

CONTRAST-ENHANCED ULTRASOUND OF NORMAL CANINE MAMMARY GLANDS DURING THE ESTRUS CYCLE

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Introduction/Purpose:

Abnormalities of the canine mammary gland are very common and include neoplasia, cysts, inflammation and infection. Different contrast enhancement and flow patterns were observed between benign and malignant lesions with contrast-enhanced ultrasound (CEUS). However, no literature is available about the normal CEUS pattern of canine mammary glands. Therefore, the purpose was to determine if CEUS could characterize variations in mammary gland vascularization during the estrus cycle and to select parameters that were stable despite cyclic changes.

Methods:

The study included 6 intact female research beagles (mean age of 1.5 y). The dogs were not used for breeding. CEUS of the first, third and fifth mammary glands were performed (2 operators for scanning, 1 operator for CEUS analysis) at 5 time points during their reproductive cycle (proestrus, estrus, metestrus (early and late) and anestrus). All dogs were sedated (butorphanol (0.4mg/kg)). Parameters derived from the time-intensity curves (peak enhancement, wash-in area under the curve, rise time, mean transit time, time to peak, wash-in rate, wash-out area under the curve, total area under the curve) were compared between the different stadia of the estrus cycle using a mixed model with dog as random effect and stadia of the estrus cycle as fixed effects. Stadia were compared pairwise by a t-test adjusting the global 5% significance level by Tukey's multiple comparisons technique (SAS Version 9.3).

Results:

It was difficult to obtain good quality images for quantitative analysis of the first mammary glands due to its small size (< 1 mm). For the third mammary glands, significant differences were found for the wash-in area, wash-out area and total area under the curve with a significant increase between estrus and late metestrus and a significant decrease between late metestrus and anestrus. Similarly, the mean transit time was significantly increased between the estrus and metestrus and decreased between the early metestrus and anestrus. For the fifth mammary gland, only the time to peak was significantly longer during the anestrus compared to the estrus whereas all the other contrast parameters did not change during the cycle.

Discussion/Conclusions:

Differences were observed in contrast parameters during the estrus cycle in dogs and should be taken into account when performing CEUS in dogs suspected of mammary gland disorders.