



## Fall 2010

**VETERINARY SPECIALTY CENTER**  
Hospital Director  
JoAnn Stewart, RVT, CVPM

### SURGERY

Claude Gendreau, DVM, MSc, DACVS  
Mitch Robbins, DVM, DACVS  
Bernard Paré, DVM, DACVS  
LeeAnn Ablin, DVM, DACVS  
India Wood, DVM, MS, DACVS  
Paula West, DVM, DACVS

### DERMATOLOGY

Karen Kuhl, DVM, DACVD

### IMAGING / RADIOLOGY

Renee Léveillé, DVM, DACVR  
Elisabeth Girard, DVM, DACVR  
Hylton Gelb, DVM, DACVR

### ANESTHESIA / PAIN MANAGEMENT

Jusmeen Dhanjal, DVM, MS, DACVA  
Berit Fischer, DVM, DACVA

### PHYSICAL REHABILITATION / HOLISTIC MEDICINE

Maria VonderHaar, DVM  
LeeAnn Ablin, DVM, DACVS

### MEDICAL / RADIATION ONCOLOGY

Rhonda Feinmehl, DVM

### INTERNAL MEDICINE

Cheryl Vargo, DVM, MVetSc, DACVIM  
Adam Mordecai, DVM, MS, DACVIM  
Mimi Noonan, DVM, DACVIM

### NEPHROLOGY

Jerry A. Thornhill, DVM, DACVIM

### CARDIOLOGY

Kelly Wessberg, DVM, DACVIM  
(Cardiology)

### EMERGENCY / CRITICAL CARE

Todd Ryl, DVM  
Heidi Sproul, VMD  
Lacey Schmidt, DVM  
Alisse Mawrence, DVM  
Tracey Haslitt, DVM  
Susan Blades, DVM  
Anna Czekala, DVM  
Matthew Schnabl, DVM

### BEHAVIOR

John Ciribassi, DVM, DACVB

## Surgical Treatment of Ectopic Ureters

India Wood, DVM, MS, DACVS, Surgery

Urinary incontinence is a common problem in dogs and can be frustrating for owners and clinicians. Most dogs live indoors and often sleep in bed with their owners. Incontinence is recognized most often in middle-aged, spayed, medium to large breed female dogs. Twenty percent of all spayed female dogs, and 30 percent of those that are over 20 kilograms, have been reported to become incontinent. There is also a subset of very young dogs that present with urinary incontinence. If not controlled, euthanasia may be the end result of urinary incontinence.



Figure 1

The symptoms of this problem can differ from pet to pet. Some dogs will present with continuous dribbling and some only dribble when sleeping or in recumbent positions. This problem will leave many owners confused about the origin, and some owners will even complain that they cannot housebreak their puppy. In some dogs, the problem is so severe that they will have wet or stained peri-vulvar or preputial regions.

Most incontinent dogs can also eliminate normally, assuming a normal posture with a normal stream of urine, but dogs with neurogenic incontinence will present for paresis or paralysis. It is important for the veterinarian to thoroughly question the owner about age of onset, progression, time of incontinence, simultaneous fecal incontinence, reproductive status, history of medications, other health conditions, whether or not the animal attempts to void on its own or any history of urinary tract infections.

Ectopic ureters, which occur when one or both ureters enter the urinary bladder at a site other than the trigonal region, can be the cause of urinary incontinence in young dogs. This is thought to result from lateral displacement of the ureteral bud from the metanephric duct, which causes an abnormal migration of the bud. Golden Retrievers, Labrador Retrievers, Siberian Huskies and Skye Terriers appear to be predisposed to this problem. Ectopic ureters are diagnosed in young animals and are often unilateral. In one study, 56 of 175 were unilateral, 156 of 175 were found in female dogs, and all were located within the wall of the bladder (intramural). In all males, the ureter entered ectopically within the prostatic urethra. Clinical signs of urinary incontinence in male dogs often present at an older age, possibly due to an increased urethral length.

Termination of the ectopic ureters can be variable. Some enter the bladder normally but then tunnel under the mucosa and open at an abnormal location (intramural), some completely bypass the bladder (extramural), and some enter normally but then have a trough or branch ... (continued on 3)

## What's Happening at VSC

You may have noticed our "new look." The entire staff of VSC has been working hard to revitalize our hospital over the past year and a half. We are dedicated to living up to our core values of *Excellent Medicine with HEART, MIND, and SOUL*. Part of that is our new look which includes new business cards, brochures, and even a new conference room to provide more quality continuing education to you, our valued referring veterinarian. Please contact Kim Perroy, our referral concierge at (847) 459-7535 x323 or myself at x260 if we can do anything to serve you better.

We are excited to welcome two new specialists: **Dr. Hylton Gelb**, our 3rd board-certified radiologist, and **Dr. Paula West**, our 6th board-certified surgeon. Dr. Gelb graduated from the University of Georgia and completed his residency in radiology at Purdue University. Dr. West has been a surgeon for over 20 years and is returning to the Chicago area after being gone for 2 years. Both Drs. Gelb and West are here to help provide you with the best service possible.

New state-of-the-art equipment is essential to provide the best medical care to your patients. We have recently added a new linear accelerator for radiation oncology and a digital gamma camera for scintigraphy. Please contact us at (847) 459-7535 for more information.

JoAnn Stewart, RVT, CVPM  
Hospital Director  
(847) 459-7535 x260



# Head Trauma

Lacey Schmidt, DVM

A dog is rushed in after being hit by a car...or a kitten, after it is accidentally dropped on its head, squirming out of the owner's arms. Unfortunately these emergencies are all too common ones facing veterinarians. Head trauma cases like these present challenges for which every veterinarian must be ready to respond.

Head trauma is defined as a sudden physical injury to the head, and results in two stages of injury to the brain: primary brain injuries and secondary brain injuries. A primary brain injury is a physical disruption of brain parenchyma that occurs during the initial traumatic insult. It is instantaneous and, unfortunately, irreversible. Examples of a primary brain injury include a concussion (least severe), contusion, or a laceration (most severe). A secondary brain injury is the delayed effects of a primary brain injury that can ultimately lead to neuronal cell death.

Secondary effects can be intracranial or systemic, and although there will be a delay in their onset, they can come quickly. The primary job of the veterinarian is responding to and mitigating these secondary impacts.

Intracranial effects include cerebral edema, seizures, disruption of the blood brain barrier, continuing hemorrhage, and mass lesions, also known as hematoma. This often leads to increased intracranial pressure (ICP). Systemic effects include hypotension, hypoxia, inflammation, hyperglycemia, electrolyte imbalances, and hyperthermia. These delayed, secondary effects usually occur hours to days later. For example, cerebral edema usually peaks in 24 to 48 hours after the insult. The main focus of the veterinarian lies in protecting the brain from these secondary effects.

The initial assessment of an animal should focus on three primary systems, respiratory, cardiovascular, and neurological. The respiratory and cardiovascular systems should always be evaluated first to make sure there is no life threatening injury to these systems. Next, the neurologic status of the animal should be evaluated based on the Modified Glasgow Coma Scale (MGCS). This scale may be used on initial and repeat assessments to provide a prognosis for survival in animals suffering from head trauma.

The MGCS is comprised of three categories: motor activity, brainstem reflexes, and level of consciousness. The animal is graded on a scale of one to six in each category. The scale is useful in that a prognosis is given based on the total score an animal receives. A lower score would indicate more severe neurologic deficits and therefore a graver prognosis. The initial score an animal receives can change with repeat neurologic exams.

Treatment of an animal suffering from head trauma should be instituted immediately and based on the initial assessment. Treatment is directed at maintaining the precise pressure gradient level required to maintain neurological health—cerebral perfusion—by controlling hypotension and elevated ICP.

One thing that is beneficial in all cases is the application of supplemental oxygen. Oxygen supplementation is beneficial to any animal regardless of the severity of head trauma. The easiest way to provide immediate oxygen is via face mask or flow by.

Next, pain and seizures should be addressed and treated aggressively. Although opiates may depress respiration, increase ICP, and interfere with neurologic monitoring, they are often necessary to control shock on initial presentation.

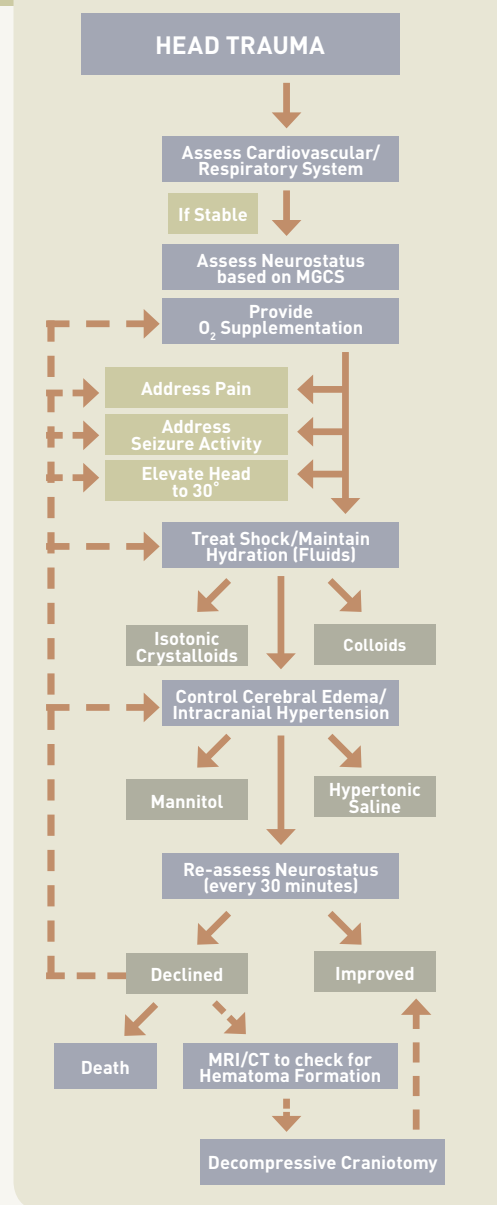
In addition, fluids should be administered as needed to treat shock and maintain hydration prior to the use of any osmotic diuretic. Isotonic crystalloids are the mainstay of shock therapy; however, colloids and hypertonic fluids such as hypertonic saline may also be needed. Hypotonic fluids and fluids containing dextrose should be avoided as hyperglycemia

correlates with a poor outcome due to increased cell death. Cerebral edema and intracranial hypertension can be treated with mannitol or hypertonic saline. Mannitol is an osmotic diuretic that improves cerebral blood flow, decreases cerebral edema, and increases cerebral perfusion pressure.

Mannitol is given as a slow bolus of 0.25 to 1 g/kg over 20 to 30 minutes. The use of furosemide with mannitol is controversial. As an alternative to mannitol, hypertonic saline (7 percent) at a dose of 3 to 5 ml/kg over 15 minutes can also be used. Hypertonic saline also has diuretic effects to help decrease cerebral edema. Furthermore, it is beneficial to elevate the animal's head 15 to 30 degrees; however, care must be taken to not kink the jugular vein. Lastly, steroids are contraindicated in patients with head trauma due to studies in human medicine (CRASH trial) that indicate steroids are associated with a worse outcome.

Once treatment has been initiated, frequent monitoring—every 30 minutes—of vitals and neurologic status is necessary. Hyperthermia should be avoided, but hypothermia in these situations is controversial, because moderate, controlled hypothermia may decrease cerebral metabolic rate and decrease cerebral pressure. The patient's blood pressure and heart rate should be checked frequently to monitor for the Cushing's Reflex. The Cushing's Reflex is the hypothalamic response to ischemia (usually due to poor perfusion in the brain). The sympathetic nervous system is activated, which causes an increased heart rate and peripheral vasoconstriction. When the mean arterial pressure (MAP) goes up, the parasympathetic nervous system is activated which causes the heart rate to drop. Bradycardia is an indication of increased ICP. When the limits of this reflex are exhausted, ischemia and/or herniation may occur. If the neurologic status continues to decline, a MRI or CT should be considered to assess for hematoma formation. A decompressive craniotomy may be indicated to help relieve the hematoma.

In summary, a head trauma patient can decline suddenly and rapidly due to secondary brain injuries. But with aggressive treatment of secondary impacts and frequent monitoring, further brain injury, either intracranial or systemic, may be prevented.



## Ectopic Ureters continued from 1

that continues distally and opens again further caudally. The location of emergence is variable as well. In one study, 70 percent were reported to enter in the vagina or vestibule, 12 percent entered in the urethra, 8 percent entered in the bladder neck, and 3 percent entered into the uterus. Many of these patients present with other congenital abnormalities as well, including renal agenesis/dysplasia, renal or ureteral duplication, persistent paramesonephric remnant, pelvic bladder/short urethra or sphincter mechanism incompetence.

A complete blood count (CBC), chemistry panel and urinalysis should be performed on every patient with urinary incontinence. A urine culture is also important since urinary tract infection can cause incontinence or exacerbate signs of existing incontinence. Sixty-four percent of dogs with ectopic ureters have a urinary tract infection at the time of diagnosis.

Radiographic imaging studies give information about location, size and morphology of urinary tract structures. They can aid in the diagnosis of many anatomic abnormalities. These imaging studies include plain radiographs, intravenous urography (Figure 1), cystourethrography, vaginourethrocytography and CT scan. Sonography can also be used to aid in diagnoses and visualize structural abnormalities. Cystoscopy allows direct visualization of the ureters, bladder, urethra and vagina.

Surgical treatment for ectopic ureters depends on the type of entrance. For extramural ureters, a ureteral reimplantation technique can be used. This method attempts to restore continence by reimplanting the distal ureter in a more appropriate position. The ureter is located at its distal end, ligated and transected (Figure 2). The distal end of the newly transected ureter is then isolated and repositioned in the bladder lumen (Figure 3). The ureteral mucosa is sutured to the bladder mucosa using several interrupted 5-0 to 7-0 absorbable sutures (Figure 4). If needed the end of the ureter can be spatulated longitudinally for a wider opening (Figure 5).

For the more common intramural ectopic ureters (Figure 6), a new opening, or stoma, is created. It is recommended that the remaining distal portion be resected and the remaining defect repaired. It is thought that by leaving the distal portion in place, the longitudinal fibers of the urethral wall are disrupted. This may, in and of itself, lead to incontinence and is likely the reason that not all animals are continent after surgery. To perform this procedure a catheter is placed retrograde into the ureteral opening (Figure 7 and 8). The ureter is then dissected free and the defect is closed (Figure 9). A new stoma remains in a more suitable location (Figure 10). Straining and dysuria can occur post-operatively. It is usually temporary although sometimes catheters are required for a few days initially.

Obviously, due to the differences in treatments, correct diagnosis of ectopic ureters is essential in order to obtain success in treatment, but veterinarians should be optimistic when a client brings in an incontinent dog that there are surgical treatments available that offer encouraging rates of success. Surgery allows for resolution of incontinence in about 50 percent of patients. Another 25 percent will be continent with added medication, but the remaining 25 percent will be incontinent after surgery even with the addition of medication. For this final group, additional treatments, including collagen injections or artificial urethral sphincter (hydraulic occluder), can be applied individually on in concert to achieve improvement or even provide a long-term cure of any remaining incontinence. Utilizing all these treatment options, allows veterinarians to offer substantial resolutions for this common and aggravating problem.

References available upon request.

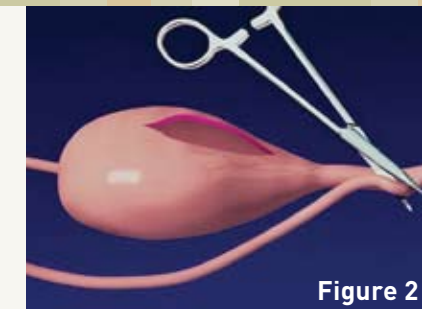


Figure 2

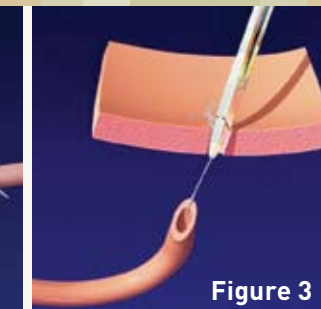


Figure 3

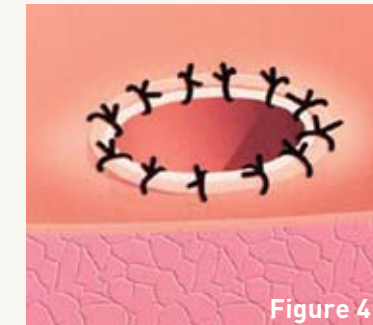


Figure 4

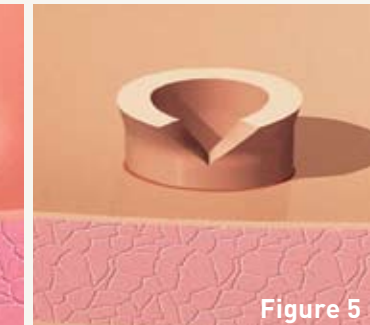


Figure 5

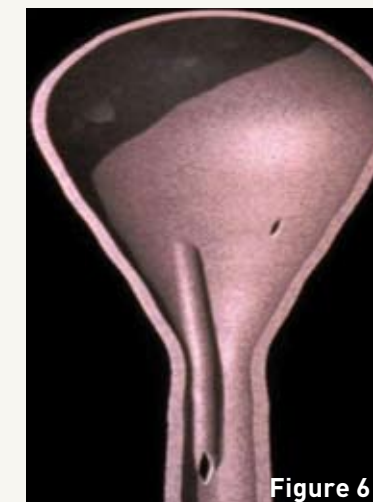


Figure 6

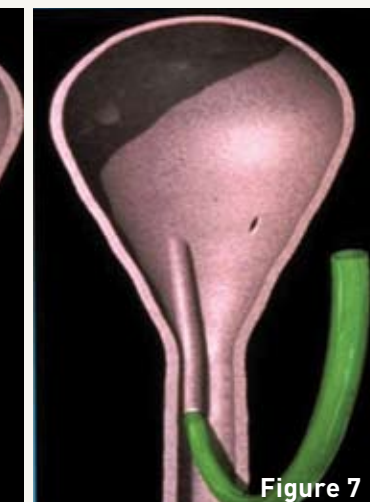


Figure 7

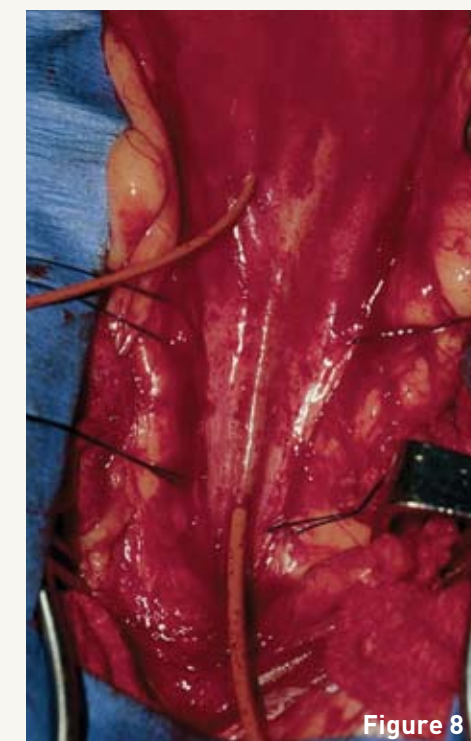


Figure 8



Figure 9

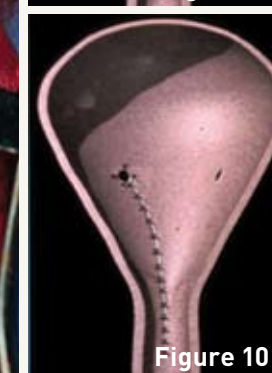


Figure 10



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## Meet Our Doctors



**DVM:** University of Illinois  
College of Veterinary  
Medicine

**INTERNSHIP & RESIDENCY:**  
Small Animal Oncology/  
Internal Medicine, Animal  
Medical Center, NY

**MEMBER:** American  
Veterinary Medical  
Association, Veterinary  
Cancer Society, Veterinary  
Emergency & Critical Care  
Society, Chicago Veterinary  
Medical Association

### Rhonda Feinmehl, DVM

Director, Internal Medicine & Emergency/Critical Care

Dr. Feinmehl is a member of the board of directors at Veterinary Specialty Center. She played an integral role in the design and development of our state-of-the-art intensive care and emergency services. In addition to her full case load and leadership responsibilities at VSC and her busy family life, Dr. Feinmehl serves on the Medical Advisory Board at Shedd Aquarium. She also regularly lectures other veterinary medicine professionals on topics in oncology, including management of the effects of chemotherapy.

*I feel fortunate that I'm able to combine my love of animals with an area of science as interesting and fulfilling as oncology."*

“I have always felt a special bond with animals and had a passion for helping them. As an undergraduate Biology major, I took an immunology course and was fascinated by the oncology section. The more I learned about oncology, the more certain I became about specializing in cancer care as a veterinarian.

“I came to VSC after completing my internship and residency in New York and have been here ever since. When I'm not at the hospital, my husband and I are keeping up with our kids, cheering them on at sports, attending concerts and their many other activities. At home, I'm gardening, baking and enjoying life with my family, including our dogs and cat.”

## VSC Calendar

**SAVE THE DATE**  
**March 13th, 2011**  
**C<sup>2</sup>E<sup>2</sup>**

Our 7th Annual Chicagoland Continuing Education Event (C<sup>2</sup>E<sup>2</sup>) is fast approaching. We have new speakers and topics, great camaraderie, and fantastic exhibit booths. Watch for your invitation in the mail over the next several weeks.

**TIME: 8:30am–3:30pm**  
(Note: it's the first day after Daylight Savings)

**CE CREDIT: 6 hours**

**INFO:** For more information, please contact our referral concierge Kim Perroy, 847-459-7535 x323 or [kperroy@vetspecialty.com](mailto:kperroy@vetspecialty.com).

**Excellent Medicine with HEART, MIND, and SOUL**