A Spayed Female Cat with Squamous Cell Carcinoma in the Uterine Remnant

Akiyoshi HAYASHI1,2), Hiroshi TANAKA2), Tomoko TAJIMA3), Masanari NAKAYAMA2) and Fumihito OHASHI1)*

1)Laboratory of Veterinary Surgery, Department of Advanced Clinical Medicine, Course of Veterinary Science, Graduate School of Life and Environmental Sciences, Osaka Prefecture University, 1–58 Rinku-Orai-Kita, Izumisano, Osaka 598–8531, Japan
2)Nakayama Veterinary Hospital, 6–1 Minamifukuro-cho, Nara 630–8342, Japan
3)Laboratory of Veterinary Microbiology, Department of Infectious Diseases Control, Course of Veterinary Science, Graduate School of Life and Environmental Sciences, Osaka Prefecture University, 1–58 Rinku-Orai-Kita, Izumisano, Osaka 598–8531, Japan

(Received 29 August 2012/Accepted 19 October 2012/Published online in J-STAGE 2 November 2012)

ABSTRACT. A 7-year-old spayed female domestic short-haired cat presented with dysuria and hematuria that had been unresponsive to medical therapy. Imaging tests such as ultrasonography, urethrocystography and computed tomography revealed a pelvic mass compressing the urethra. Based on histological examination of the mass following surgical resection, the cat was diagnosed squamous cell carcinoma (SCC) derived from the uterine remnant. After surgery, dysuria was resolved, but on instead, urine and fecal incontinence were observed. Then, about four months after surgery, recurrence of the mass and the symptoms was observed. Consequently, the cat was ultimately euthanized.

This is the first report of SCC arising from the uterine remnant in a spayed female cat.

KEYWORDS. SCC, spayed cat, uterine remnant.

Squamous cell carcinoma (SCC) is a malignant neoplasm arising from squamous epithelium and is relatively common in cats. Most feline SCCs arise on the skin of the head and oral cavity [10]. They are typically locally aggressive, with a reported low to moderate metastatic potential [3]. SCCs in the feline uterus are rare, and therefore, there is only a single report about it [6] to our knowledge. In addition, because SCCs arising from the uterine remnant in spayed female cats have never been reported, this is the first report of such a case, and therefore, the occurrence factor, biologic behavior and prognosis of the tumor are unclear.

A 7-year-old, spayed female, domestic short-haired cat presented with dysuria and severe hematuria that had persisted for several days despite medical therapy. Physical examination showed distended bladder, while prompting urination by abdominal compression and inserting a urethral catheter were easy. Abdominal ultrasonography and retrograde urethrocytography revealed a parenchymal mass compressing the dorsal aspect of the urethra.

Urinalysis revealed severe gross hematuria, but not any bacteria or crystals. Serum biochemical analysis revealed severe azotemia, with a blood urea nitrogen (BUN) level of 106.8 mg/dl and a creatinine level of 10.8 mg/dl. This azotemia rapidly resolved after several days of treatment, including placement of an indwelling urethral catheter and intravenous fluid administration; the BUN and creatinine levels were 14.5 mg/dl and 0.7 mg/dl, respectively, on day 3. Therefore, this azotemia was considered to be caused by dysuria. Feline leukemia viral (FeLV) antigen and feline immunodeficiency viral (FIV) antibody were both negative. Hematologic analysis revealed development of anemia, which was apparently caused by severe hematuria; the red blood cell count (RBC) was 4.33 × 106 cells/µl on day 1, but was 2.40 × 106 cells/µl on day 3. The cat received a transfusion of 50 ml of whole blood. Symptomatic treatment, including urination control, nutritional intervention and administration of intravenous fluid, antibiotics and antiinflammatory and hemostatic agents, achieved stabilization of the renal function index and reduction of hematuria.

Under general anesthesia, pelvic computed tomography (CT) scans, with placement of a urethral catheter to locate the urethra, showed a mass located dorsal to the pelvic urethra and compressing the urethra ventrally (Fig. 1). As a result of intravenous administration of iohexol (IOPAQUE 300; Konica Minolta Medical & Graphic, Inc., Tokyo, Japan), contrast enhancement showed at the periphery of the mass. Because the clinical deficit caused by the presence of the mass was severe, it was considered necessary to eliminate the influence of the mass as soon as possible. Therefore, immediately after CT scans, a ventral midline celiotomy with pubiotomy was performed to allow removal of the mass and relief of compression of the urethra. Following pubiotomy, the mass was approached by dividing the lateral ligament of the bladder and reflecting the bladder and urethra ventrally. The origin of the mass was unclear. The mass was carefully dissected away from surrounding structures, such as the urethra, colon and rectum, and then removed. However, unfortunately, the mass was strongly adherent to the serosa of the urethra and colon wall. Therefore, it was impossible to secure sufficient surgical margins within these regions. In addition, surgical injury to these regions could not be avoided. The pubis was
put back together with stainless steel wire sutures, and the abdominal incision was closed routinely.

The excised mass was formalin fixed, and histological examination was carried out using sections stained with hematoxylin and eosin (HE). Focal and solid proliferation of neoplastic epithelial cells and interstitial growth with central necrosis were present within the mass. These cells had eosinophilic to slightly eosinophilic wide cytoplasm and abnormal oval nuclei with clear nucleoli. A few mitoses were observed. The diagnosis of SCC was confirmed by the evidence of cornified cells, while cornification was poor overall (Fig. 2A). The mass involved a luminal structure enclosed by a smooth muscle layer with severe infiltration of neoplastic cells. This observation suggested that the mass had arisen from the uterine remnant (Fig. 2B).

Because papillomavirus infection could contribute to the development of SCC, evaluation for the presence of papillomaviral DNA in the mass was performed by polymerase chain reaction assays. DNA was extracted from formalin-fixed tissue using a DNeasy Blood & Tissue Kit (QIAGEN) according to the manufacturer’s protocol. The consensus primer sets, IFNR-2/IDNT-2 [5], FAP59/FAP64 [2] and MY09/MY11 [9], which have been shown to detect a broad range of papillomaviruses in humans and animal species, were used to detect the feline papillomavirus L1 protein gene. Amplification was performed as described previously [9]. After amplification, samples were analyzed by electrophoresis; however, none of the samples were positive.

After surgery, the cat was administered 0.3 mg/kg piroxicam (Baxo; Taisho Toyama Pharmaceutical Co., Ltd., Tokyo, Japan) every other day for antineoplastic and anti-inflammatory effects. The urethral catheter was removed on day 9. Urination was made possible, and postrenal renal failure associated with dysuria did not relapse. However, the cat experienced intermittent urine and fecal incontinence and mild diarrhea. But, good control of the cat was provided through the effort of the owner, and a good postoperative general condition and quality of life (QOL) were maintained for a while.

Abdominal ultrasonography and retrograde urethrocystography performed for follow-up on day 40 revealed a mass considered to be local recurrence without compression of the urethra. The owner declined further treatment. On day 118, the cat was presented again with anorexia and dysuria for several days. Physical examination revealed enlargement of the relapsed mass. Serum biochemical analysis revealed severe azotemia, with a BUN level>140 mg/dl and a creatinine level of 9.3 mg/dl. A catheter was inserted through the external urethra opening into not only the bladder but also the rectum. A urethrorectal fistula was thought to have formed by neoplastic infiltration of the rectal wall. The cat was euthanized by the owner’s request on day 130, because...
of the difficulty in improving its QOL. The owner did not consent to necropsy.

Severe dysuria, the main clinical sign of the cat, was thought to be caused either by urethral compression caused by the mass or by an effect of the mass on nerves distributed to the bladder and urethra that led to obstructive postrenal azotemia. As a result of mass excision, urination was made possible, and the QOL of the cat was improved. The surgery provided a temporary benefit. Postoperative urine incontinence was speculated to be caused by surgical injury to the nerves distributed to the urethra such as the pudendal nerve and/or the urethral sphincter. Also, postoperative fecal incontinence was speculated to be caused by surgical injury to nerves supplying the colon and rectum. Another report also described that similar symptoms were recognized in a dog given a similar surgery [13]. While urine and fecal incontinence were not resolved completely, good control of general condition was achieved as a result of the gentle character of the cat and dedicated effort of the owner. In spite of continuous administration of piroxicam, about four months after surgical resection, relapses of tumor growth, severe dysuria and subsequent postrenal azotemia were observed. For improvement of prognosis, aggressive adjunctive therapies, such as chemotherapy and radiotherapy, should be considered, with the owner’s consent.

Uterine tumors are rare in cats, constituting 0.29% of feline neoplasms reported in one study [7], and most uterine tumors are adenocarcinomas or leiomyomas. Furthermore, there have so far been only a few reports about tumors in the uterine remnant of spayed female cats. Chronic local inflammation [4] and biomaterials such as nonabsorbable sutures [1] and implants [11] have been associated with the development of neoplasms in animals. In addition, chronic inflammation is regarded as one of the contributors of the SCC development in animals [12]. Three years before developing symptoms, the cat had been sterilized with silk sutures used for ligation of the cervical stump. Therefore, it is possible that nonabsorbable sutures (silk) used in sterilization and chronic inflammation arising from the sutures were associated with the development of SCC in the uterine remnant in this case. However, because the presence of sutures could not be determined on histological examination, their association could not be revealed. Several viral infections, such as FeLV, FIV and papillomavirus, are also suspected risk factors of SCCs [8]. However, because none of these viral infections were proven in this case, their association also could not be revealed.

This is the first report of an SCC arising from the uterine remnant in a spayed cat. This diagnosis should be considered as a possible cause of dysuria in spayed female cats.

REFERENCES


