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Adherence of Oral Opportunistic Bacteria to Endotracheal Tubes and Cuffs

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Abstract: Ventilator-associated pneumonia is a major medical problem leading to high-level mortality. Prolonged endotracheal intubation frequently leads to colonization of the upper respiratory tract by opportunistic pathogens, which are commensal microorganisms inhabiting the human oral cavity. In this study, we examined the adherence of oral opportunistic bacteria to saliva-coated endotracheal tubes and cuffs, and also examined the mechanism by which a *Klebsiella pneumoniae* strain adheres to the saliva-coated cuff. Eight strains of oral opportunistic bacteria were examined regarding their ability to adhere to saliva-coated tubes and cuffs. An inhibition assay of the adherence of a *K. pneumoniae* strain and aggregation assay were performed to clarify the binding mechanism of the bacterium. Of the bacteria tested, strains of *Streptococcus pyogenes* and *K. pneumoniae* strongly adhered to saliva-coated tubes, and strains of *Pseudomonas aeruginosa*, *K. pneumoniae*, and *Enterobacter cloacae* adhered strongly to saliva-coated cuffs. The adherence of *K. pneumoniae* cells to saliva-coated cuffs was inhibited by spermidine. Both spermidine and whole saliva induced the aggregation of *K. pneumoniae* cells. These results suggest that oral opportunistic bacteria have the ability to adhere to saliva-coated endotracheal tubes and cuffs, and that the adherence of *K. pneumoniae* cells to the saliva-coated cuff is mediated by type 3 fimbriae.

Key words: Opportunistic bacteria, Adherence, Endotracheal tubes and cuffs