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## HEMATURIA: DIAGNOSIS AND THERAPY

Hematuria is increased numbers of red blood cells (i.e. generally > 20/hpf) in urine; it may be microscopic (occult) or macroscopic (gross). However, when hematuria is the presenting problem, owners have observed their dog or cat voiding red urine. The urinalysis is an important test for determining the cause of red urine.

Table 1. Urinalysis Findings to determine the source of hematuria (red urine)

Source of red urine	Urinalysis Findings			Common causes
	Color	Occult Blood	Red blood Cells*	
Non-Heme Pigments	Pink to Red	Negative	<20 RBC/hpf	Eating beets, red dragon fruit, others
Hemoglobinuria and Myoglobinuria	Red to Brown	Positive	<20 RBC/hpf	Intravascular hemolysis
Hemorrhage	Pink to Red	Positive	>20 RBC/hpf	Coagulopathy, urogenital neoplasia, urolithiasis, UTI

Increased numbers of iatrogenic red blood cells can occur if sampling technique is traumatic (e.g. collection via cystocentesis or catheterization). If verification of hematuria without potential trauma is needed, consider analysis of a voided urine sample.

#In most cases, the number of RBC/hpf is much higher, usually to numerous to count.

### Timing of Hematuria

The timing of macroscopic hematuria during urination may help to localize the cause. Initial hematuria (i.e. presence of blood during the first fraction of voided urine) tends to occur with diseases of the urethra or genital tract, whereas hematuria at the end of urination (ie, terminal hematuria) suggests a focal lesion in the ventral or ventrolateral aspect of the urinary bladder (eg, uroliths, polyps). With this type of hematuria, red blood cells remain in the dependent area of the urinary bladder and are voided last. In

addition to urinary bladder disorders, terminal hematuria may be observed in patients with intermittent renal hematuria. Hematuria that occurs throughout urination (ie, total hematuria) may be associated with coagulopathies or disorders of the kidneys, ureters, or urinary bladder (especially diffuse lesions). It also is possible for total hematuria to occur secondary to severe disorders of the urethra or prostate gland that cause reflux of blood into the urinary bladder. Lastly, hemorrhagic urethral discharge may occur independent of urination and be confused with hematuria in some dogs that have urogenital disease (eg, distal urethral disease, prostatic disease, vaginal disorders)

### Treatment of hematuria

Treatment of hematuria is often based on the correcting the underlying cause and replacing blood components if cases of excessive loss resulting in symptomatic anemia. Once the diagnosis is made, in most cases therapy is obvious (correction of hemolysis, antibacterials to eradicate infection, urolith removal to remove urothelial trauma). However, some diseases cannot be resolved (for example transitional cell carcinoma) and in other cases the underlying cause remains hidden (e.g. idiopathic renal hematuria). In the past, unilateral renal hematuria was managed by unilateral nephrectomy. However, in many cases the remaining kidney became afflicted with the same syndrome and hematuria recurred. To spare kidney removal endoscopic sclerotherapy have provided temporary and sometimes long lasting correction of renal bleeding.1-2 When renal bleeding has resulted in symptomatic blood clots in the bladder they can be removed surgically or dissolved with thrombolytics.3

### References

1. Berent AC, Weisse CW, Branter E. et. al. Endoscopic-guided sclerotherapy for renal-sparing treatment of idiopathic renal hematuria in dogs: 6 cases (2010–2012). J Am Vet Med Assoc 2013;242:1556–1563
2. Adelman LB, Bartges J, Whittemore JC. Povidone iodine sclerotherapy for treatment of idiopathic renal hematuria in two dogs. J Am Vet Med Assoc. 2017;250:205-210.
3. Pineda C, Guisado A, Aguilera-Tejero E, Lopez I. Dissolution of Urinary Bladder Clots in a Dog with Alteplase. J Vet Intern Med 2015;29:1627–1628