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Relationship between Doppler parameters and postnatal outcomes in fetuses with congenital diaphragmatic hernia

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Objective

Congenital diaphragmatic hernia (CDH) is a challenging lesion complicated by lung hypoplasia (LH). The evaluation of LH is important for perinatal counseling and postnatal management strategies, however, the evaluation of LH is still under investigation. The purpose of this study was to determine more accurate ultrasound parameters to evaluate the prognosis of CDH fetuses.

Methods

We collected 31 prenatally diagnosed CDH fetuses in our institutes from 2012 to September 2017. Pulmonary arterial (PA) size, observed/expected lung area/head circumference ratio (o/e LHR) and PA Doppler parameters such as acceleration/ejection time ratio (AT/ET), peak early diastolic reverse flow (PEDRF) and pulsatility index (PI) were measured. PA size was converted to z-score. Perinatal outcome including the survival and duration of intubation was evaluated. Weight, deformity of the chest and the respiratory outcome at 1 year of age were observed as parameters for long-term outcome.

Results

PA z-score in contralateral PA was significant smaller in the lethal group compared to the survivor group ($p<0.05$). There was a decreased trend of AT/ET in the lethal group compared to survivors ($p=0.05$). However, there were no significant differences in PEDRF or PI. O/e LHR was significantly lower in the lethal group compared to the survivors ($p<0.01$). Interestingly, the duration of intubation was rather related to AT/ET ratio than o/e LHR or PA z-score. There was no correlation between the prenatal evaluation and weight at 1 year of age. 2 out of 20 had a mild chest deformity at 4 years of age.

Conclusion

The postnatal risk of death in CDH fetuses correlates to o/e LHR and contralateral PA z-score. The prognosis of LH morbidity might be rather related to AT/ET in PA. The lung area or volume and pulmonary vascular resistance could be evaluated from a different perspective.