

What is Ventilator-Associated Pneumonia?

Pneumonia is an infection that results in the inflammation of the lungs. A **ventilator** is a machine that mechanically helps a patient to breathe by providing oxygen through a tube. **Ventilator-Associated Pneumonia (VAP)** is pneumonia appears in an intubated patient within 48 or more hours from the start of ventilation or up to one week after ventilation is discontinued. This usually occurs when germs enter the tube and get into the patient's lungs.



The signs and symptoms of VAP are similar to those of other pneumonias. —Journal of Infection Prevention, 2015

What are the Risks?

- Prolonged periods of ventilation
- Extended hospitalization
- Excessive use of antimicrobial medications
- Increased healthcare expenses
- Higher mortality rate

“Pneumonia is the No. 1 hospital-acquired infection in America”

—Centers for Disease Control and Prevention, January 9, 2018

What is an Effective Way to Reduce Risks of VAP?

Multiple studies have shown that cleaning the inside of the mouth by means of **toothbrushing** and **rinsing with antimicrobial oral rinses**, such as chlorhexidine gluconate, can significantly reduce patients' risk of developing VAP.

Methods:

Various clinical studies compare the effects of oral care treatment that combines **tooth brushing and rinsing with antiseptic rinses** (experimental group), with conventional oral care treatment that includes **cleaning with a sponge/swab and atraumatic clamp, followed by spreading a 0.2% solution of chlorhexidine gluconate** throughout the mouth (control group).

Results:

One study that examined the impact of oral care in the prevention of VAP among post-op cardiovascular surgical patients showed that the risk of developing VAP after surgery was **3-fold higher** in patients who did not receive oral care treatment.

Another study showed that there was a **significant reduction of the mean time of ventilation** in the experimental group (with toothbrushing and rinse) in comparison to the control group (swab with chlorhexidine only).

	Study group	Control group	p value
Percentage of patients that developed VAP	8.9	33.3	< 0.004
Development of VAP per 1,000 ventilation days	10.2	29.5	< 0.06

This table shows the development of VAP among patients in a study group that received oral care which included toothbrushing and patients in a control group that received oral care without toothbrushing.



Toothbrushing is seen as a strong defense against pneumonia. —WSJ, 2018

Can VAP be treated?

VAP can be a very serious infection. Most of the time, these infections can be treated with antibiotics. However, antibiotics can cause side effects and lead to antibiotic resistance (occurs when bacteria develop immunity toward the drugs designed to kill them). According to the U.S. Centers for Disease Control and Prevention, overuse of antibiotics can reduce the drugs' effectiveness. Researchers also estimate that antibiotic resistance causes Americans upwards of \$20 billion in additional healthcare costs annually.



The more we rely on antibiotics, the more bacteria develop resistance to them, which makes treating infections that much more challenging. —Scientific American, 2015

What is the Role of the Dental Hygienist?

- Inform the patients the importance of reducing the risk of VAP via toothbrushing
- Teach and perform oral care that includes toothbrushing and antiseptic oral rinses
- Monitor the progress of the patients regularly and encourage patients to continue oral care after their hospital stay

Tips for Preventing Ventilator-Associated Pneumonia

- Clean the inside of the patient's mouth by toothbrushing and using antiseptic oral rinses at least twice a day
- For infection control, oral care providers should wash hands with soap and water or an alcohol-based sanitizer before and after touching the patient or the ventilator



At NYU Langone Health and other hospitals across the country, patients are brushing their teeth before operations in an effort to prevent pneumonia. (Annie Tritt for the WSJ)

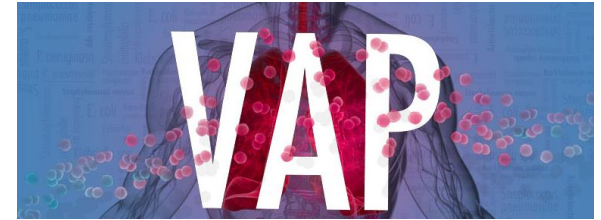
References

- Healthcare-associated Infections. (2012, May 17). Retrieved March 27, 2018, from <https://www.cdc.gov/hai/vap/vap.html>
- Healthcare-associated Infections. (2018, January 09). Retrieved March 27, 2018, from <https://www.cdc.gov/hai/surveillance/index.html>
- Lagnado, Lucette. "In Hospitals, Pneumonia Is a Lethal Enemy." *The Wall Street Journal*, Dow Jones & Company, 17 Feb. 2018, www.wsj.com/articles/in-hospitals-pneumonia-is-a-lethal-enemy-1518868800.
- Lev, Amiram, et al. "The Effect of Different Oral Hygiene Treatments on the Occurrence of Ventilator Associated Pneumonia (VAP) in Ventilated Patients." *Journal of Infection Prevention*, vol. 16, no. 2, 2015, pp. 76–81., doi:10.1177/1757177414560252.
- Nicolosi, L. N., Del, M., Martinez, C. D., González, N. N., & Cruz, M. E. (2013, October 8). Effect of oral hygiene and 0.12% chlorhexidine gluconate oral rinse in preventing ventilator-associated pneumonia after cardiovascular surgery. Retrieved March 27, 2018, from <https://www.ncbi.nlm.nih.gov/pubmed/24106323>
- Radding, Dolores. "Big Gains in Preventing Pneumonia." *Kaiser Permanente Look Inside KP Northern California*, 1 Mar. 2017, lookinside.kaiserpermanente.org/big-gains-preventing-pneumonia/.
- "Ventilator-Associated Pneumonia." *Obp*, 22 Mar. 2018, obpmedical.com/ventilator-associated-pneumonia-vap/.
- Vidal, C. F., Vidal, A. K., Monteiro, J. G., Cavalcanti, A., Henriques, A. P., Oliveira, M., . . . Lacerda, H. R. (2017, January 31). Impact of oral hygiene involving toothbrushing versus chlorhexidine in the prevention of ventilator-associated pneumonia: A randomized study. Retrieved March 27, 2018, from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5286780/>
- What Are the Consequences of Antibiotic Overuse? (2015, January 12). Retrieved March 29, 2018, from <https://www.scientificamerican.com/article/what-are-the-consequences-of-antibiotic-overuse/>

Image References

- <https://askthedentist.com/fighting-pneumonia-with-brushing-and-flossing/>
- http://cdn.stateuniversity.com/assets/logos/images/1643/large_logo.gif
- https://www.pharmastar.it/binary_files/news/polmone_2_63601.gif
- https://si.wsj.net/public/resources/images/BN-XM259_PNEUMO_M_20180214153522.jpg
- <http://news.mit.edu/2017/new-way-test-antibiotics-could-lead-better-drugs-0831>

Addressing and Reducing the Risks of Ventilator-Associated Pneumonia



Presented by:

Basti Beniagu

Bushra Meraj

Nancy Zhang



**NEW YORK CITY
COLLEGE OF TECHNOLOGY**