ULTRASOUND DIAGNOSIS

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History

An eight-year-old, spayed, female, Dachshund dog was presented at Chulalongkorn University, Small Animal, Veterinary Teaching Hospital showing inappetance, vomiting and depression over a period of ten days. The dog had chronic urinary incontinence and hematuria for the past year. Physical examination revealed pale mucous membranes. Abnormal clinical parameters included elevated serum ALT (206 units), blood urea nitrogen (68.6 mg%), creatinine (9.9 mg%), leukocytosis (2.78 x 10^4 white blood cells/µl, 58% neutrophils, 23% band cells, 1% eosinophils, 1% lymphocytes, 17% monocytes) and anemia (3.14 x 10^6 red blood cells/µl, 6.5 g/dl hemoglobin, 21% hematocrit). The blood morphology showed anisocytosis, poikiocytosis and target cells. Plain radiographs of the caudal abdomen and pelvis revealed aggressive periosteal bone proliferation of the left hemiplegia. The urinary bladder was moderately distended.

Ultrasonographic Findings

Ultrasonographic examination of the abdomen was performed using a real time scanner with an 8-5 MHz broadband, convex, phased array transducer. Sagittal and transverse scans of both kidneys showed moderate dilation of the anechoic renal pelvis (3 cm width) and the anechoic ureters (1.3 cm and 0.6 cm width of proximal and distal ureters, respectively) (Figures 1A, 2A, 1B and 2B). The left and right kidneys were 4.6 by 6.4 and 4.5 by 6.0 cm in diameter. The peripheral renal cortex was isoechoic to the liver and hypoechoic to the spleen. A sonograph through the urinary bladder showed wall thickening (1.5 cm) in the caudal portion with an echogenic pedunculated mass obliterating the area of the trigone (Figures 1C and 2C). The urinary bladder contained a small amount of anechoic urine with some echogenic sediments.

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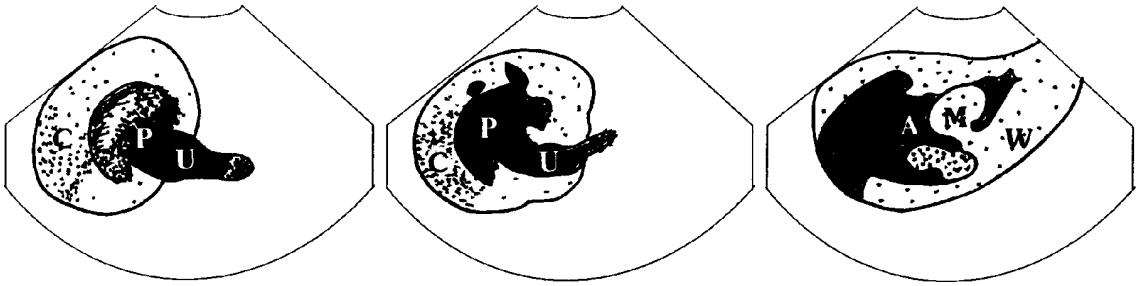
A B C

Figure 1 Sagittal ultrasonographs of the left kidney (A), right kidney (B) and urinary bladder (C) in an eight-year-old, female, Dachshund dog, in dorsal recumbency. Moderate dilation of the anechoic renal pelvis and the anechoic ureter were present. There was obvious thickening in the caudal portion of the urinary bladder wall with an echogenic pedunculated mass obliterating the area of the trigone.



A B C

Figure 2 Schematics of the relative positions of the structures scanned in Figure 1. P -anechoic renal pelvis; U -anechoic ureter; C -renal cortex; W -echogenic urinary bladder wall; M -echogenic pedunculated mass; A -anechoic urine.

Diagnosis

Ultrasonographic diagnosis —— Ureteral obstruction with secondary bilateral hydronephrosis and hydroureter.

Comments

The major advantage of renal ultrasonography is that it is noninvasive, independent of renal function and significantly increases the ability to differentiate hydronephrosis or renal cysts from solid masses (Konde et al., 1986). Dilation of the renal pelvis is ultrasonographically characterized by separation of the normal, uniformly hyperechoic, central renal sinus echoes causing an anechoic space. A variable amount of renal cortex and diverticula that are visible about periphery of the kidney are dependant on the degree of hydronephrosis, which will vary with the completeness and duration of obstruction. In cases of severe hydronephrosis, the entire kidney will be seen as a large, ovoid, thin-walled anechoic mass. In a milder case, the dilated anechoic pelvis will be seen surrounding the hypoechoic renal crest (Nyland et al., 1995). However, excretory urography should always be compared with the ultrasound findings for evaluating subtle pelvic and ureteral dilation. Whenever hydronephrosis is ultrasonographically diagnosed, a scan for an accompanying dilated ureter should be made in the area of the kidney and urinary bladder. In this dog, a bilateral hydroureter and subsequent hydronephrosis appeared to have been induced by the mass within the visceral trigone.

References

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