

SOUTHWESTERN NEWS

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A COMPONENT OF AIR POLLUTION MAY HELP SAVE THE LIVES OF NEWBORNS WITH A SERIOUS LUNG DISEASE

DALLAS — February 27, 1997 — A compound usually associated with air pollution may help newborn infants survive a sometimes fatal lung condition.

In a study published in the Feb. 27 *New England Journal of Medicine*, researchers from UT Southwestern Medical Center at Dallas and several other medical institutions describe their success in using small doses of nitric oxide gas to treat newborns with severe pulmonary hypertension.

Pulmonary hypertension is a condition in which blood vessels in the lungs are constricted so tightly that blood cannot flow through them to pick up oxygen and circulate it through the body. It occurs in about 1 in 500 live births.

Dr. Philip Shaul, professor of pediatrics at UT Southwestern and an author of the study, said pulmonary hypertension may occur because the gene responsible for making nitric oxide in the body is not sufficiently "turned on" before the baby is born. Nitric oxide is a naturally occurring gas that also is a byproduct of the combustion process in automobiles. It has many functions in the body, including helping to dilate blood vessels.

The current treatment for babies with pulmonary hypertension is to put them on a ventilator. Those who do not respond to the extra oxygen and are in danger of dying are placed on a heart-lung machine as a last resort. This machine removes blood from the body, oxygenates it and returns it to the body. The process, known as extracorporeal membrane oxygenation, has several possible complications, including lung damage, bleeding in the brain and strokes.

While there has been anecdotal evidence that administering nitric oxide to newborns could reduce pulmonary hypertension, this was the first controlled study using nitric oxide gas. It took three years to complete and involved 58 patients of the most seriously ill patients from seven medical centers across the country. UT Southwestern was the only center in Texas participating in the study. The UT Southwestern study involved babies treated in the neonatal intensive care units at Parkland Memorial Hospital and Arlington Memorial Hospital and the pediatric intensive care unit at Children's Medical Center of Dallas.

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The study found that after breathing a nitric oxide mixture for only 20 minutes, 53 percent of the infants improved. Seventy-five percent of these babies maintained this response with continued nitric oxide and the use of heart-lung bypass machines was nearly cut in half. Babies in the study received nitric oxide through a ventilator for periods ranging from 24 hours to eight and a half days.

"You could literally see the change in an infant's color from blue to pink within one to two minutes," Shaul said. "It is not often that you get to see a patient literally change in front of your eyes."

In addition to being a much less invasive treatment than placing infants on a heart-lung machine, Shaul noted that administration of nitric oxide also is considerably less expensive — a few hundred dollars compared with \$40,000 in hospital costs alone for keeping an infant on a heart-lung machine.

Shaul said further studies are under way that may lead to Food and Drug Administration approval of nitric oxide for treating pulmonary hypertension in newborns. The current studies focus on extending nitric oxide treatment to newborns with less severe pulmonary hypertension.

Meanwhile, Shaul and other researchers at UT Southwestern are working on ways to "turn on" the gene that makes the enzyme responsible for producing nitric oxide. This research will get a boost with the establishment of the new Crystal Charity Ball Center for Research in Pediatric Critical Care at UT Southwestern to be funded by proceeds from the 1997 gala, one of Dallas' most prestigious and successful society events.

Shaul said his research suggests that the lack of nitric oxide in some newborns may be caused by a lack of estrogen production by the placenta during the last few weeks of pregnancy.

"Normally, the placenta pours out estrogen during the end of the gestation period," he said. "When labor starts, it pours out even more. If the placenta is not making enough estrogen, the nitric oxide production won't get turned on."

Other UT Southwestern researchers involved in the study included Dr. Thomas Zellers, associate professor of pediatrics. Zellers currently is conducting another study of nitric oxide in infants who have heart surgery. Many infants who have congenital heart disease are at risk for developing pulmonary hypertension after they have open heart surgery and are placed on a heart-lung machine.

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