

EP09.51: Preparing multidisciplinary teams for emergent airway management in fetuses with FETO using a high-fidelity simulation

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BACKGROUND

- Congenital diaphragmatic hernia (CDH) occurs in about 1 in 4,000-10,000 live births
- Associated with impaired lung development, resulting in pulmonary hypoplasia and pulmonary hypertension
- Fetoscopic endoluminal tracheal occlusion (FETO) is a prenatal intervention
- A balloon placed percutaneously in the fetal trachea to promote lung growth
- Failure to promptly reestablish airway patency prior to delivery risks neonatal asphyxia

OBJECTIVE

To describe the development and clinical application of a multi-disciplinary simulation designed to prepare physician teams for emergent airway management when a fetus with FETO in situ requires urgent delivery.

SIMULATION MATERIALS

- Fetoscopic tray, fetal mannequin, occlusion balloon, endotracheal tube

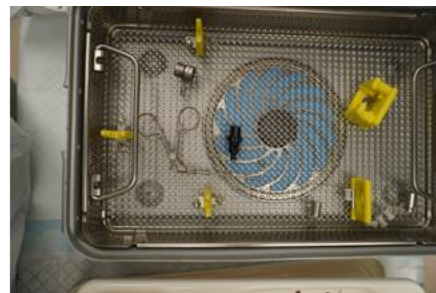


Figure 1: Fetoscope tray



Figure 2: Fetoscope assembly and mechanism review



Figure 3: Utilizing 22 gauge needle to rupture the FETO balloon

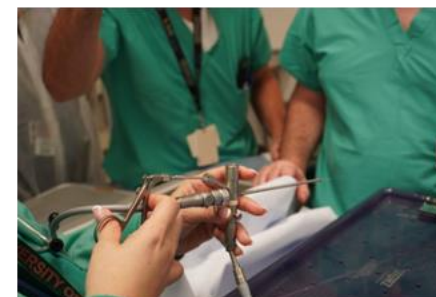


Figure 4: Practice utilizing fetoscope scissors/forceps for fetoscopic removal



Figure 5: Neonatal team practicing initial resuscitation



Figure 6: Practicing postnatal tracheoscopy if antenatal attempts are unsuccessful

DESIGN

- Teams: Maternal Fetal Medicine, Pediatric Anesthesiology, Neonatology, and Pediatric Otolaryngology
- Hands-on team-based scenarios to practice multiple techniques to rapidly establish airway patency in the setting of an emergent delivery of fetus with a FETO in place.
 - Ultrasound-guided puncture
 - Fetoscopic retrieval
 - Ex-utero intrapartum treatment (EXIT)
 - Postnatal tracheoscopy
- Goals focused on communication, team coordination, and building familiarity with potential management strategies.

CLINICAL CASE

- 33 y/o G1P0 at 31w4d s/p FETO procedure presents with premature rupture of membranes and abruption
- Teams listed above were emergently called for delivery
- Ultrasound guidance puncture of FETO balloon with a 22-gauge needle, resulting in successful deflation and removal of the balloon from the fetal trachea with first attempt
- Both physician and nursing teams expressed increased preparedness following simulation

TAKE HOME POINTS

- High-fidelity simulation offers an effective strategy to prepare multidisciplinary teams for rare but high-risk emergencies involving fetuses with FETO.
- Broader adoption of simulation-based training may improve team readiness and clinical outcomes in this highly specialized patient population.