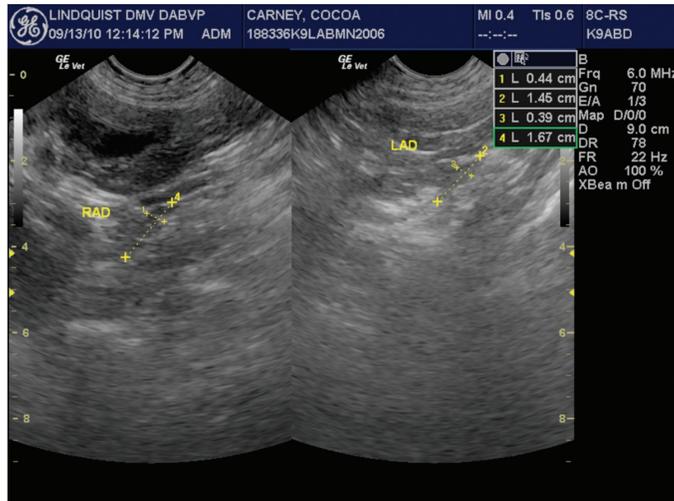


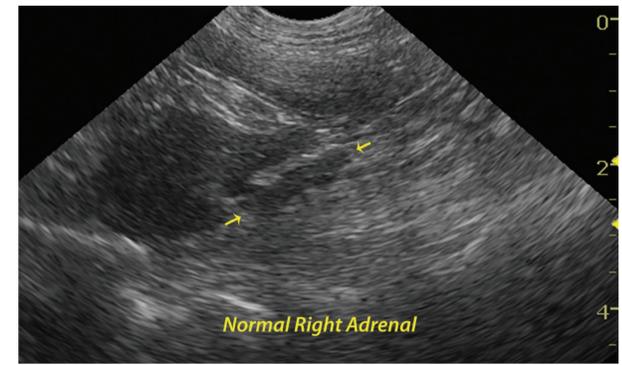
Sonographic Parameters of Adrenal Glands in 19 Addisonian Dogs

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NORMAL ADRENALS



Canine hypoadrenocorticism is typified by variable non-specific clinical signs. Therefore, dogs with undiagnosed hypoadrenocorticism may present for abdominal sonography as part of the medical work-up. The purpose of this study was to identify a reliable set of ultrasonographic parameters for adrenal gland size and appearance that may be used to increase the index of suspicion of typical or atypical hypoadrenocorticism.

Abdominal ultrasound was performed on three groups of dogs. Adrenal gland measurements and morphology were retrospectively reviewed. Group 1 consisted of dogs confirmed with typical or atypical hypoadrenocorticism by ACTH stimulation (n = 19). Group 2 included dogs initially suspected to have hypoadrenocorticism based on clinical signs and/or ultrasonographic appearance of adrenal glands, but ultimately had a normal ACTH stimulation test (n = 11). Group 3 consisted of control dogs with no clinical signs or biochemical evidence of hypo- or hyperadrenocorticism (n = 22).

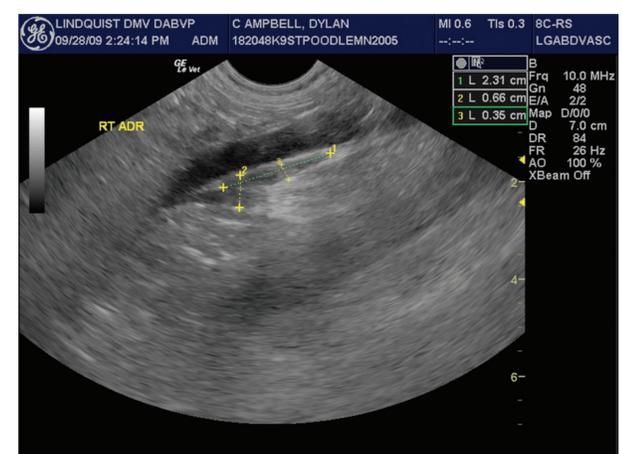
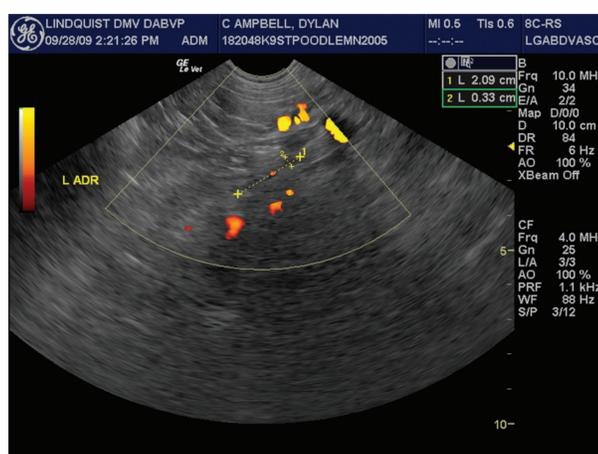
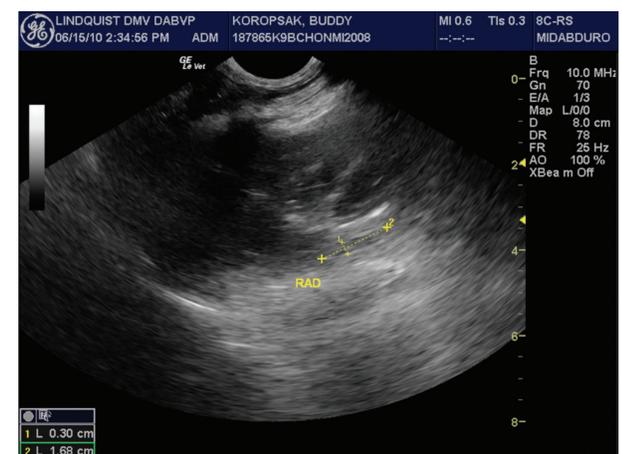
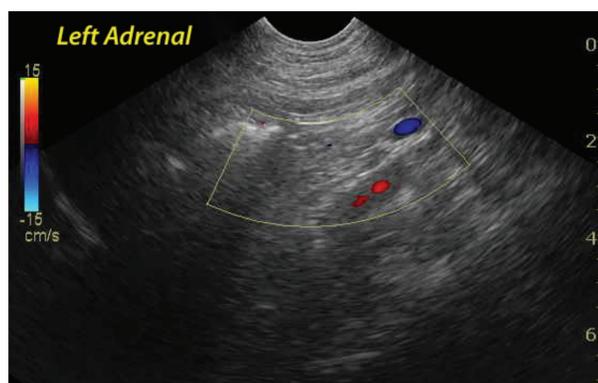
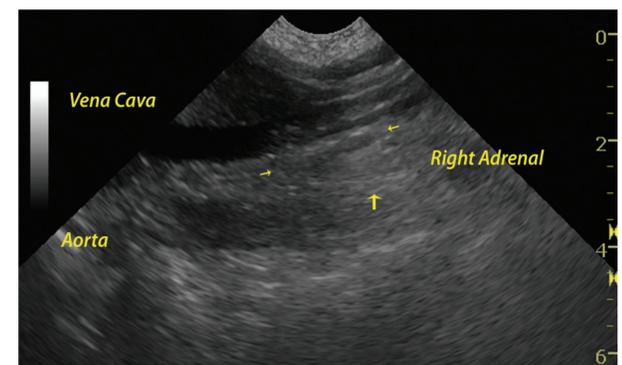
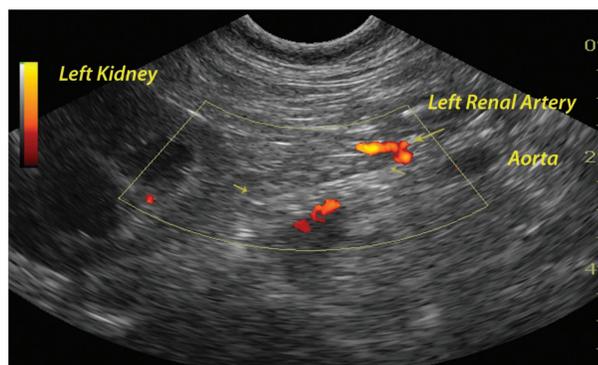
The mean values/ standard deviation for adrenal gland measurements were: R adrenal (Radr) length: group 1: 1.76 ± 0.58 cm, group 2: 1.87 ± 0.7 cm, group 3: 2.05 ± 0.53 cm; Radr width: group 1: 0.34 ± 0.08 cm, group 2: 0.39 ± 0.13 cm, group 3: 0.63 ± 0.11 cm; left adrenal (Ladr) length: group 1: 1.84 ± 0.74 cm, group 2: 2.14 ± 0.56 cm, group 3: 0.7 ± 0.47 cm; Ladr width: group 1: 0.32 ± 0.11 cm, group 2: 0.41 ± 0.09 cm, group 3: 0.58 ± 0.11 cm.

An ANOVA demonstrated a significant effect of group on the 4 different measures (F = 7.79, p < 0.001). Subsequent t tests were performed to evaluate differences between the groups. Statistically significant differences were noted when comparing the Radr width between groups 1 and 3 (p < 0.001) and between groups 2 and 3 (p < 0.001) as well as significant differences in Ladr width between groups 1 and 3 (p < 0.001) and groups 2 and 3 (p < 0.001). There was no significance when comparing the lengths of the adrenal glands between groups. There were no differences in the measurements between groups 1 and 2 (p > 0.2) except for Ladr width (p < 0.05). The sonographer also noticed a reliable morphologic pattern of flattened capsular contour and isoechoic parenchyma in groups 1 and 2.

Sonographic identification of small, flattened, isoechoic adrenals is not diagnostic for hypoadrenocorticism and can be seen in other sick dogs; however, these findings should alert the clinician to its possibility thus prompting additional function testing.

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ADDISONIAN ADRENALS



Left:

The left adrenal gland may be found readily by using the aorta and left renal artery as landmarks. Normally the left adrenal gland is plump and formed like a peanut with distinct hypoechoic parenchyma compared to surrounding fat. The cortex and medulla may be readily distinguished. In the case of Addisonian left adrenal glands, power Doppler (orange) or color flow Doppler may be utilized to enhance the left renal artery and aorta. The gland itself is isoechoic to surrounding fat and flattened in contour.

Right:

As in the left, the normal right adrenal gland should have distinct hypoechoic parenchyma compared to surrounding fat and a prominent contour with an "arrowhead" or "thumb & forefinger" shape pointing caudally on the patient with a prominent cranial pole and smaller caudal pole. The vena cava (above the gland on screen) and aorta (below the gland on screen) can be used as landmarks. In the course of Addison's disease the right adrenal develops a flattened contour, is more difficult to locate, and is more isoechoic to surrounding fat.