dominal fluid, and administration of corticosteroids, fluid therapy, and antibiotics. The type of antibiotic recommended varies. Sulfadimethoxine, Tylosine, and chloramphenicol are all suggested.

The post mortem lesions seen with feline infectious peritonitis divide the disease into two different types. The first type is the “classic” or “wet” type of the disease. In this form of the disease up to one liter of the previously described abdominal fluid can be found. Granular gray-white fibrinous exudate can also be found on the surface of the abdominal viscera in this form. Focal areas of necrosis can be found in the spleen, kidneys, liver, pancreas and muscular layers of the intestine. There can be an associated meningitis and uveitis.

The second type of feline infectious peritonitis is known as the “parenchymal” or “dry” form. It differs from the above type in that the characteristic abdominal fluid is not found. Any of the abdominal organs can be invaded as can thoracic organs. Histologically, affected organs show multifocal pyogranulomas. The kidneys, liver, and pancreas are the most commonly affected organs. Even when the thorax is involved clinical signs of this are seldom seen. Ocular problems are also common in this form of the disease. The damage can vary from corneal edema to retinal detachment. A characteristic lesion is chorioretinitis. CNS involvement is often seen. This can result in posterior incoordination, tremors, or convulsions. Damage to any organ often will result in spread to the subcapsular veins, resulting in a phlebitis.

Since the etiologic agent involved in feline infectious peritonitis has not been isolated, no immunizing product can be produced. Therefore, the only way to prevent the spread of the disease is to isolate suspect animals. Cages in which suspects are kept should be sterilized after use and should be kept vacant as long as is practical. People who have had a cat with infectious peritonitis in their home should be warned about bringing in a new cat to the premises. A minimum period of 30 days should be observed.

References


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Case Report

On July 30, 1974, a fourteen-month-old intact female Cocker Spaniel was referred to the Iowa State University small animal clinic by Dr. Robert Riordan of Des Moines, Iowa with a history of lifelong urinary incontinence. Urine dribbled most of the time, and the flow was increased during hot weather, and by stilbestrol, which had been previously dispensed, along with Caricide™ as a heartworm preventative, and K/D diet. A distinct odor of urine was present about the dog.

The initial physical examination revealed nothing unusual. The CBC and BUN were normal, fecal examination negative, and a urine culture was also run. Urinalysis revealed bacteria and WBC's, and the dog was put on Gantrisin. Intra-venous pyelography showed hydronephrosis and hydrourerter on the left side, but the exact termination of the left ureter could not be determined (see Figure 1). The right side was considered normal.

Treatment consisted of surgical removal of the left ureter and kidney, and an ovari-o hysterectomy was also performed to avoid stress on the bitch's remaining kidney should she become pregnant. The dog was put on chloromycetin for 17 days and made an uneventful recovery.

Discussion

Ectopic ureters are often associated with other congenital or acquired anomalies of the urinary system, such as mega-ureter, hydronephrosis and pyelonephritis, with bacterial invaders easily moving up and into the associated kidney since there is no functional sphincter of the ectopic ureter. A progressive destruction of functioning nephrons may lead to continued reduction in urine formation by the affected kidney, with resulting progressive decrease in the severity of urinary incontinence in some female dogs. Ectopic urethra or defects in the urethral sphincter have also been observed, or hypoplasia of the kidney, urinary bladder, and urethra.

The diagnosis of ectopic ureter is based on the history of persistent urinary incontinence since birth or weaning—an almost pathognomonic sign with this condition. The great predominance of diagnoses in the female may be due to the fact that the ectopic termination of the ureter in the male is usually in the prostatic urethra, and urine thus dribbles back into the urinary bladder, therefore greatly reducing the chances of detection.

Observation with a vaginal endoscope of an abnormal orifice in the vagina, or failure to identify ureteral orifices at the trigone of the bladder via cystoscopy provide significant evidence of ectopic ureters. Confirmation can be made by catheterization of the orifice, followed by retrograde ureteropyelography. Although intravenous urography may be of value, detection of the exact termination of the ureter may be difficult due to: 1) insufficient contrast media in the distal ureter, which may be caused by ureteral peristalsis, 2) reduced function of the associated renal tissue, and 3) accumulation of contrast media in the urinary bladder interfering with visualization of the distal ureter.

Another radiographic alternative is the vaginogram, best performed in puppies and small breeds. The animal is tilted with the head down, and the vagina distended with contrast solution combined with sterile lubricant to increase the viscosity, thereby revealing reflux into the ectopic ureters if they terminate in the vagina.

One more method of diagnosis involves injection of any sterile dye into the urinary bladder. The bladder is first expressed, then filled partially with some type of dye (methylene blue, phenylphythalain) via catheter. In the case of an ectopic ureter which opens somewhere beyond the sphincter of the bladder (urethra or vagina), normal unstained urine coming directly from the associated kidney will appear at the vulva, and colored urine will be evident when the dog urinates, since the dyed urine was retained in the bladder by the sphincter.

Exploratory laparotomy with lack of termination of the ureter at the trigone of

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1Caricide—diethylcarbamazine citrate produced by American Cyanamid Co., Princeton, N.J.
2K/D—prescription diet produced by Hill's division of Ralviana Foods Inc., Topeka, Ks.
3Gantrisin—sulfisoxazole produced by Roche Laboratories, Nutley, N.J.
the bladder also verifies the anomaly.

There is no medical treatment for the urinary incontinence due to an ectopic ureter, the treatment of choice being surgical intervention. Any urinary tract infection should be brought under control before surgery. Indications for transplantation of the ureter into the urinary bladder include: 1) normal function and gross anatomical appearance of the associated kidney, 2) extravesicular termination of both ureters, and 3) hypofunction of both kidneys—here, nephrectomy may result in a uremic crisis.

Nephrectomy and ureterectomy may be done in the case of an abnormal kidney, provided the remaining kidney is functioning normally, or with a serious infection of the urinary bladder, ureter, or kidney.

Prognosis is guarded to good with surgical correction. If the ectopic ureter terminates in the urethra, the dog may continue to exhibit urinary incontinence as a result of an abnormal urethra.

**Bibliography**