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Evaluation of the correlation between renal dimensions and volume in ultrasonography and real measurement in dogs

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Abstract

The main objective of this study was to compare the accuracy of renal volume measured with ultrasonography to real volume in ten native dogs that were candidates for euthanasia due to severe injuries sustained in traffic accidents. Furthermore, correlations of renal dimensions in ultrasonography, such as length, width, and height, were determined with real ones. Initially, the dimensions of the right and left kidneys were determined using ultrasonography. Renal volume was measured using two different methods. The first method consisted of choosing automatic volume measurement in an ultrasonography unit. The volume formula of a prolonged ellipsoid (length × width × height × 0.523) was used in the second method. The real renal dimensions (golden standard) were measured during celiotomy and after necropsy, and the true volume of kidneys was calculated using water displacement. Linear regression analysis was used to determine correlations between renal dimensions and volume in ultrasonography with real ones. Results showed that renal dimensions and volume measured in ultrasonography were lower than actual measurements. There were positive and statistically significant correlations between renal volume in ultrasonography and actual renal volume. However, the correlation coefficient (r) of volume determined by the formula was greater than that of the automatic volume method, and its mean was closer to that of the real volume mean. There were also positive and significant correlations between renal dimensions measured with ultrasonography and those measured in real measurement. No significant difference was found between renal dimensions measured during celiotomy and after necropsy. These findings indicate that ultrasonographic measurements underestimated renal dimensions and volume, and the formula method provided more accurate results than the automatic volume method.

Keywords: Ultrasonography, Renal Dimension, Renal volume, Dog

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