Predicting of postnatal outcomes in fetal thorax anomalies

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Objective
To make the analysis of US images and postnatal results in fetuses with non-cardiac thorax anomalies, which were revealed at post-anomaly scans.

Methods
24 fetuses with non-cardiac thorax anomalies. There were decreased chest circumference (ChC) to the abdomen circumference (AC) ratio with long lasting oligohydramnios (4), abnormal cardio-thoracic ratio (CTR) (12), pleural effusion (4), bronchogenic cysts (1), displaced structures in fetal chest caused by non syndromic congenital diaphragmatic hernia (CDH) (3). Assessing of ChC/AC ratio and CTR was applied. Availability of the liver in the chest cavity (liver-up sign) and the ratio between size of lungs and fetal head circumference (LHR) was applied to predict the outcome in CDH. In cases of perinatal or infant deaths the autopsy results were studied.

Results
In the presented case series the perinatal and infant deaths rate was 62.5%, the rate of postnatal morbidity of respiratory system among the surviving children was 64%. US imagine of fetal lungs as well as CTR ratio did not allow to accurately diagnose PH and to predict the pulmonary function and the type of respiratory distress after birth. Sensitivity of evaluation of CTR in the diagnosis of PH was 66%, specificity 62%, accuracy 64%. However, 10 out of 12 fetuses (83.3%) with abnormal CTR value had poor postnatal results. ChC/AC ratio estimation allowed to diagnose PH truly in 3 out of 4 cases. In 2 out of 3 fetuses with non syndromic CDH the lethal PH and critical violations of respiratory function after birth was correctly predicted in cases with LHR 0, 35 and 0, 55, the last one was connected by liver-up sign >50%. While at LHR 1. 51 general postnatal and postoperative outcomes of CDH were good. Small bronchogenic cysts in fetus with normal CTR also had good postoperative outcome. In 2 out of 4 hydrothorax cases unilateral isolated defeat had favorable postnatal results. 2 cases of isolated bilateral hydrothorax with decreased CTR were accompanied with tracheal atresia and compressive atelectasis of lungs with neonatal death.

Conclusion
Given the limited possibility of a single center study, further prospective multicenter studies are appropriate for detecting antenatal US fetal lung changes and their association with perinatal outcomes. Criteria for prediction of postnatal risk depending on US pattern of the fetal thorax can be presented as well as thorax anomalies requiring post-natal follow-up monitoring.