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The Fetus as Patient

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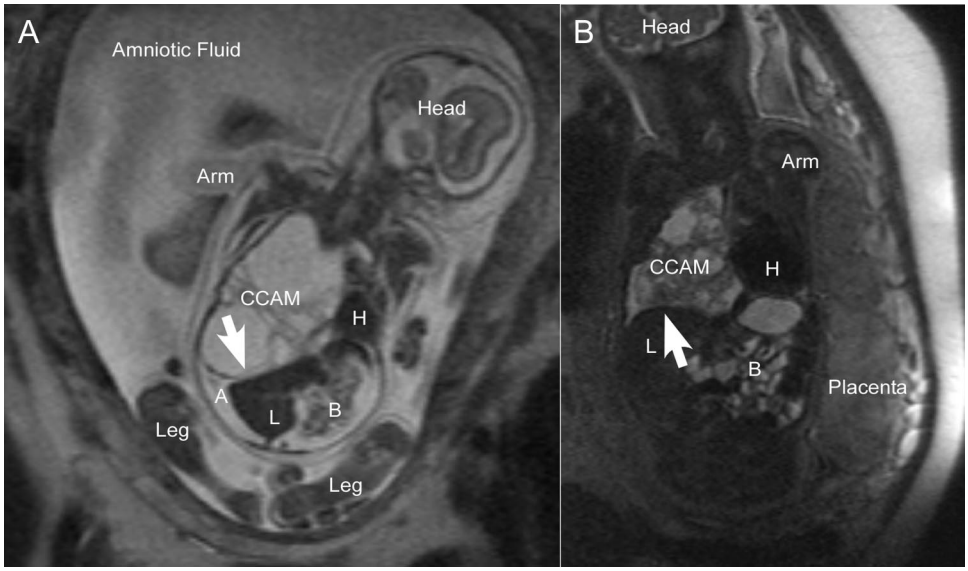

A 19-WEEK PARTURIENT presented with a fetus with a lung mass. Magnetic resonance imaging (*panel A*) demonstrated a congenital cystic adenomatous malformation (CCAM) occupying the right chest causing mediastinal shift, cardiac compression (H = heart), and displacement of the hemidiaphragm (*arrow*). Both lungs were compressed. Hydrops fetalis was present (A = fetal ascites; B = bowel; L = liver). Echocardiography revealed a compressed but structurally normal heart. The hydrops improved after aspiration, but the macrocyst recurred and the solid component continued to enlarge. A thoracoamniotic shunt was placed for continuous drainage. Imaging at 36 weeks (*panel B*) demonstrates the right hemidiaphragm in the correct position and resolution of the fetal ascites.

Lung hypoplasia and mediastinal shift necessitated mass resection during *ex utero* intrapartum therapy. A maternal laparotomy was performed, followed by hysterotomy allowing delivery of the fetal head, chest, and arm. High-dose volatile anesthetic (2 minimum alveolar concentration of desflurane) provided uterine relaxation and fetal anesthesia. Maternal blood pressure was maintained with phenylephrine. Intramuscular fetal injections included fentanyl (20 μg/kg), vecuronium (200 μg/kg), and atropine (20 μg/kg). The fetus was intubated (not ventilated), and pulse oximeter and peripheral venous access were established. After pulmonary lobectomy, the fetus was ventilated and delivery and newborn resuscitation were completed.

Congenital cystic adenomatous malformation results from overgrowth of terminal bronchial epithelium. Mass effect results in pulmonary hypoplasia. Cardiac compression with impaired venous return leads to lethal cardiac failure (hydrops).[1] Maternal health is threatened, as a state similar to preeclampsia (maternal mirror syndrome) may ensue.[2] *Ex utero* intrapartum therapy procedure is a feasible and potentially a life-saving treatment for congenital cystic adenomatous malformation. It provides time on uteroplacental gas exchange for controlled resection of the large fetal lung mass. The anesthetic goals for *ex utero* intrapartum therapy procedure include achieving uterine hypotonia, using deep general anesthesia or nitroglycerin, to maintain uteroplacental circulation; avoiding postpartum hemorrhage; maintaining normal maternal blood pressure often requiring α-adrenergic agonist support; and achieving surgical anesthesia for the fetus to avoid first breathing while avoiding fetal cardiac depression.[3]

References

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