Prepubic Urethrostomy and Vaginoplasty in a Female Cat

A 1-year-old, intact female, domestic shorthaired cat was presented for dysuria resulting from perineal scarring subsequent to injuries incurred during a cat fight. A prepubic urethrostomy was performed to manage the dysuria. Eleven months later, the cat was re-presented with a 3-day history of pyrexia and inappetence. A pinpoint opening extending 0.5 cm ventral to the anus on midline, exuding a clear discharge, was noted in the perineal region. A contrast fistulogram was performed, and a vaginoperineal fistula was diagnosed. The fistulous tract was a result of vulvar stricture from the trauma of the cat fight. A vaginoplasty was performed to create an opening for vaginal secretions. This is the first published report of a prepubic urethrostomy performed in a female cat. J Am Anim Hosp Assoc 2010;46:439-443.

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Introduction

Prepubic urethrostomy is the creation of a urethral stoma on the ventral abdomen, cranial to the pubis.\textsuperscript{1} Indications for prepubic urethrostomy surgery include failed perineal urethrostomy surgery, failed transpelvic urethrostomy surgery, urethral tumors, urethral strictures, granulomatous urethritis, treatment of pelvic urethral rupture, and skin defects that prevent perineal urethrostomy surgery from being completed.\textsuperscript{2} In cats, a prepubic urethrostomy is a salvage procedure usually performed in males with lower urinary tract disease and recurrent urethral obstruction after a failed perineal urethrostomy. Although the procedure has been performed in female dogs, no reports have been published regarding prepubic urethrostomy in female cats and the associated considerations and complications. The purpose of this case report is to discuss prepubic urethrostomy and vaginoplasty in a female cat and potential complications involved with a prepubic urethrostomy.

Case Report

A 1-year-old, intact female, domestic shorthaired cat was presented for dysuria resulting from scarring and contracture of the vulvar and perivulvar tissue caused by trauma suffered during a cat fight that occurred 2 weeks prior to presentation. The owner noted that the cat dribbled urine when attempting to urinate. Extensive scar tissue from second-intention healing of cutaneous wounds was noted in the perineal and inguinal regions, with a small but patent vulvar opening. After discussing diagnostic and therapeutic options with the owner, the decision was made to perform a prepubic urethrostomy to alleviate the dysuria.

Prior to performing the prepubic urethrostomy procedure, the packed cell volume, total solids, blood glucose, and blood urea nitrogen levels were evaluated. All results were within normal limits. Cystocentesis was performed to obtain urine for urinalysis, which was within normal limits, and for aerobic urine culture, which yielded no growth.
The cat was administered medetomidine (0.01 mg/kg intramuscularly [IM]), atropine (0.04 mg/kg IM), and morphine (0.1 mg/kg IM) for preanesthesia. Anesthesia was induced and maintained with isoflurane in oxygen. Perioperative crystalloid fluids (10 mL/kg intravenously [IV]) and ampicillin (22 mg/kg IV q 90 minutes) were administered.

A ventral midline incision was created to expose the linea alba. This incision extended from the umbilicus to the level of the pubis. An elective ovariohysterectomy was completed prior to the prepubic urethrostomy. Two stay sutures were placed at the apex of the urinary bladder using 3-0 absorbable suture. Blunt dissection was performed to isolate the urethra at the level of the pubic bone. A circumferential ligature of 4-0 absorbable suture was placed around the urethra cranial to the pubis. The urethra was transected using blunt-ended tenotomy scissors. Stay sutures of 4-0 absorbable suture were placed on the lateral aspects of the cut end of the urethra for atraumatic manipulation. The proximal portion of the urethra was spatulated, and a 3.5 French polypropylene catheter was placed within the urethra to help maintain the lumen when suturing the urethra to the external rectus sheath of the rectus abdominis muscle.

The body wall was closed using 3-0 absorbable suture in a simple continuous pattern, with one suture beginning at the umbilicus and extending caudally to the cut end of the urethra, and a second continuous suture beginning at the caudal end of the incision and extending cranially to the cut end of the urethra—leaving an approximate 1-cm opening in the body wall for the urethra to exit. The subcutaneous tissue was closed with 4-0 absorbable suture, using a simple interrupted pattern, leaving a corresponding opening for the urethra. At the location of the prepubic urethrostomy, just cranial to the pubis, the urethra was secured to the external sheath of the rectus abdominis muscle with two simple interrupted sutures (using 5-0 absorbable suture material) to ensure no tension existed on the urethrostomy site. The spatulated, transected end of the urethra was sutured in apposition to the skin using 5-0 nonabsorbable suture material in a simple interrupted pattern. Skin sutures were placed in the remainder of the skin incision using 4-0 nylon suture in a cruciate pattern [Figure 1]. The transected end of the distal portion of the urethra was left patent.

Recovery was uneventful. The urinary catheter was removed 24 hours postoperatively. No postoperative antibiotic therapy was administered.

Eleven months after the prepubic urethrostomy, the cat was presented to a local veterinarian for inappetence and lethargy. The cat was pyrexic with a temperature of 38.7°C, a heart rate of 200 beats per minute, and respiratory rate of 28 breaths per minute. The prepubic urethrostomy site appeared healthy. A vulvar stoma was not present; however, ventral to the anus, a pinpoint fistula with serosanguineous discharge was noted.

Analysis of urine obtained via cystocentesis showed a specific gravity of 1.054, pH of 6, and protein level of 100 mg/dL. A large amount of blood was present, and one to three white blood cells per high-powered field. Urine culture yielded no growth. Complete blood count and serum biochemical profile were performed and were within normal limits.

Abdominal radiographs showed no evidence of urinary calculi, and the kidneys were unremarkable. The urethra was visualized as leaving the urinary bladder and coursing ventrally to the urethrostomy site. Abdominal ultrasound showed a slightly hypoechoic liver and a diffusely thickened bladder wall.

A contrast cystourethrogram was performed to evaluate the position of the urinary bladder and urethra to determine if they were associated with the fistula. Six milliliters of nonionic contrast medium (240 mg iodine/mL) were administered through the urethrostomy site and into the bladder [Figure 2]. No connection from the urethra or urinary bladder to the fistula was appreciated. A catheter was subsequently placed in the perineal fistula, and 1 mL of contrast...
was injected, which documented an 18-mm fistula extending caudoventrally from the level of the caudal ischium to the perineal skin, approximately 5 mm ventral to the anus [Figure 3].

Determination was made that scarring from the trauma inflicted during the cat fight resulted in stricture of the vulvar stoma, which led to accumulation of vaginal secretions and creation of a fistulous tract. A vaginoplasty was recommended to permit drainage of normal vaginal secretions.

The cat was administered a combination of morphine\textsuperscript{c} (0.1 mg/kg IM), medetomidine\textsuperscript{a} (0.01 mg/kg IM), and atropine\textsuperscript{b} (0.04 mg/kg IM) for premedication. Anesthesia was induced with thiopental\textsuperscript{d} (5 mg/kg IV) and maintained with isoflurane\textsuperscript{d} in oxygen. A lumbar epidural of bupivacaine\textsuperscript{p} (0.5 mg/kg) and preservative-free morphine\textsuperscript{i} (0.1 mg/kg) was administered once the cat was under general anesthesia. Perioperatively, crystalloid fluids\textsuperscript{d} (10 mL/kg per hour IV) and ampicillin\textsuperscript{l} (22 mg/kg q 90 minutes IV) were administered.

A vaginoplasty was performed to allow drainage of the secretions from the vaginal vestibule. A 3.5 French polypropylene catheter\textsuperscript{i} was placed in the perineal fistula. A midline skin incision was created 1 cm dorsal to the fistula and was extended ventrally to the catheter. The incision was extended deep into the vestibule to create a vaginoplasty. Once the vaginal mucosa was identified, a small strip of soft tissue (<1 mm in length) was removed from the ventral aspect of the incision. Using 5-0 nylon suture\textsuperscript{r} in a simple interrupted pattern, the vaginal mucosa was sutured to the skin to create a new vaginal opening. The polypropylene catheter was removed immediately postoperatively, and recovery was uneventful. Postoperative medications included ampicillin\textsuperscript{l} (22 mg/kg IV q 8 hours), buprenorphine\textsuperscript{s} (0.005 mg/kg IV q 8 hours), and meloxicam\textsuperscript{t} (0.1 mg/kg per os [PO] q 24 hours). The cat was discharged on amoxicillin/clavulanic acid\textsuperscript{a} (62.5 mg PO q 12 hours for 10 days).

At both the 10-day and 4-month postoperative examinations, the vaginoplasty was intact and patent [Figure 4]. No purulent discharge was noted, and little to no swelling or redness was seen. The owner reported no complications. At the 10-day postoperative examination, the owner was advised to keep the cat’s hair that surrounded the prepubic

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**Figure 2**—Lateral image from contrast urethrocystogram performed 11 months following prepubic urethrostomy. The contrast-filled urinary bladder is seen with the urethra (white arrow) exiting caudally and coursing ventrally toward the urethrostomy site.

**Figure 3**—Lateral view of the contrast fistulogram showing the fistulous tract (white arrowhead). The dead-end urethra (black arrow) can be seen caudoventral to the vaginal vault (black arrowhead). Residual contrast can be seen in the urinary bladder (white arrow) from the contrast cystourethrogram performed immediately prior to this fistulogram.
urethrostomy site clipped to help prevent urine-scald dermatitis. At the 4-month postoperative examination, the owner admitted a delay in clipping the hair around the prepubic urethrostomy site, which led to mild urine-scald dermatitis.

Discussion

This is the first published report of a prepubic urethrostomy in a female cat. The cat initially presented for dysuria, and physical evaluation revealed damage to the urethral opening in the vagina, which caused the dysuria. While a contrast cystourethrogram was recommended to determine the extent of the damage and the viability of the more proximal urethra in the perineal and pelvic regions, the owners declined.

Other treatment options such as perineal urethrostomy, neourethrovaginostomy, or transpelvic urethrostomy could have resulted in successful outcomes; however, the owners requested the procedure that the surgeon felt would most likely resolve the dysuria in the most cost-effective manner. A perineal urethrostomy was considered, but concern was present because of the scarring of the perineal, vulvar, and vaginal skin. After discussing the various treatment options, the decision was made to perform a prepubic urethrostomy.

Prepubic urethrostomy is a salvage procedure often performed when the membranous urethra suffers irreparable damage or when local tissue condition prevents perineal urethrostomy.3 The cat of this case suffered trauma to the inguinal and perineal regions during a cat fight. The trauma resulted in vulvar scarring that led to a stricture of the vulvar opening. A prepubic urethrostomy was performed to redirect urine flow to compensate for the strictured vulvar opening.

Potential complications (i.e., urinary incontinence, urethral stricture, and subcutaneous urine collection around the urethral stoma) associated with this procedure limit the use of prepubic urethrostomy.2 Further, nerve damage may lead to incontinence,3 and urine-scald dermatitis can occur from urine splashing on the skin around the urethrostomy site.2 Applying a small amount of petroleum jelly around the urethro-stomy site reduces the risk of urine scald.4 Urine-scald dermatitis can also occur if the hair surrounding the urethrostomy site is not clipped regularly, and urine soaks the adjacent hair and skin. The cat of this case suffered some mild urine-scald dermatitis because of this latter issue.

Postoperative incontinence is a frequent complication with prepubic urethrostomy.2 Despite being a common complication, the cat of this report was not incontinent at any point postoperatively. Urinary tract infections are also relatively common postoperatively. By shortening the urethra and widening the stoma, prepubic urethrostomies predispose animals to urinary tract infections.4 When the cat reported herein was re-presented for the vaginoplasty (11 months after the prepubic urethrostomy), a negative urine culture was obtained. While the referring veterinarian noted the cat was pyrexic, we did not appreciate the pyrexia; however, the noted pyrexia possibly could be attributed to an inflammatory reaction caused by the fistula.

After the prepubic urethrostomy in this cat, the main complication was the formation of a fistulous tract. The fistula most likely formed from closure (secondary to scarring) of the vulvar stoma, which led to the accumulation of vaginal secretions. Important to remember is that even though the urine outflow had been diverted, the vulva still serves as an outflow for secretions from the vagina, cervix, and vestibule. Vaginoplasty was performed to reconstruct an opening to permit drainage of these normal secretions. Complications that may occur following vaginoplasty include stricture of the stoma, dehiscence, and infection; none of these occurred in this cat.

This case demonstrates the need to preserve the vulvar stoma for draining of secretions, even if the female is spayed and urine is diverted. Secretions produced from the cervix, vagina, and vestibule still need to drain; otherwise, accumulation of secretions may create fistulous tracts.

Conclusion

This case is the first published report of a prepubic urethrostomy in a female cat. The report describes the procedure and highlights associated potential complications.

Footnotes

a Dormitor; Pfizer, New York, NY 10017
b Atropine Sulfate Injection; Vedco, Inc., St. Joseph, MO 64504
c Morphine Sulfate Injection; Baxter Healthcare Corp., Deerfield, IL 60015
d IsoFlo; Abbott Laboratories, North Chicago, IL 60064
References