**SUMMARY**

Ventilator associated pneumonia (VAP) is one of the most common healthcare associated infections in critical care settings and accounts for 6.8% to 32.2% of health care-acquired infections among neonates. It is associated with prolonged hospitalization, increased health care costs, and high attributable mortality. The presence of an endotracheal tube (ETT) is an independent risk factor for developing VAP. These infections are most commonly caused by biofilm producing organisms. Cells in biofilm display phenotypic traits that are dramatically different from those of their free-floating (planktonic) counterparts and are resistant to antimicrobial agents. Consequently, biofilm-related infections are inherently challenging to treat and difficult to be fully eradicated with normal treatment regimens.

This study aimed to investigate biofilm formation on the luminal and surface of ETTs of children in ICU on mechanical ventilation and study its relation to VAP. The presence of biofilm on the surface of ETTs and biofilm stage were evaluated by Scanning Electron Microscope (SEM), meanwhile, bacteria harvested from the surface of ETTs and the secretions of lower respiratory tract were isolated, identified and assessed for antimicrobial susceptibility.

The study was conducted on Twenty ETTs from 20 child patients who were intubated and mechanically ventilated in the ICU of pediatrics hospital Cairo University during the period from November 2012 to May 2013.

The results revealed that Bacterial colonization and biofilm formation was observed on 85% of inner surface of collected ETTs using SEM. Staging of biofilm revealed that 64.7% of the biofilms were grade III, 23.5% were grade II, and 11.7% were grade I. Bacterial colonization and biofilm grading was shown to be time dependent (p=0.0005). Inner endotracheal tube surface yielded 70% positive aerobic cultures. The most prevalent isolates were *Klebsiella pneumoniae followed by Coagulase negative Staph (CoNS), Acinetobacter, Pseudomonas aeruginosa and Proteus mirabilis*.

Seventeen neonates (85%) developed VAP and this was confirmed by positive endotracheal aspirate cultures. A total of 22 isolates were recovered, the most prevalent isolates were *Klebsiella pneumoniae* followed by *Coagulase negative Staph (CoNS), Acinetobacter, Pseudomonas aeruginosa, Proteus mirabilis and Stenotrophomnous maltophilia*. Nine samples had the same pathogen both on the inner surface of ETTs and in the endotracheal aspirate which accounted for 52% of the positive cultures from ETTs. Five samples (29.4%) of ET aspirate grew one organism phenotypically similar to ETT inner surface culture.

All Gram negative isolates were resistant to ampicillin-sulbactam,cefepime,cefotaxim,cefotriaxon.

We can conclude that endotracheal tube colonization and biofilm formation are frequently observed in children undergoing mechanical ventilation, increases with the duration of intubation and is correlated with occurrence of VAP. Bacteria implicated in VAP showed multi-resistance towards most antibiotics used in the study.