

Ventilator-associated pneumonia and oral health

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If it is true that intensive care saves many lives, it also involves risks to patients. Among those risks, ventilator-associated pneumonia (VAP) is one of the most frequent ones worldwide.

Taking into account the epidemiology of VAP among different Brazilian hospitals, it is of note that we systematically report a much higher incidence of VAP (17.8-24.6 episodes per 1,000 ventilator days)¹⁻³ than the incidence reported by the National Healthcare Safety Network (NHSN) of the Centers for Disease Control and Prevention (2.5-12.3 episodes per 1,000 ventilator days), which is based on the United States of America (USA) and is considered a global reference on the field of infection control⁴.

In fact, many reasons could be elicited to explain such differences and we bring the reader's attention to three of them that we believe may play a relevant role in that explanation.

First, it may be that we overestimate our incidence rates, because the VAP diagnosis is not that simple, there being many differential diagnoses, such as alveolar hemorrhage, pulmonary infarct, heart failure, atelectasis, acute respiratory distress syndrome, among others. So, in the intensive care unit (ICU), when a patient develops VAP suspicious, a chest computerized tomography scan may be required, and/or a bronchoscopy followed by microbiological cultures and/or a pulmonary biopsy to define the diagnosis and determine the therapeutic approach. Those invasive techniques are not always available in the vast majority of Brazilian ICUs but are frequently used among North-American ICUs, maybe leading them to rule out those alternative diagnostics more properly⁵.

Second, although definite data is lacking, we believe that nurse understaffing is far more frequent among Brazilian ICUs than among North-American ICUs. While they discuss what is the most adequate patient/nurse ratio, 1:1 or 2:1, Brazilian federal regulation demands ICUs to have an 8:1 ratio, relaying most of the nursing care in the hands of nursing technicians. There is increasing evidence that nurse understaffing may be related to poor hand-hygiene compliance and a worse nursing care, eventually incrementing the risk of nosocomial infections, including VAP⁶.

But what we felt is the most relevant difference between South and North-American populations, regarding VAP susceptibility, is the oral health status. It is well known that the pathophysiology of VAP

begins in most cases with the migration of pathogenic bacteria from the oral cavity to the airways and the lungs. In this sense, a poor oral health is an established risk factor for nosocomial pneumonia, related or not to mechanical ventilation.

A recent national survey of the Brazilian population oral health status made by the Ministry of Health has shown that by the age of 12 years, 56.5% experienced at least one caries event and the mean Decayed/Missing/Filled/Teeth index (DMFT) at this age is 2.07, being 1.19 in the USA for the same age^{7,8}. The mean DMFT index observed among adults in Brazil is 27.53 in the age range 65-74 years, which is also higher than the 22.4 index, observed among north-Americans aged 60 and above.

When it comes to periodontal disease, analyzed according to the Community Periodontal Index (CPI), the prevalence identified in Brazil, counting excluded sextants, is around 82.2% for persons aged 35-44 years and 98.2% for persons aged 65-74 years, while being only 47% for adults aged 30 years and above in the USA⁹.

We previously demonstrated that the topical application of chlorhexidine as an oral antiseptic is ineffective for VAP prevention, on the context of a poor oral health and hygiene¹⁰. Although chlorhexidine inactivates oral microbes efficiently *in vitro*, the great microbial concentration on teeth biofilms and periodontal pockets renders it ineffective *in vivo*.

Despite the progress observed in Brazil on the area of primary prevention of caries, related mainly to the implementation of routine water fluorination in the last decades, we made little progress in the efforts to offer public dental treatment, as it is needed.

The consequences of a poor oral health go far beyond the enhanced susceptibility to nosocomial infections and affect the nutritional status, cardiovascular system, and quality of life of the affected people.

We believe that it is now time to pass through this ancient scenario and to invest in oral health promotion, recognizing them as a public health priority, as predicted in the constitution of our public health system. Meanwhile, for those in charge of Brazilian ICUs, it may be advised that more than doctors, we need nurses, physiotherapists, and dental surgeons working on our intensive care patients, thus enhancing their chances of surviving VAP and getting discharged from the hospital alive.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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