Introduction Polycystic ovary syndrome (PCOS) women have higher incidence of intrauterine growth restriction (IUGR). In a PCOS-like phenotype sheep model programed by prenatal testosterone (T) administration, IUGR offspring are found at term (D140) and an early placental gross morphology shift is observed at midgestation (D90). The objective of this study was to evaluate uteroplacental blood flow and placental morphology in PCOS pregnancy at midgestation, using this sheep model.

Methods From D30 to D90, 12 pregnant ewes received twice a week 100 mg intramuscular injection of T (T group), 12 controls received vehicle (C group). At D90, 3D power Doppler acquisitions of placentomes were performed and Doppler indices were calculated. Afterwards, type A placentomes were collected for stereological analysis, which included calculation of volume density (VD) and surface density (SD) of trophoblast, fetal and maternal vessel, maternal stromal, fetal mesenchyme and haematophagous area. Mixed models were used to compare parameters between group C and T.

Results At D90, fetal weight and placentome efficiency was not influenced by T, however the fetal weight was lighter in twins and triplets (p<0.05, p=0.062, respectively). Placentome volume and Doppler indices were not significantly different between group C and T (n= 172 and 139, respectively). Placental stereological parameters were similar in two treatment groups, nevertheless, SD of trophoblast and maternal stromal were significantly smaller in twins compare with singletons (p<0.01, p<0.05, respectively).

Conclusion Uteroplacental blood flow and vascularity morphometry were not affected by T at D90, indicating either a too early examination time or a compensation mechanism through an increase of nutrient transfers. Nutrient transporters analysis should allow us to better understand origin of IUGR in PCOS pregnancy.