

September 10, 2010



Pearls for the Practitioner

Topic: Dried Solidified Blood...in the Ureters???

Serge Chalhoub, DVM; Cathy Langston, DVM, ACVIM
Renal Medicine Service

The Animal Medical Center has created this e-mail publication to keep you informed about the latest practices in veterinary medicine and how these practices are being applied at The AMC. If you are interested in receiving Pearls for the Practitioner e-mails and you are not already on our list, please e-mail allison.younger@amcny.org. To access past issues of Pearls, visit www.amcny.org/vetpearls.

PUNCH!!!

Punch is a 6 year old male castrated Tuxedo cat who began having difficulty urinating for a few days. Blood work performed at the local veterinarian revealed severe elevations in renal values. Yet, on physical examination his bladder was small. An ultrasound was performed and revealed bilaterally enlarged kidneys and proximal ureteral dilations. The appearance on ultrasound suggested calculi in each ureter obstructing the flow of urine from the kidneys to the bladder. Punch received two days of fluid therapy which brought no improvement to his renal values, and he became overhydrated because he was not producing urine.

Punch was transferred to The Animal Medical Center (AMC) for hemodialysis and further diagnostic investigation. Punch was quite unstable with a very high serum potassium and low blood pressure. The Renal Medicine Team placed a temporary jugular dialysis catheter into his right jugular late at night and began hemodialysis. After two days of hemodialysis, Punch was more stable with normal potassium and normal hydration. He was still not urinating. An ultrasound performed at AMC revealed similar findings to the previous ultrasound. However, the two obstructing substances in the ureters did not create the typical shadowing effect normally seen with ureteral calculi. Differential diagnoses at the time included calculi, pyelonephritis, debris, ureteral strictures, and dried solidified blood.

Three days after starting hemodialysis, Punch underwent exploratory laparotomy. The ureters were in fact both dilated. Ureterotomy revealed firm, rubbery substances in each ureter obstructing the flow of urine. Bilateral ureteral stents were placed to prevent future stricture formation and allow unobstructed flow of urine from the kidneys to the bladder. Punch made a full recovery and four days after surgery his renal function was normal and he was finally urinating...a ton!!! The ureteral substances analyzed and determined to be dried solidified blood calculi.

DISCUSSION

Acute renal failure has many etiologies, ranging from hemodynamic causes (dehydration, anesthesia, low blood pressure), intrinsic causes (pyelonephritis, intoxications, acute on chronic renal failure) and post renal causes (calculi, debris, strictures, dried solidified blood). [1] Dried solidified blood calculi are increasingly being recognized as a cause of ureteral obstruction in cats, yet their cause is unknown. They are usually radio-opaque on radiology, and typically do not shadow on ultrasound. Although they are referred to as calculi, they usually do not contain any crystalline material and can be split in two with rongeur forceps, which makes them different from blood clots. They contain significantly more carbon, nitrogen, and sulfur than do stones or blood clots. They can be found anywhere in the urinary system and cause ureteral obstructions and acute renal failure. [2] Treatments include typical therapy for acute renal failure (intravenous fluids if dehydrated, hemodialysis, treatments to control hyperkalemia) and surgery to relieve the obstruction (ureteral stent placement, ureterotomy). It is important to identify ureteral obstructions early in the course of disease to allow a greater chance of renal recovery.

In conclusion, dried solidified blood calculi are becoming more common as a cause of ureteral obstruction and acute renal failure. Early and aggressive therapy with IV fluids, hemodialysis, and surgery can resolve the problem. In Punch's case, it has been two years since his hospitalization and he's doing great, terrorizing birds on the balcony and waking his owners at 2AM for more food!

The Renal Medicine Service at The Animal Medical Center is available 7 days a week, 24 hours a day for emergencies. Veterinarians can reach us at 212-838-8100. Non-urgent inquiries or questions can also be addressed via email: hemodialysis@amcny.org or by calling 212-329-8618 or 212-329-8713.

To reach a Referral Coordinator, please call 212.329.8758/8890.

Renal Medicine Team

Cathy Langston, DVM, DACVIM
Staff Veterinarian
cathy.langston@amcny.org
212-329-8671

Serge Chalhoub, DVM
Associate Staff Veterinarian
serge.chalhoub@amcny.org
212-329-8714

Adam Eatroff, DVM
Renal Fellow
adam.eatroff@amcny.org
212-329-8781

Karen Poeppel, LVT
karen.poeppel@amcny.org

Ella Mitelberg, LVT
eleonora.mitelberg@amcny.org

Suggested Reading

1. **Langston, C.E.**, *Acute Uremia*, in *Textbook of Veterinary Internal Medicine*, S.J. Ettinger and E.C. Feldman, Editors. 2010, Saunders Elsevier: Philadelphia. p. 1969-1984.
2. Westropp, J.L., et al., *Dried Solidified Blood Calculi in the Urinary Tract of Cats*. J Vet Intern Med, 2006. 20: p. 828-834.