

# Effect of topical antibiotics on antibiotic resistance, patient outcomes in ICUs

October 1 2014

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A comparison of prophylactic antibiotic regimens applied to an area in the mouth and throat and digestive tract were associated with low levels of antibiotic-resistant bacteria and no differences in patient survival and intensive care unit (ICU) length of stay, according to a study published in *JAMA*. The study is being posted early online to coincide with its presentation at the European Society of Intensive Care Medicine annual congress.

Reductions in the incidence of ICU-acquired respiratory tract infections have been achieved by some antibiotic regimens, such as selective decontamination of the digestive tract (SDD) and selective oropharyngeal (the mouth and throat) decontamination (SOD). Both SDD and SOD comprise nonabsorbable antibiotics with activity against gram-negative bacteria, yeasts, and *Staphylococcus aureus*; these agents are applied in the oropharynx every 6 hours throughout the ICU stay. Selective decontamination of the [digestive tract](#) also includes administration of topical antibiotics in the gastrointestinal tract, and a third-generation cephalosporin administered intravenously during the first four days in the ICU. Controversy exists regarding the relative effects of both measures on patient outcomes and antibiotic resistance, according to background information in the study.

Evelien A. N. Oostdijk, M.D., Ph.D., of the University Medical Center Utrecht, the Netherlands, and colleagues conducted a study that compared 12 months of administration of SOD or SDD in 16 Dutch ICUs between August 2009 and February 2013. Patients with an

expected length of ICU stay longer than 48 hours were eligible to receive the regimens, and 5,881 and 6,116 patients were included in the clinical outcome analysis for SOD and SDD, respectively. Intensive care units were randomized to administer either regimen.

Respiratory and perianal (rectal) culture samples were performed and demonstrated that the prevalence of antibiotic-resistant gram-negative bacteria in perianal swabs and ICU-acquired bacteremia were significantly less common with SDD compared with SOD (5.6 percent vs 11.8 percent, respectively). During both interventions the prevalence of rectal carriage of aminoglycoside-resistant [gram-negative bacteria](#) increased 7 percent per month during SDD and 4 percent per month during SOD.

Day 28 mortality was 25.4 percent and 24.1 percent during SOD and SDD, respectively. Median length of stay in the ICU and hospital was determined for patients alive at day 28 and was similar for SOD and SDD. Intensive care unit-acquired bacteremia occurred in 5.9 percent and 4.6 percent of patients during SOD and SDD, respectively.

The authors note that because of the low incidence and minor absolute risk difference between the two study groups, the number needed to treat with SDD to prevent 1 episode of ICU-acquired bacteremia (as compared with SOD) was 77 and was 355 for ICU-acquired bacteremia caused by an aminoglycoside-resistant gram-negative bacterium. "It is therefore not surprising that the observed reduction in ICU-acquired bacteremia during SDD was not associated with a detectable effect on patient outcome."

Marin H. Kollef, M.D., of the Washington University School of Medicine, St. Louis, and Scott T. Micek, Pharm.D., of the St. Louis College of Pharmacy, comment on this study in an accompanying editorial.

"The investigation by Oostdijk et al represents another important study performed by expert investigators and aimed at determining the optimal use of topical antibiotic prophylaxis for ICU patients with a specific focus on intestinal and oropharyngeal decontamination. Despite a large amount of research in this area, clinicians are still unclear on the optimal use of SDD and SOD. For the time being in the United States, SOD seems to be a more reasonable approach for the prevention of pathogenic bacterial overgrowth in critically ill patients. The use of SDD in the United States should probably be avoided until multicenter studies demonstrate the overall efficacy of SDD in hospitals with more widespread background antibiotic resistance."

**More information:** [DOI: 10.1001/jama.2014.7247](https://doi.org/10.1001/jama.2014.7247)  
[DOI: 10.1001/jama.2014.8427](https://doi.org/10.1001/jama.2014.8427)

Provided by The JAMA Network Journals

Citation: Effect of topical antibiotics on antibiotic resistance, patient outcomes in ICUs (2014, October 1) retrieved 5 May 2024 from <https://medicalxpress.com/news/2014-10-effect-topical-antibiotics-antibiotic-resistance.html>

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