Venous wave protraction time is shorter in pre-eclampsia than in normal third trimester pregnancy

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Background

Venous pulse waves, as obtained by Duplex Ultrasonography, are a reflection of cardiac right atrial function. The time-interval between cardiac electrocardiographic signals (ECG) and venous Doppler waves is the so-called Venous Wave Protraction Time (VWPT).

Aim

To compare hepatic vein VWPT between normal third trimester pregnancy (NP) and pre-eclampsia (PE).

Methods

Cross-sectional study in 2 groups of 10 women with NP or PE at gestation of 28-33 weeks. Three consecutive venous Doppler waves were recorded at the cranio-caudal midportion of the liver from each of the three main branches of the hepatic vein, simultaneously with an ECG. The time-interval between the ECG P-wave and corresponding A-deflection of venous Doppler waves was measured, without or with correction for gestation-induced changing heart rate (PA and PA/RR respectively), illustrated in figures 1 and 2. For each group, means and standard deviations (table 1) were calculated and compared statistically using conventional F-tests for linear mixed-effects models (SAS procedure MIXED).

Results

VWPT was significantly shorter in PE than in NP (figures 3 and 4). This difference persisted under antihypertensive treatment (table 1).

Conclusion

VWPT is significantly shorter in pre-eclampsia than in normal third trimester pregnancy. This observation probably results from PE-related maternal cardiovascular maladaptation.

Our study illustrates that VWPT may be a potential new parameter to study venous hemodynamics during pathological pregnancies, in particular pre-eclampsia.