Cardiac Intensive Care units.
- Composite surface samples were collected in a sample of patient rooms, shared clinical workspaces, and staff personally used devices among units with current C. auris patients.
- The samples included:
  - "high touch" surfaces near the patient
  - the general area of the patient room
  - shared medical equipment for the unit
  - shared staff work areas
  - equipment dedicated to individual staff members.
- Presence of C. auris was determined by polymerase chain reaction (PCR).
- Association between DHP exposure and C. auris contamination was determined by Fisher's exact test.

RESULTS

In the presence of patients previously identified with C. auris:

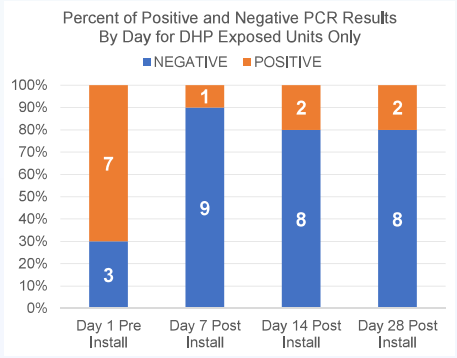
- No DHP System Present:
  - Baseline samples were collected from units without DHP on days 1, 7, 14, and 28.
  - At baseline (Day 1), 40% (2/5) were PCR positive.
  - During subsequent timeframes, 27% (4/15) were positive (p=0.66).
- DHP System Present:
  - 5 baseline samples per unit were taken before DHP was installed
  - Additionally, 5 samples per unit were taken on days 7, 14, and 28 post-installation.
  - Pre-DHP installation, 70% (7/10) of samples were positive for C. auris.
  - Post-DHP installation, 16.7% (5/30), were positive for C. auris (p<0.05).
- There were no adverse impacts reported from patients, visitors, or personnel in association with operation of DHP systems.

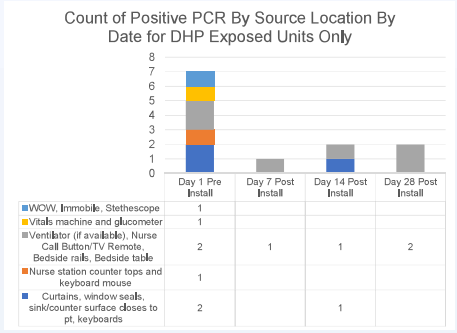
No DHP Present

	Results			
	Negative	Positive	Sample Totals	
Pre	3	2	5	Fischer exact test: 0.6125 (not statistically significant); p=0.66
Post	11	4	15	Percent Change Pre/Post: 13% reduction
Grand Total	14	6	20	

DHP Present

	Results			
	Negative	Positive	Sample Totals	
Pre	3	7	10	Fischer exact test: 0.0033 (statistically significant); p<0.05
Post	25	5	30	Percent Change Pre/Post: 53.3% reduction
Grand Total	28	12	40	





MATERIALS

- Sponge-Sticks with neutralizing buffer were used for sampling following the CDC protocol.
- PCR and reflex to culture if positive was conducted: 100 µL of the concentrated eluent is used to inoculate enrichment media that incorporates a high salt concentration and high incubation temperature to enrich C. auris. After incubation for 5 days, enriched cultures are plated onto CHROMagar Candida plates and incubated at 37° C. Plates were monitored for up to 2 days for growth of yeast with morphologies consistent with C. auris.
- Species ID: The identification of isolates suspected to be C. auris were determined by MALDI-TOF (MALDI Biotyper, Bruker Daltonics, Billerica, MA) using the Bruker and MicrobeNet (https://microbenet.cdc.gov/) databases; species-level identification is confident for scores ≥ 2.0.

CONCLUSIONS

This study suggests that continuous DHP™ is effective in reducing surface *C. auris* contamination in a variety of patient and healthcare worker surfaces.

Further study is warranted to better characterize the potential for DHP to decrease risk of C. auris transmission in the health care setting.

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