

Chlorhexidine-treated Vascular Catheters Performance Against an Emerging Fungal Pathogen: *Candida auris*

Nisha Gupta, BSc, MSc, PhD; Shanna Haughton, BS; Sydney Kemper, BS

Purpose

Candida auris infections are becoming a widespread issue. Are current infection prevention measures, such as chlorhexidine (CHX)-treated Centrally Inserted Central Catheter (CICC) effective against this pathogen? The present study answers that question by evaluating CICC against clinically isolated *Candida auris* strains.

Methods

External Evaluation: Segments from CICC treated with CHX on external surface only (First Generation CICC), CICC treated with CHX on both external and internal surfaces (Second Generation CICC), and Non-Antimicrobial (Non-AM) CICC were plasma pre-conditioned with either a quick dip exposure (1-day study) or continuous plasma exposure for 6-days (7-day study) both at 37°C with agitation. Plasma was refreshed daily for the 7-day study. Subsequently, segments were inoculated with 10² colony forming units per milliliter (CFU/ml) with one of three *Candida auris* strains under agitation for 24 hours at 37°C.

Internal Evaluation: CICCs were flushed with saline, plasma, and then saline locked for 6 days. Saline was exchanged every 1-2 days. On Day 6, catheters were plasma flushed, then inoculated via locking with 10² CFU/ml for 24 hours at 37°C.

Organism Recovery: Adherent organisms were recovered from either surface through sonication in neutralizing media, which thereafter was serially diluted, filtered, plated on neutralizing agar, and incubated for 24-48 hours. Percent reductions in microbial adherence were based on adherence to the untreated catheter.

Results

External Evaluation:
External Surface Antimicrobial Efficacy of CICC after exposure to three clinical isolates of *Candida auris*.

Percent Reduction compared to Untreated Catheter				
Test Organism	First Generation CVC with CHX on external surface		Second Generation CVC with CHX on both external and internal surfaces	
	1-Day	7-days	1-Day	7-days
<i>Candida auris</i> AR-0383/CAU-03	100%	86.96%	100%	99.95%
<i>Candida auris</i> AR-1097/CAU-23	100%	95.91%	100%	99.85%
<i>Candida auris</i> AR-1101/CAU-26	100%	100%	100%	100%

Internal Evaluation:
Internal efficacy results were inconclusive due to inadequate organism growth upon recovery from the internal surface of treated and untreated catheters.

Limitations & Disclosure

Percent reductions were based on adherence to untreated control catheters which are subject to the variable growth observed on those devices. Data on file at Teleflex. In-vitro study may not be indicative of clinical performance. Catheters used in this study are manufactured by Teleflex and the authors are employed by Teleflex

Conclusions

First and second generation Centrally Inserted Central Catheters of the longtime standing antimicrobial antiseptic, Chlorhexidine, proved highly efficacious against the multi-drug resistant fungal pathogen, *Candida auris*, in an external surface evaluation. This finding held true whether the pathogens were exposed to the catheters during simulated insertion (1-day test) or after multiple days of dwell (7-day testing).

In conclusion, as infection preventionists continue to seek risk reduction strategies against emerging multi-drug resistant pathogens, chlorhexidine containing products should be considered.

Future Directions

Assessment of antimicrobial efficacy against *Candida auris* of the third generation Chlorhexidine technology applied on PICCs.