The Relevance of Ultrasound Examination in the Diagnosis of Urinary Tract Diseases in Dogs

Mircea MIRCEAN, Iuliu SCURTU, Daniela NEAGU, Liviu OANA, Cosmin MUREŞAN, Gavril GIURGIU

University of Agricultural Science and Veterinary Medicine Cluj-Napoca
Manastur street 3-5, Faculty of Veterinary Medicine, cscurtu@yahoo.com

Abstract. The goal of this study is to review the main urinary tract diseases, in which the ultrasound exam provides the most useful informations for an early and accurate diagnosis. The main urinary tract diseases diagnosed by this method were: acute and chronic bladder inflammations, bladder neoplasia, lithiasis of bladder and urethra, nephrocalcinosis, nephrolithiasis, hydronephrosis, polycystic kidney disease, renal neoplasia, chronic nephritis.

Keywords: ultrasonography, dog, kidney, bladder, urinary diseases

Introduction. In dogs, the profile of upper and lower urinary tract diseases is so heterogeneous that raises serious problems of differential diagnosis. The clinical exam alone can’t provide an acceptable amount of useful information to establish the type of lesions and their location. This lack of reliable and valid information can be compensated by paraclinical exams. Ultrasonographic evaluation of the kidneys is the best method used for the assessment of their morphology, because of its noninvasive character and its accuracy.

Objectives. The aim of this study is to review the main urinary tract diseases, in which the ultrasound exam provides the most useful informations for an early and accurate diagnosis.

Materials and methods. We scanned 80 dogs that presented clinical symptoms of upper and lower urinary tract diseases. For this purpose, we used Logiq α-100 ultrasound machine with a 5.5 MHz convex probe.

Results and discussion. The main urinary tract diseases diagnosed by this method were: acute and chronic bladder inflammations, bladder neoplasia, lithiasis of bladder and urethra, nephrocalcinosis, nephrolithiasis, hydronephrosis, polycystic kidney disease, renal neoplasia, chronic nephritis. The acute cystitis was characterized by mucosal thickening with a hypoechoic aspect and a mild blurring in the normal pattern of wall bladder. The chronic cystitis was characterized by the thickened and a hyperechoic aspect of mucosa. In some cases we also found very clearly defined polyps of the mucosa, having the same echogenic intensity.

The bladder tumors have appeared as a single pedunculated mass or as an unique or multiple sessile masses with an heterogeneous echotexture and irregular edges. Bladder and urethral calculi have been identified as hyperechoic structures with clean acoustic shadowing. Often, the bladder sediment has been observed as floating corpuscles without acoustic shadowing, with a “swirl” appearance after few shaking movements. Both sediment and calculi were secondary, associated with chronic cystitis lesions.

Acute tubular necrosis has been associated with ethylene glycol poisoning and the most important ultrasound sign was a hyperechoic rim at the corticomedullary junction.

Renal calculi have been presented as hyperechoic masses with clean acoustic shadowing. Unilateral hydronephrosis was diagnosed incidentally and no clinical signs were observed. The ultrasonographic findings have consisted in pyelectasia with an obvious dilatation of the proximal ureter. Polycystic kidney disease was characterized by multiple anechoic structures with distal...
enhancement. These structures have distorted the renal contour and the normal internal architecture, in particularly the kidney’s collecting system was severely affected.

The most frequent renal tumors that were identified in our study were lymphoma and haemangiosarcoma. The ultrasonographic aspect in lymphoma has consisted in uniformly hypoechoic nodules with blurred peripheral edges and without distal enhancement.

Haemangiosarcoma has been characterized by a profound alteration of the normal echogenicity and echotexture affecting all corticomedullary compartments. In both types of neoplastic lesions the final diagnosis was made by post-mortem examination using the histopathology. Chronic nephritis has been characterized by reduction of the kidneys size, irregular contour and an increased echogenicity of the renal cortex with a poor corticomedullary differentiation.

**Conclusions.**

In this study, the ultrasound scanning of kidneys allowed to distinguish between inflammatory, degenerative and neoplastic alterations of the normal renal parenchyma. For accuracy, the neoplastic lesions have required a supplementary assessment by histological examination.

At the bladder level, the ultrasound scanning has identified acute and chronic inflammatory lesions and also tumor mass.

Both levels of the urinary tract were characterized by the presence of calculi and sediments associated or not with secondary lesions of affected segments.

**REFERENCES**