

Helping patients breathe during dangerous procedure prevents complications

February 18 2019



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Thousands of Americans die each year during a dangerous two-minute procedure to insert a breathing tube.

Now a Vanderbilt University Medical Center (VUMC) study in the *New England Journal of Medicine (NEJM)* is showing that using bag-mask ventilation, squeezing air from a bag into the mouth for 60 seconds to help patients' breathing, improves outcomes and could potentially save lives.

"When you place a [breathing tube](#), you have to give patients medications to make them relaxed and sleepy. And those medications take about a minute to kick in," said first author Jonathan D. Casey, MD, a Pulmonary and Critical Care Fellow at VUMC.

"After you give those medications, there is a big divide among doctors about whether to just wait and watch while their breathing slows and stops, or to provide ventilation (breath for the patient) with a bag-mask device. We found that providing ventilation with a bag-mask device is safe and very effective. Most importantly, it cut the rate of severely low oxygen levels in half."

Tracheal intubation, the process of placing a breathing tube, may be required to perform surgery or to support breathing during a serious illness. During tracheal intubation for illness, about 40 percent of people suffer low oxygen levels, which may cause damage to the brain and heart, and 2 percent of people suffer cardiac arrest, a sudden failure of heart function that is frequently fatal.

The PreVent trial (Preventing Hypoxemia with Manual Ventilation during Endotracheal Intubation) is a multicenter trial of bag-mask ventilation during tracheal intubation; the results, released today in the *NEJM*, have the potential to change practice across the nation, as more than 1.5 million patients undergo tracheal intubation each year in the U.S.

"Doctors have been performing this procedure for 50 years and there has

always been controversy about the safest way to do it," Casey said.

"Some doctors believe that when you squeeze the bag and force air into the lungs that will also put air into the stomach and put the patient at risk for vomiting of stomach contents into the lungs.

"That is not what we found. Our study found that bag-mask ventilation didn't cause the vomiting that people were worried about, and it was very effective at preventing low oxygen levels."

The multicenter trial was conducted in seven ICUs across the U.S., with [adult patients](#) undergoing the procedure receiving either ventilation with a bag-mask device or no ventilation between induction and laryngoscopy.

Among the 401 patients enrolled, the lowest median oxygen saturation was 96 percent in the bag-mask ventilation group as compared to 93 percent in the no-ventilation group.

A total of 21 patients in the bag-mask ventilation group had severely low oxygen levels, as compared with 45 patients in the no-ventilation group.

Vomiting of stomach contents into the lungs occurred during 2.5 percent of intubations in the bag-mask ventilation group and during 4 percent of the group without bag-mask ventilation.

The Medical ICU at Vanderbilt now routinely uses bag-mask ventilation during placement of a breathing tube.

"It is important to act on what we learn. Not only did we immediately apply these important results to our practice, but we have started follow-up trials of other ways to improve the safety of tracheal intubation—and those new trials require that bag-mask [ventilation](#) be provided for every patient receiving a breathing tube," said Matthew W. Semler, MD MSc,

Associate Director of the Medical ICU at Vanderbilt and senior author on the study.

"The best thing about this intervention is that it is free," concluded David R. Janz, MD, MSc, Assistant Professor of Medicine at Louisiana State University and a co-author on the trial. "This is a device that is already always available when you are placing a breathing tube. In the past, we only used the bag-mask device to assist patients' breathing if we had difficulty placing a breathing tube. Now we know that it should be used in every procedure even before we make our first attempt to place a breathing tube."

Provided by Vanderbilt University Medical Center

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