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## Ultrasound Diagnosis

Phiwipha Kamonrat

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# ULTRASOUND DIAGNOSIS

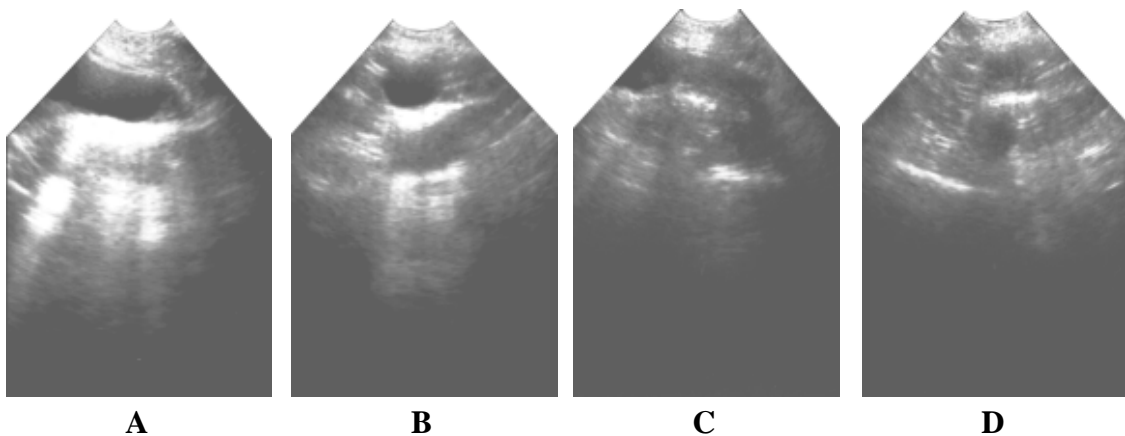
Phiwipha Kamonrat

## History

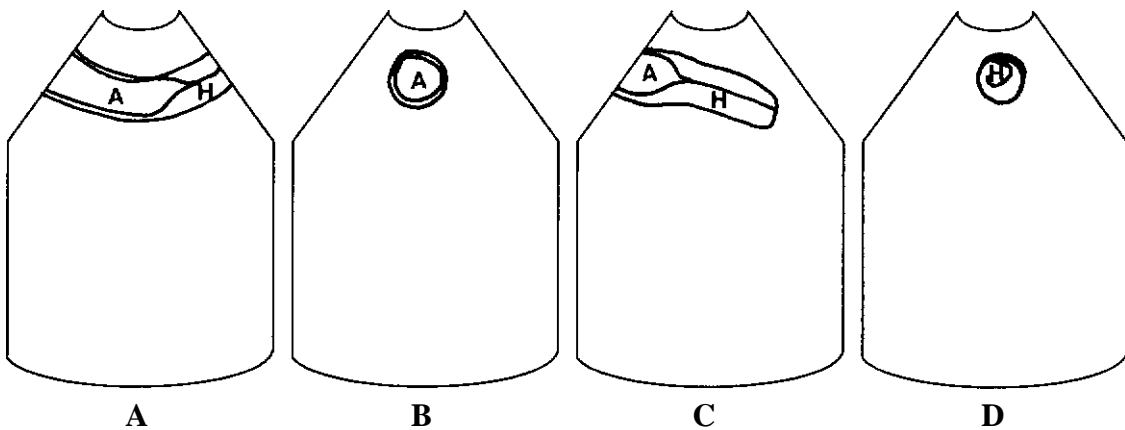
A fourteen-year-old, spayed female, mixed breed dog was presented at the Chulalongkorn University, Small Animal, Veterinary Teaching Hospital following chronic hematuria. The dog also had clinical signs of tenesmus and anorexia. Recently, urine incontinence developed, with a small amount of bloody urine dripping out all the time. A physical examination revealed pale mucous membranes and a caudal soft tissue mass with urinary bladder distention. Haematological examination revealed a leukopenia ( $3,870 \times 10^3$  white blood cells/ (l, 77% neutrophils, 2% band cells, 6% eosinophils, 1% monocytes and 14% lymphocytes). Biochemical examination showed an elevation of serum alkaline phosphatase (438 units), urea nitrogen (51 mg%) and creatinine concentration (3.4 mg/dl). Survey radiography demonstrated marked urine retention with no evidence of any radiopaque calculi. An abdominal ultrasonography was performed to obtain a more specific information.

## Ultrasonographic Findings

Trans-abdominal ultrasonography was performed, using a real-time scanner with an 8-5 MHz broadband, convex, phased array transducer. Both kidneys were hyperechoic to hepatic parenchyma. The kidney size was within the normal range, with a slightly dilated pelvis (approximately 5.5 mm in diameter). The urinary bladder contained a large amount of anechoic urine, with marked sediments. Hyperechoic materials with acoustic shadowing, 2-6 mm in diameter, which represented calculi, were also found within the urinary bladder. With sagittal and transverse scans, the diameter of the proximal and mid portions of the urethra was 1.6 and 1.3 cm, with a wall thickness of 2 and 4-5 mm, respectively (Figs. 1, 2). The thickened wall of the mid urethra was hypoechoic and had a diffuse, irregular, mucosal surface. Abnormalities of other abdominal organs, including the iliac lymph nodes, was not observed.



**Figure 1** Urethral ultrasonograms of a 14-year-old, spayed female, mixed breed dog in dorsal recumbency. Sagittal (A) and transverse (B) scans of the proximal portions of the urethra showing an anechoic dilation, 1.6 cm in diameter, with a smooth wall of normal, 2 mm thickness. The stenotic area of the mid urethra was characterized as a diffuse, hypoechoic, thickened wall of 4-5 mm, with an irregular mucosal surface, as shown by both sagittal (C) and transverse (D) scans.



**Figure 2** Schematics of the relative positions of the structures scanned in Fig. 1. A -anechoic, dilated urethral lumen; H-irregular, hypoechoic, thickened, mucosal surface.

## Diagnosis

Ultrasonographic diagnosis — Urethral stenosis.

## Comments

Transcutaneous urethral ultrasonography is of limited value in the dog and cat (Nyland et al., 2002). It is more useful when evaluating the proximal urethra. Urethral stenosis can cause urinary bladder distention and an anechoic dilation of the prestenotic portion of the urethra. The stenosis may be caused by inflammation or tumors. Urethral tumors are most found in older female dogs. They may be ultrasonographically characterized as diffuse thickening of the urethral wall or masses surrounding the urethra and extending into the urethral lumen (Hanson and Tidwell, 1996). When neoplasia is suspected, the iliac lymph nodes and adjacent structures should be ultrasonographically examined for possible metastasis.

Although retrograde positive-contrast urethrography is the best method for evaluating the location and the extent of urethral tumors, this may not be performed if the urethra is obstructed, as in this dog. A definitive diagnosis of a urethral tumor or inflammation requires a cytological or histological examination of tissue samples from the stenotic area.

## References

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- Nyland T.G., Mattoon J.S., Herrgesell E.J. and Wisner E.R. 2002. Urinary tract. In: *Small Animal Diagnostic Ultrasound*. 2<sup>nd</sup>ed. T.G. Nyland and J.S. Mattoon (eds.) Philadelphia: W.B. Saunders Company. 158-195.