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Color Doppler ultrasonography for early pregnancy diagnosis in goats

I.O. Cosentino^{*1}, M.F.A. Balaro¹, F.S.C. Leal², A.L.C. Bade¹, L.R. Côrtes¹, E.K.N Arashiro¹, J.F. Fonseca³, F.Z. Brandão¹

¹Universidade Federal Fluminense, Niterói, Rio de Janeiro, Brazil; ²Dairy goat farm Capril Vale das Amalthéias, Sapucaia, Rio de Janeiro, Brazil; ³Embrapa Caprinos e Ovinos, Coronel Pacheco, Minas Gerais, Brazil.

Subjective luteal blood flow analysis by color Doppler ultrasonography (US) was previously demonstrated in cows and sheep as an early and accurate method for pregnancy diagnosis. This study aimed to establish the best day for such diagnosis in dairy goats. 131 Saanen does 2.0±0.5 years old were used. In the first study, after a hormonal protocol for induction of synchronous estrus and AI, 60 goats were evaluated from Day 15 to Day 23 of the estrous cycle (Day 1 or D1 = ovulation day), by a subjective Color Doppler US assessment (score 1-4, where score 1 means no pregnancy and, score 2-4 means positive pregnancy) using portable equipment (Sonoscape S6, Shenzhen, China) with a 7.5 MHz linear rectal transducer. In the second study, 71 does received the same protocol and had the ultrasound exam performed at Day 21 (the best day detected in the first study) for luteal blood flow assessment. In both studies, B-Mode US at Day 30 confirmed pregnancy diagnosis (gold standard). The performance of the subjective luteal blood flow analysis and its agreement with the gold standard outcome in both studies was classified calculating Sensitivity (SEN), Specificity (SPEC), Positive Predictive Value (PPV), Negative Predictive Value (NPV), and Kappa index (K). In study 1, pregnancy diagnosis by subjective luteal assessment by Color Doppler US was not feasible at D15 and D16 (SEN 100%; SPEC 0%; PPV 49%; NPV not calculable, and K = 0) as all CL were considered viable (vascularization score was = 2) and consequently all animals were diagnosed as pregnant. From D17 to D21, the overall performance of the technique progressively increased (D17: SEN 96%; SPEC 4%; PPV 49%; NPV 50%, and K = 0.01; D18: SEN 100%; SPEC 12%; PPV 52%; NPV 100%, and K = 0.11; D19: SEN 100%; SPEC 42%; PPV 62%; NPV 100%, and K = 0.42; D20: SEN 100%; SPEC 73%; PPV 78%; NPV 100%, and K = 0.73). Results did not change from D21 to D23 (SEN 100%; SPEC 92%; PPV 93%; NPV 100%, and K = 0.92). Two animals diagnosed as non-pregnant on Day 30 had a well vascularized CL until Day 23. On D17, a doe diagnosed as pregnant on Day 30 had the CL scored as 1, even though it was evaluated as score = 2 on the following days. In study 2, the assessment presented a similar pattern of sensibility and specificity observed in study 1 (SEN 100%; SPEC 93%; PPV 91%; NPV 100%, and K = 0.92). The results showed that subjective luteal vascularization assessment by color Doppler US was a reliable tool for early pregnancy diagnosis in goats and can be efficiently used as early as 21 days post-breeding. Universidade Federal Fluminense, Infra-LabPesq/PROPPI, FAPERJ and the dairy goat farm Capril Vale das Amalthéias.