Objective: The aim of our study was to confirm the hypothesis that placental hypoperfusion in women who secondary develop placental vascular diseases (PVD) occurs as soon as the first trimester.

Materials and Methods: Acquisition of utero-placental volume was performed prospectively in 67 low risk patients, between 11 and 14 weeks, using an abdominal probe and 3D power Doppler (3D PD) angiography with standardised parameters. Thanks to VOCAL software, we quantified separately, placental and myometrial vascularization. Values obtained from patients with PVD were compared with those with favourable outcome.

Results: PVD occurred in 6 cases (1 preeclampsia, 1 gestational hypertension associated to IUGR and 4 isolated IUGR). All 3D PD indices (VI, FI and VFI) in placenta significantly decreased in patients who developed PVD (p<0.01) {mean VI: 1,73 vs 6,9; VFI: 0,59 vs 2,81 and FI 33,41 vs 41,49} whereas in myometrium, only VI and VFI were reduced (p<0.05) {mean VI: 12,97 vs 20,97; VFI: 5,6 vs 10,27}. In contrast, placental volumes were not different.

Conclusion: In PVD, utero-placental vascularization is impaired very soon in pregnancy. This technique could be a way to detect patients at high risk of PVD in general population and to select patients needed preventive treatment and increased medical monitoring.