810. Resistance to the Minocycline-Rifampin-Chlorhexidine (MRC) combination does not emerge in biofilms of Tetracycline and Rifampin resistant bacteria on MRCH catheters depleted below antimicrobially effective concentrations

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Session: P-33. HAI: Device-Associated (CLABSI, CAUTI, VAP)

Background. Central Line Associated Bloodstream Infections (CLABSI) remain one of the major pathogens of hospital-acquired infection recently and hospital outbreaks have been reported worldwide. On September 2017, New intensive care unit (ICU) with only single rooms, remodeling from ICU with multi beds, was opened in an acute-care tertiary hospital in Seoul, Korea. We investigated the effect of room privatization in the ICU on the acquisition of carbapenem-resistant Acinetobacter baumannii (CRAB).

Methods. We retrospectively reviewed medical records of patients who admitted to the medical ICU in a tertiary care university-affiliated 1,806-bed hospital from January 1 2015 to 1 January 2019. Patients admitted to the medical ICU before the remodeling of the ICU were designated as the control group, and those who admitted to the medical ICU after the remodeling were designated as the intervention group. Then we compared the acquisition rate of CRAB between the control and intervention groups. Patients colonized with CRAB or patients with CRAB identified in screening tests were excluded from the study population. The multivariable Cox regression model was performed using variables with p-values of less than 0.1 in the univariate analysis.

Results. A total of 1,105 cases admitted to the ICU during the study period were analyzed. CRAB was isolated from 110 cases in the control group (n=687), and 16 cases in the intervention group (n=418). In univariate analysis, room privatization, prior exposure to antibiotics (carbapenem, vancomycin, fluoroquinolone), mechanical ventilation, central venous catheter, tracheostomy, the presence of feeding tube (Levin tube or percutaneous gastrostomy) and the length of ICU stay were significant risk factors for the acquisition of CRAB (p<0.05). In the multivariable Cox regression model, the presence of feeding tube (Hazard ratio (HR) 4.815, 95% Confidence interval (CI) 1.94-11.69, p=0.001) and room privatization (HR 0.024, 95% CI 0.127-0.396, p<0.000) were independent risk factors.

Table 1. Univariate analysis of Carbapenem-resistant Acinetobacter baumannii

| CRAB acquisition | No CRAB (n=797) |
|------------------|----------------|
| Age (yr) (mean) | 64±10 (31.50) |
| Sex (M/F) | 60 (76.7%) |
| BMI (kg/m²) | 34.3±1 (13.1) |
| Chronic disease index | 8.9±3 (4.15) |
| Prior exposure to antibiotics | 86 (69.0%) |
| Error in the use of levofloxacin in the past | 46 (35.6%) |
| 3rd generation cephalosporin | 36 (28.6%) |
| 4th generation cephalosporin | 31 (24.8%) |
| Ciprofloxacin | 10 (8.0%) |
| Vancomycin | 10 (8.0%) |
| Treatment variables | 41 (34.1%) |
| Mechanical ventilation | 41 (34.1%) |
| Tracheostomy | 41 (34.1%) |
| Total nosocomial | 41 (34.1%) |
| Duration of hospital stay | 41 (34.1%) |
| The length of hospital stay | 88 (73.5%) |
| The length of ICU stay | 89 (76.1%) |
| In-hospital mortality | 34 (31.1%) |

811. Utilizing IV team in Reducing the Central Line Associated Infections

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Session: P-33. HAI: Device-Associated (CLABSI, CAUTI, VAP)

Background. Central Line-Associated Bloodstream Infections (CLABSI) are significant medical problem for critically ill cancer patients who required catheters for extended durations. Minocycline (M)- Rifampin (R) loaded catheters have shown the greatest impact on reducing CLABSI; however, there is a risk for developing anti-biotic resistant organisms when exposed to catheters whose concentration becomes depleted below antimicrobially effective levels due to extended indwells. Chlorhexidine (CH) and M-R combination catheters (MRC) have been proposed as a next generation catheter with improved performance. Here we studied whether bacteria that were Tetracycline and Rifampin resistant became resistant to MRC when allowed to form biofilms on MRCH catheters depleted below antimicrobially effective MRC concentrations.

Methods. Minimum inhibitory concentrations (MICs) of Tetracycline and/or Rifampin resistant stock isolates were measured by standard microbroth dilution methods. MRCH catheters were depleted to below antimicrobially effective concentrations by soaking in serum for 6 hours. The resistant bacteria were then allowed to form biofilm for 24 hrs on the depleted catheters in broth. Following 24 hour incubation the biofilm concentrations were removed by sonication and MICs were remeasured. The same organisms grown on non-antimicrobial catheters were used as controls.

Results. MICs (ug/mL) of the organisms against each agent and the combination are tabulated below:

| Bacteria | History | MICs |
|----------|---------|------|
| Klebsiella pneumoniae | Stock organism | 16 2 2 2 |
| Enterohectoria cloacae | Stock organism | 8 4 3 2 |
| Staphylococcus aureus | Stock organism | 16 3 2 2 |
| Acinetobacter baumannii | Stock organism | 16 3 2 2 |
| Enterococcus faecalis | Stock organism | 8 16 2 2 |
| Staphylococcus epidermis | Stock organism | 16 0.5 1 0.5 |
| Acinetobacter baumannii | Stock organism | 0.5 1 0.5 |
| Enterohectoria cloacae | Stock organism | 0.5 1 0.5 |

Conclusion. The M and R resistant bacteria did not develop in vitro resistance to the MRC combination after forming biofilms on MRCH catheters depleted below antimicrobially effective concentrations.

Disclosures. Joel Rosenblatt, PhD, Cook Medical (Shareholder, Other Financial or Material Support, Inventor of the MRCH catheter technology which is owned by the University of Texas MD Anderson Cancer Center and has been licensed to Cook Medical) Novel Anti-Infective Technologies (Shareholder, Other Financial or Material Support, Inventor of the MRCH catheter technology which is owned by the University of Texas MD Anderson Cancer Center and has been licensed to Cook Medical) Issam I. Raad, MD, Citius (Other Financial or Material Support, Ownership interest) Cook Medical (Grant/Research Support) Inventive Protocol (Other Financial or Material Support, Ownership interest) Novel Anti-Infective Technologies (Shareholder, Other Financial or Material Support, Ownership interest)
Table 2. Multivariable Cox regression model of the acquisition of Carbapenem-resistant Acinetobacter baumannii

| Risk factor | Beta coefficient | Hazard ratio (95% CI) | p-value |
|-------------|-----------------|----------------------|---------|
| Room privatization | -1.740 | 0.214 (0.121-0.362) | < 0.001 |
| Length of stay in ICU | < 0.016 | 1.884 (1.845-1.924) | < 0.011 |
| Feeding tube | 1.555 | 4.737 (1.907-11.762) | < 0.001 |

Conclusion. In the present study, room privatization of the ICU was correlated with the reduction of CRAB acquisition independently. Remodeling of the ICU to the single room would be an efficient strategy for preventing the spreading of multidrug-resistant organisms and hospital-acquired infection.

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814. A Quasi-Experimental Study on Stethoscopes Contamination with Multidrug-Resistant Bacteria: Its Role as a Vehicle of Transmission

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Session: P-34. HAI: Disinfection/Sterilization & Environmental Infection Prevention

Background. Stethoscopes have been suggested to be a possible vector of contact transmission. However, only a few studies have focused on the prevalence of contamination by multidrug-resistant (MDR) bacteria and effectiveness of disinfection training to reduce the aim of this study is to investigate the burden of stethoscope contamination with nosocomial pathogens and multidrug-resistant (MDR) MDR bacteria to analyze habit changes in the disinfection of stethoscopes before and after education and training.

Methods. We performed a prospective pre and post quasi-experimental study. All participants were surveyed on their disinfection behavior and stethoscopes were cultured by pressing the diaphragm directly onto a blood agar plate before and after education on disinfection. Pulsed-field gel electrophoresis (PFGE) was performed to determine the relatedness of MDR bacteria.

Fig. 1. Study flow for pre and post quasi-experimental study. Abbreviations. PFGE, Pulsed-field gel electrophoresis

Fig. 2. Changes in colony forming units of bacteria isolated from stethoscopes between pre and post intervention period. Abbreviations. CFUs, colony forming units; ns, non-specific

Table 1. Contamination rates caused by nosocomial pathogens and proportion of MDR bacteria

| Nosocomial pathogens | Pre-intervention samplings (n=90) | Post-intervention samplings (n=94) |
|----------------------|-----------------------------------|-----------------------------------|
| Overall              | 72 (80.0%)                        | 88 (95.0%)                        |
| S. aureus            | 13 (14.4%)                        | 18 (19.2%)                        |
| Enterococcus         | 6 (6.7%)                          | 11 (11.7%)                        |
| A. baumannii         | 0 (0.0%)                          | 1 (1.1%)                          |
| P. aeruginosa        | 0 (0.0%)                          | 0 (0.0%)                          |
| Enterobacteriaceae   | 3 (3.3%)                          | 2 (2.1%)                          |
| K. pneumonia         | 1 (1.2%)                          | 1 (1.1%)                          |
| E. coli              | 0 (0.0%)                          | 1 (1.1%)                          |
| Enterococcus        | 2 (2.3%)                          | 0 (0.0%)                          |

Conclusion. Stethoscopes were contaminated with various nosocomial pathogens and were very likely to be a vehicle of MDR bacteria. Healthcare workers feel the need for education and think it helps, but continuous, consistent education and training should be done in multifaceted approach to reduce the nosocomial transmission via stethoscopes.

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815. Biofilm Accumulation in New Flexible Gastroscope Channels within 30 Days in Clinical Use

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Session: P-34. HAI: Disinfection/Sterilization & Environmental Infection Prevention

Background. Flexible endoscopes are complex-design reusable devices, with long and narrow channels, making reprocessing difficult. Biofilm formation is a key factor for persistent contamination, as it protects microorganisms against cleaning and disinfection agents. The aim of this study was to assess the accumulation of biofilm on the inner surfaces of new flexible gastroscope channels after 30 days of patient-use and full reprocessing.

Methods. Three flexible gastroscopes (FG) (GIF-Q150, Olympus) with new internal channels (Teflon®) were subjected to 30 days of clinical use and reprocessing by trained nursing personnel, using a revised reprocessing protocol, at the endoscopy service of a Brazilian teaching hospital (235 beds). The reprocessing protocol included: pre-cleaning: manual cleaning; automated cleaning and disinfection - 2% Glutaraldehyde; manual drying (forced-air drying) and alcohol rinsing, and storage in vertical position in exclusive cabinets. Then, internal channels were removed from the three patient-ready FG (three biopsy, three air, three water and three air/water junction channels), and the inner surface subjected to bacteriological culture (~30 cm) (n=9) and Scanning Electron Microscopy (SEM) (~1 cm) (n=12). Air/water junctions (~1 cm) were subjected to SEM only.

Results. The average of use/reprocessing of the FG was 60 times. Bacterial growth was detected in 6/9 channels (three from FG1 showed residual moisture) and seven bacterial isolates were recovered, most from air or water channels (Fig 1). Inner surface structural damage was identified in 11/12 channels by SEM. Extensive biofilm was detected in air, water and air/water junction channels (7/12) (Fig 2). Residuals matter were detected in all channels (12/12).