A 6-week-old sexually intact male domestic shorthair kitten was evaluated for stranguria that developed within 36 hours of routine medical management for organophosphate toxicosis. On physical examination, the kitten was bright, alert, and responsive, with a large distended urinary bladder that could not be expressed. The penis was extruded and unremarkable. No other abnormalities were detected. The kitten was anesthetized with isoflurane, and a 3.5-F closed-end urinary catheter was passed into the urethra. One centimeter from the tip of the penis, the catheter temporarily met resistance and then advanced smoothly. No urine could be obtained, although saline (0.9% NaCl) solution flowed easily into the catheter. Shortly after administration of saline solution through the catheter, fluid leaking from the anus was noted. Because of concerns of bladder rupture, 20 mL of urine was removed from the bladder via cystocentesis. Results of urinalysis were within reference ranges. One milliliter of noniodinated contrast agent was infused into the catheter, and survey abdominal radiographs were made (Fig 1). Contrast agent could be seen filling the distal portion of the colon on both views, and the catheter was evident in the colon, within the pelvic inlet.

Colonic perforation carries a poor to grave prognosis. The kitten was unowned and being cared for by a veterinary technician. The technician decided to proceed with medical management, with the understanding that surgical intervention might be needed if complications developed.

The urinary catheter was removed. Prophylactic antimicrobial treatment with piperacillin (22 mg/kg [10 mg/lb], IV, q 6 h) and supportive fluid therapy with isotonic crystalloids (90 mL/kg/d [41 mg/lb/d]) were instituted for 14 days. During this time, the kitten remained afebrile and active. For 24 hours after the perforation, the kitten vocalized while positioning to urinate but voided its bladder without assistance; the bladder was confirmed to be small by palpation after urination. After the first day, the kitten urinated and defecated without apparent difficulty. No abnormalities were identified during ultrasonographic evaluation of the abdomen 8 days after the perforation. Body weight increased from 0.77 to 1.04 kg (1.69 to 2.29 lb) over 14 days, which was similar to weight gain in the other kitten in the litter. After 14 days, fluid and antimicrobial administration were discontinued. Urethrogram was not performed because of concerns about further potential trauma to the urethra. Results of an IV pyelogram on day 14 were unremarkable, and no focal accumulation of contrast material was identified in the urethra or colon when the bladder was expressed.

Medical management of urethral and colonic perforation associated with urinary catheterization in a kitten

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Urethral and colonic perforation is an uncommon but severe complication associated with urinary catheterization. Although surgery is the treatment of choice, some patients will respond well to medical management alone.

Figure 1—Ventrodorsal radiographic view of the abdomen of a kitten with urethral and colonic perforation associated with urinary catheterization. Notice the urinary catheter, contrast material in the colon, and lack of contrast material in the urinary bladder.
The kitten was placed in an adoptive home at this time. Four months after perforation and initial treatment, the kitten continued to urinate and defecate normally. The kitten appeared to have a normal growth rate, and its weight was similar to the littermate’s weight. The kitten was monitored closely for urinary blockage; quantity and quality of stools were also monitored for evidence of colonic stricture. Although the kitten continues to thrive, the risk of urethral stricture persists, and close monitoring of urination and defecation is being continued.

Urethral perforation is an uncommon but severe complication of urinary catheterization. The risk of perforation can be minimized by gentle, slow introduction of the catheter and by use of soft rubber catheters instead of rigid polypropylene catheters. The small size of the kitten of this report affected catheter selection; the only catheter that would pass into such a small urethral aperture was a rigid, closed-end urinary catheter. In retrospect, use of a 2-inch, 20-gauge IV catheter without stylet might have been a successful alternative; however, it was not considered at the time of the procedure.

Treatment of choice for urethral and colonic perforation is surgical repair. Referral for microvascular surgery in the pelvic inlet was not considered realistic by the person taking care of the cat. Use of an indwelling urinary catheter for several days can aid in healing and decrease the risk of stricture; in this kitten, placement would have required a cystotomy, retrograde catheter placement, and possibly a second surgery for catheter removal. If a cystotomy was performed to place a urinary catheter, placement of a cystostomy tube for temporary urine diversion might decrease urine leakage through the perforation and improve healing.

Another option for urinary diversion is ultrasound-guided placement of a pre-pubic cystostomy tube. Neither option would address treatment of the colonic perforation. Medical management was chosen in this case, with the option of surgery if the kitten remained dysuric or developed complications. Numerous salvage techniques are available, including pre-pubic cystostomy, if urethral function is lost.

Management of urethral and colonic perforations is still a subject of active debate in the human literature. Treatment for urethral perforation often involves pre-pubic cystostomy with urinary catheterization. Some authors recommend conservative treatment of humans with colonic perforations caused by diagnostic colonoscopy; if they have had high-quality preparation of the colon before the procedure and show no signs of peritonitis. Recommended treatment includes prolonged avoidance of oral ingestion of foods, IV fluid therapy, indwelling urinary catheterization with continuous irrigation, rectal cannulation, and administration of broad-spectrum antimicrobials.

Complications of urethral perforation include urethral stricture, development of a urethral flap, urine contamination of the abdomen, and infection. Given the nature of the perforation reported here, additional potential complications included colonic stricture, formation of an urethrocolonic fistula, continued urethral blockage, and high risk of infection.

The main indication for antimicrobials was to limit ascending infection of the urinary tract from the colonic perforation. Piperacillin was chosen for prophylactic treatment, because it is an extended-spectrum penicillin with high efficacy against intra-abdominal infections and sepsis in humans. Piperacillin is also commonly used in pediatric patients for treatment of a variety of infections and medical conditions, including perforating appendicitis, pneumonia, sepsis, intra-abdominal infections, and bacteremia. It is uncommonly used in our hospital, and resistance to it has not been detected in any bacteria cultured from samples from our hospital.

There were several factors that may have facilitated spontaneous resolution of the perforation in this kitten. Excellent wound healing as a result of the kitten’s age and the lack of preexisting urinary or colonic disease may have facilitated healing without fibrosis. The small size of the perforation increased the likelihood of adequate apposition of epithelial surfaces, after the catheter was removed. In addition, rapid identification of the trauma led to prompt removal of the catheter and aggressive prophylactic antimicrobial and supportive therapy. Finally, small colonic perforations can heal spontaneously; in cats, this may be facilitated by their dry feces.

References