

Fetal therapy for severe diaphragmatic hernia

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A new study shows that a fetal procedure called fetoscopic tracheal occlusion (FETO) is feasible and significantly improves the survival of newborn babies with severe left congenital diaphragmatic hernia. FETO also reduces the need for ECMO, a procedure in which a machine takes over the function of the lungs after birth. Baylor College of Medicine and Texas Children's Hospital have the largest experience in the U.S for treating severe congenital diaphragmatic hernia with FETO. The study appears in *Obstetrics & Gynecology*.

"Diaphragmatic hernia is a congenital condition that affects 1 of 3,000 live births; it is usually diagnosed during the late second trimester. Most cases present with the condition on the left side of the diaphragm," said Dr. Michael Belfort, Ernst W. Bertner Chairman and professor of the obstetrics and gynecology at Baylor and obstetrician and gynecologist-in-chief at Texas Children's Pavilion for Women.

Mortality after birth is high in newborns with the severe form of the disease, mostly because their lungs are poorly developed. Belfort and colleagues show here that with FETO it is feasible to improve [lung](#) development and increase the rate of survival of newborn infants when compared with those that did not received FETO.

Treating severe fetal diaphragmatic hernia with FETO

The diaphragm is a thin muscle that separates the organs in the chest from those in the abdomen. In contrast, the diaphragm of a fetus with [diaphragmatic hernia](#) has a gap that allows organs in the abdomen, such as the intestines, the stomach and the liver, to cross over to the chest. The fetal chest is now overcrowded and in this tighter space the lungs do not have room to grow and develop their normal functions.

Most neonates with this condition struggle with their breathing, even after the diaphragm has been surgically repaired after birth and some may require extracorporeal membrane oxygenation (ECMO), a treatment with a machine that receives the neonate's blood, oxygenates it and returns it to the baby. Despite medical advances, mortality remains high in these neonates.

FETO aims at helping the lungs affected by severe diaphragmatic hernia to improve their development while still inside the uterus. The procedure consists of accessing the womb through a small cannula, a thin, hollow tube, placed through the mother's abdomen and passing a fine endoscope through the cannula to deploy a balloon that will temporarily block the fetal windpipe, the trachea. The blockage allows fluid normally produced by fetal lungs to accumulate, expanding the lungs. Physicians think that this process helps the otherwise small lungs in diaphragmatic hernia to grow. The balloons are then removed from the fetal trachea before the fetus is delivered.

In this study, balloons were placed in 11 patients around a gestational age of 28 weeks and removed at about week 34. There were no maternal complications or fetal deaths.

The results

Belfort and colleagues treated a group of patients presenting with severe fetal diaphragmatic hernia with FETO and compared the newborns'

survival and need for ECMO with those of a historical non-treated group of fetuses with diaphragmatic hernia of similar severity. The procedure made a big difference for babies with severe diaphragmatic hernia.

"We found that FETO is feasible and that it can increase the survival of newborns with severe diaphragmatic hernia. For instance, one year after the procedure, 70 percent of the FETO patients had survived, while only 11 percent survived from the non-treated group," said Belfort. "In addition, FETO reduced the newborns' need for ECMO from 70 percent to 30 percent."

"Although the numbers are small, the findings of this study are very encouraging and suggest that fetuses with severe diaphragmatic hernia may benefit from this therapy," said Dr. Oluyinka Olutoye, professor of surgery, pediatrics and obstetrics and gynecology at Baylor, and co-director of the Texas Children's Fetal Center at Texas Children's Pavilion for Women. "It is very exciting that with FETO we have the potential of improving the lives of patients with severe [congenital diaphragmatic hernia](#) who did not have a treatment option before."

Belfort and colleagues are now determining whether FETO can also improve survival and decrease morbidity in patients with moderate forms of diaphragmatic hernia.

"We don't know whether the procedure would work as well for the moderate group, and that is why we are randomizing patients in the upcoming trial," Belfort said.

More information: Michael A. Belfort et al. Feasibility and Outcomes of Fetoscopic Tracheal Occlusion for Severe Left Diaphragmatic Hernia, *Obstetrics & Gynecology* (2017). [DOI: 10.1097/AOG.0000000000001749](#)

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