

Aortic isthmus shunt dynamics in normal and complicated monochorionic pregnancies

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Objectives

To measure aortic isthmus (Aoi) shunt dynamics in monochorionic (MC) gestations, in relation to vascular parameters of cardiac preload and afterload.

Methods

Normal and complicated MC pregnancies were prospectively enrolled. The relationship of the isthmus flow index (IFI) with Doppler parameters of umbilical artery (UA), descending aorta (DAo), middle cerebral artery (MCA), and ductus venosus (DV), and with left- and right-ventricular (LV, RV) cardiac output (CO) and stroke volume (SV) was studied using correlation and regression analyses.



Figure 1 Aoi flow

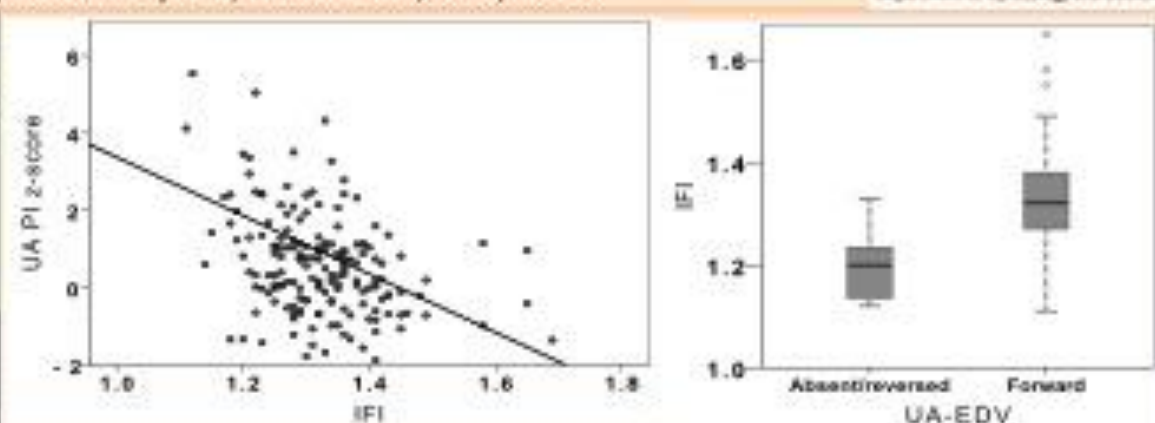


Figure 2 Relation between umbilical artery (UA) waveform characteristics and isthmus flow index (IFI)

Results

The IFI was obtained in 180 exams from 48 pregnancies (24 TTTS, 4 sIUGR, 12 TTTS with sIUGR, 8 normal, median gestational age: 21 weeks). Aoi diastolic flow was reversed in three cases. UA- and DV-PI z-scores were negatively correlated with the IFI (r_s -0.40 and -0.26, respectively, $p < 0.001$). Regression analysis identified only UA-PI as a determinant of the IFI ($p < 0.001$). The IFI was significantly correlated with LV-SV and LV-CO. It did not differ between TTTS donors and recipients. sIUGR fetuses had significantly lower IFI compared to normal-grown counterparts ($p < 0.001$).

Conclusion

In MC gestations, Aoi shunting is predominantly determined by placental flow resistance, while cerebral impedance and volume status have no impact. The relationship between Aoi flow and outcome in MC pregnancies deserves further study in the setting of sIUGR.