Pulmonary arterial Doppler changes in the fetuses with congenital pulmonary airway malformation

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Background
Congenital pulmonary airway malformation (CPAM) is known as a lung mass with relatively favorable prognosis unless fetal hydrops is complicated. In a case with pulmonary hypoplasia such as CDH, decreased acceleration time/ejection time ratio (AT/ET), increased peak early diastolic reverse flow (PEDRF) and higher pulsatility index (PI) have been seen in pulmonary arterial (PA) Doppler measurement, with increased pulmonary vascular resistance. Indeed smaller pulmonary arterial size is expected. Our objective of this study was better to understand a natural history of CPAM with PA Doppler.

Method
We evaluated 11 CPAM cases retrospectively. From 2017 to 2019.
Age matched normal controls were also collected. Branch PA size, branch PA Doppler (AT/ET, PEDRF, PI) and lung mass size were measured. Number of cases by CPAM type was as follow; type 1=1, type 2=4, type 3=6.

Outcomes

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<tr>
<th>Outcome</th>
<th>Value</th>
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<tr>
<td>Gestational age at study (wk)</td>
<td>28.8 (21-37)</td>
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<tr>
<td>CVR (CPAM volume ratio) at late gestation</td>
<td>0.6223 (0.133-3.127)</td>
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<tr>
<td>Highest CVR</td>
<td>0.8428 (0.133-3.675)</td>
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Fig 1. Comparison of Branch PA size, PEDRF, PI and AT/ET ratio in ipsilateral PA vs contralateral PA

Fig 2. Comparison of AT/ET ratio in ipsilateral PA in CPAM vs in control

Fig 1.
a-c: There were no significant differences in PA z-score, PEDRF and PI.
d: AT/ET ratio in ipsilateral PA (0.18±0.02) was slightly higher compared to the ones in contralateral PA (0.16±0.02), although there was no significance (p=0.08).

Discussion
We expected that ipsilateral PA diameter in CPAM is larger and blood flow in ipsilateral PA would increase due to CPAM masses. According to our result, slightly increased AT/ET in ipsilateral PA was seen, which might support our expectation. However, severe CPAM cases with large masses were not included at this time, thus our data should be reassessed with severe cases and larger sample size.

Conclusion
Although CPAM is an occupied lesion in the lungs, the rest of lungs normally grow and sometimes compensate for the mass. Slightly increased AT/ET in ipsilateral PA might show the change of flow distribution in CPAM fetuses.

I have no potential COI to disclose.