Anesthesia for ex-utero intrapartum treatment to resection of a bronchogenic cyst causing airway compression

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Introduction
The Ex Utero Intrapartum Treatment (EXIT) procedure was initially described for reversal of tracheal occlusion in fetuses with severe congenital diaphragmatic hernia that had undergone in-utero tracheal occlusion1. Indications for EXIT have now expanded to include large fetal neck, mediastinal and lung masses, in which resuscitation of the neonate may be improved by the presence of placental support2, 3. We report a case of EXIT to resection of a bronchogenic cyst causing airway and lung compression.

Case report
A 28-year-old female with a singleton pregnancy was referred to our institution for evaluation of a fetal congenital cystic adenomatoid malformation (CCAM). Serial ultrasound and fetal MRIs (fig 1) revealed a CCAM in the left upper lobe and a fetal congenital cystic adenomatoid malformation (CCAM). Serial ultrasounds and fetal MRIs (fig 1) revealed a CCAM. Serial ultrasound and fetal MRIs (fig 1) revealed a CCAM. Serial ultrasound and fetal MRIs (fig 1) revealed a CCAM. Serial ultrasound and fetal MRIs (fig 1) revealed a CCAM. Serial ultrasound and fetal MRIs (fig 1) revealed a CCAM. Serial ultrasound and fetal MRIs (fig 1) revealed a CCAM. Serial ultrasound and fetal MRIs (fig 1) revealed a CCAM. Serial ultrasound and fetal MRIs (fig 1) revealed a CCAM.

Fig 1. Fetal MRI showing bronchogenic cyst causing airway compression

A low transverse abdominal incision was made to expose the uterus. A sterile ultrasound was used to map the placental borders (fig 2). Prior to hysterotomy, the propofol infusion was discontinued. A 7-11.5 MAC of desflurane was used to maintain maternal blood pressure at baseline. Warm normal saline was continuously infused into the uterine cavity to maintain uterine volume.

The fetus was positioned in the left lateral position on the mother’s abdomen for a right thoracotomy (fig 4). A large bronchogenic cyst compressing the distal trachea and left mainstem bronchus was excised. The left lung had herniated to the right side and significant mediastinal shift was noted. A flexible bronchoscope after the thoracotomy showed a widely patent trachea and left mainstem bronchus with no evidence of malacia. The endotracheal tube was then pulled back to the trachea.

Just before clamping the umbilical cord, continuous fetal echocardiography and fetal pulse oximetry was used for monitoring of fetal heart rate and contractility. A brief episode of fetal bradycardia to the 70s secondary to umbilical cord compression was quickly recognized and treated. Direct laryngoscopy was performed and the fetus was intubated (fig 3). A flexible bronchoscope was then used to advance the endotracheal tube into the right main stem bronchus. A peripherally inserted central venous catheter was inserted on a fetal hand.

The fetus was fully delivered, the umbilical cord was clamped and the newborn was transferred to the newborn isolette for stabilization. Uterine tone returned with an oxytocin infusion and uterine massage. The epidural catheter was bolused with local anesthetic and preservative free morphine and the patient was extubated at the end of the procedure.

Conclusions
The EXIT to resection strategy in this very high-risk fetus allowed successful transition to extra uterine life. The resection of a large fetal lung lesion at delivery in a controlled clinical environment circumvented a potentially fatal neonatal airway emergency.

References