

## Inhaled nitric oxide reduces hospital stay and improves oxygenation in pregnant patients with COVID-19 pneumonia

Findings could offer a new treatment approach for pneumonia combining high dose inhaled nitric oxide gas with careful patient monitoring

*Date:* July 7, 2022

*Source:* Massachusetts General Hospital

*Summary:* Researchers found that high dose nitric oxide given to pregnant women with severe COVID-19 pneumonia resulted in reductions in the need for supplemental oxygen as well as in hospital and ICU lengths of stay, with no adverse events reported in mothers or newborns.

### FULL STORY

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High dose inhaled nitric oxide gas (iNO) is a safe and effective respiratory therapy for pregnant women hospitalized with severe COVID-19 pneumonia, resulting in a more rapid weaning from supplemental oxygen and reduced length of hospital stay, according to a research team led by Massachusetts General Hospital (MGH). In a study published in *Obstetrics & Gynecology*, researchers from four Boston hospitals reported that the addition of twice-daily nitric oxide to standard of care oxygen therapy decreased the respiratory rate of pregnant women with low oxygenation levels of the blood without causing any side effects.

"To date, very few respiratory treatments to complement supplemental oxygenation in COVID-19 pregnant patients have been tested," says senior author Lorenzo Berra, MD, with the Department of Anesthesia, Critical Care and Pain Medicine, MGH. "Investigators from all four medical centers that participated in our study agreed that administration of high dose nitric oxide through a snug-fitting mask has enormous potential as a new therapeutic strategy for pregnant patients with COVID-19."

Pneumonia triggered by COVID-19 is particularly threatening to pregnant women since it may quickly progress to oxygen insufficiency in the blood and bodily tissues, a condition known as hypoxemia, requiring hospitalization and cardiopulmonary support. "Compared to non-pregnant female patients with COVID-19, pregnant women are three times more likely to need intensive care unit admission, mechanical ventilation, or advanced life support, and four times more likely to die," notes Carlo Valsecchi, MD, lead author in the Department of Anesthesia, Critical Care and Pain Medicine, MGH. "They also face a greater risk of obstetric complications such as preeclampsia, preterm delivery, and stillbirth."

Nitric oxide is a therapeutic gas that was initially approved by the U.S. Food and Drug Administration in 1999 for inhalation treatment of intubated and mechanically ventilated newborns with hypoxic respiratory failure. With MGH driving many early studies, iNO in high concentrations was also shown to be effective as an antimicrobial in reducing viral replication of SARS-CoV-1 and, more recently, SARS Co-V-2, the virus that causes COVID-19. During the first wave of COVID-19, MGH treated six non-intubated pregnant patients with iNO at high doses of up

to 200 parts per million (ppm). Findings of a more favorable outcome with iNO led MGH clinicians to offer this treatment to other pregnant patients, and to design the current study to determine the safety and efficacy of iNO200 for COVID-19 pneumonia in pregnancy.

To that end, a collaborative network of four medical centers in the Boston area was formed. In addition to MGH, it included Tufts Medical Center, Beth Israel Deaconess Medical Center, and Boston Medical Center. Researchers and clinicians from multiple departments -- including critical care medicine, respiratory care, and maternal fetal medicine -- studied 71 pregnant patients with severe COVID-19 pneumonia admitted to these hospitals, 20 of whom received iNO200 twice daily. The study found that iNO therapy at this dosage, when compared to standard of care alone, resulted in reductions in the need for supplemental oxygen and in hospital and ICU lengths of stay. No adverse events related to the intervention were reported in either mothers or their babies.

"Being able to wean patients from respiratory support quicker could have other profound implications, including reducing stress on women and their families, lowering the risk of hospital-acquired infections, and relieving the burden on the health care system," notes Berra. "Above all, our study supports the safety of high dose nitric oxide in the pregnant population, and we hope more physicians will consider incorporating it into carefully monitored treatment regimens."

Berra is an associate professor of Anesthesia, Harvard Medical School (HMS), and medical director of Respiratory Care, MGH. Valsecchi is a post-doctoral fellow and investigator in the Department of Anesthesia, MGH. Co-authors include William Barth, Jr., MD, vice chair of Obstetrics, MGH, and an associate professor of Obstetrics, Gynecology, and Reproductive Biology, HMS; Ai-ris Collier, MD, investigator and instructor in Obstetrics, Gynecology, and Reproductive Biology, Beth Israel Deaconess Medical Center; Ala Nazari, professor of Anesthesiology at Boston Medical Center; Jamel Ortoleva, MD, assistant professor of Anesthesiology at Tufts Medical School, and cardiothoracic anesthesiologist and critical care physician at Tufts Medical Center; and Anjali Kaimal, MD, chief of the Division of Maternal-Fetal Medicine, MGH, and an associate professor of Obstetrics, Gynecology, and Reproductive Biology, HMS.

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#### Story Source:

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