STIC Combined with High-Definition Flow Imaging in the Diagnosis of Fetal Vascular Rings - an approach based on 3 cases from a tertiary center

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Introduction

The majority of congenital vascular rings can be diagnosed through 2D fetal echocardiography with color Doppler in the three-vessel-trachea and its adjacent views. The dilemma present in prenatal diagnosis of fetal vascular rings results from the limitation of the 2D examination to study vascular variations in the upper mediastinum (i.e., the brachiocephalic arteries). Few studies have used 3D reconstructed images to investigate the aortic arch branching in fetal vascular rings. Here, in addition to 2D ultrasound findings, we describe a case series of fetal vascular rings by using STIC technique with high-definition (HD) flow imaging. 3D images were reconstructed via the glass-body and HD live flow rendering modes.

Case Series

We demonstrated 3 types of fetal vascular rings by using STIC combined with HD flow imaging. Case 1: A left aortic arch with a left ductus arteriosus and an aberrant right subclavian artery (ARSA) was diagnosed at 21+1 weeks (Figure a). The left aortic arch gave rise to the right common carotid artery as the first branch, followed by the left common carotid artery, left subclavian artery, and ARSA in sequence. Case 2: A right aortic arch with a left ductus arteriosus and an aberrant left subclavian artery (ALSA) was diagnosed at 21+6 weeks (Figure b). The right aortic arch was spatially visualized to have four major branches from the anterior to posterior direction relative to the fetal heart: left common carotid artery, right common carotid artery, right subclavian artery, and ALSA. Case 3: A double aortic arch at was diagnosed 24+5 weeks (Figure c). The branching vessels from each aortic arch from the anterior to posterior direction relative to the heart, namely the common carotid artery and subclavian artery, could be well-visualized.

Conclusion

In summary, the application of STIC combined with HD flow imaging enables enhanced visualization of aortic arch branching in fetal vascular rings. This information is critical to direct perinatal counseling and management through more comprehensible 3D images.

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