Reference range of the gestational uterine artery resistance index in toy canine breeds

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The objectives of this study were to describe and to determine reference values of resistance index (RI) of the uterine artery during normal pregnancy in toy dogs. For these purposes, fifty-two, 1–6 years old, 1.5–6.5 kg, purebred healthy pregnant bitches were included in this study. The dogs were evaluated by Doppler ultrasound every 10 days from day 30 of the estrous cycle to parturition. Uterine body was observed with two-dimensional ultrasound in a transversal axis. Color Doppler was used to localize uterine arteries at both sides of the uterine body and pulsed-wave Doppler was performed to obtain the waveforms\cite{1}. Peak systolic velocity (PSV; m/s) and end diastolic velocity (EDV; m/s) were measured while RI \[(PSV−EDV)/PSV\] was automatically calculated\cite{2}. Peak systolic velocity, EDV and RI of the left and right uterine arteries were compared using Student’s t-tests. Values of PSV, EDV and RI were analyzed by repeated measures ANOVA followed by Tukey test. Also, a covariance analysis was carried out to assess the influence of age, litter size and parity on RI. RI reference ranges were constructed by regressing this index on gestational age (GA). Polynomial regression model was fitted to mean. The information about standard deviation of the measurement is contained in the residuals around the fitted curve. Equation of the polynomial regression curves were used to calculate the mean, 2.5\textsuperscript{th} and 97.5\textsuperscript{th} centiles for each gestational age (SPSS 19.0, SPSS Inc. Chicago, IL, USA)\cite{3}. All the females whelped normally 2 to 6 healthy puppies. No differences were found between right and left uterine arteries (P>0.1), therefore values of PSV, EDV and RI were averaged. A gradual increase of PSV (P<0.01) and EDV (P<0.01) and a decrease in RI (P<0.01) were found throughout the study period in all the cases. Age, litter size and parity did not influence RI (P>0.1). A second-degree polynomial, described the relationship between RI of uterine artery and GA in the different time points \[RI= 0.993 + 8.4\times 10^{-5} \times GA^2 - 0.0117 \times GA\]. On day 30, RI values were 0.60, 0.72 and 0.84 for the 2.5\textsuperscript{th}, 50\textsuperscript{th} and 97.5\textsuperscript{th} centiles, respectively. On day 40, these values were 0.53, 0.66 and 0.79 for the same centiles. On day 50, RI were 0.48, 0.62 and 0.76 and on day 60, they were 0.49, 0.59 and 0.69 for the same centiles, respectively. It is concluded that uterine artery blood flow progressively increased throughout normal pregnancy in toy canine breeds. In addition, RI reference range of uterine artery was determined in these dogs at different time points during gestation.