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Transitional cell carcinoma of urinary bladder along with pyometra in a female German Shepherd dog

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A 10-yr-old female German Shepherd was presented with a history of vomiting and anorexia for 4-5 days. The owner reported reduced feed and water intake. The dog had been mated four to five months earlier but failed to conceive. Purulent discharge had been observed from the genital tract for the past month. Clinical examination revealed dullness and moderate dehydration; however, temperature (103.7°F), heart rate, and respiratory rate were within normal physiological limits. Haematobiochemical analysis showed monocytosis and leukocytosis with neutrophilia. Elevated SGOT (48.85 U/L), blood urea nitrogen (55.08 U/L), and creatinine (2.05 U/L) levels were also recorded, indicating renal injury and uremic gastritis. Transabdominal ultrasonography revealed marked endometrial thickening along with multiple ovarian cysts. The uterine loops appeared anechoic with a distension of 2.93 cm. The urinary bladder was moderately distended and contained an echogenic soft tissue mass (Fig. 1). Based on the history, clinical findings, and ultrasonographic examination, the animal was diagnosed with pyometra, while urine cytology revealed the presence of transitional carcinoma cells (Fig. 2). For further confirmation, transurethral cystoscopy of the urinary bladder was performed, which revealed a large, red, mulberry-like mass within the bladder (Fig. 3).

Fig. 1: Ultrasonography images of moderately distended urinary bladder with presence of echogenic intraluminal mass.

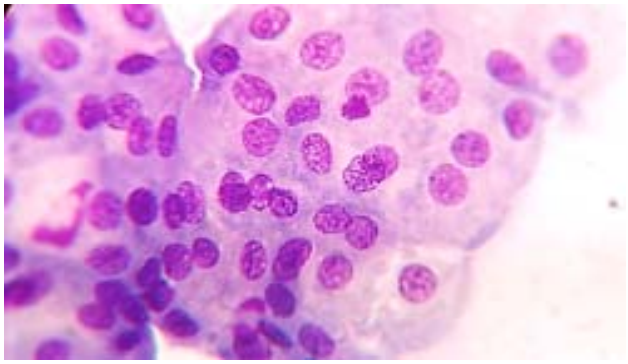

Fig. 2: Transitional carcinoma cells displaying pleomorphism, increased N:C ratio and irregularly bordered de-condensing nuclei.

The dog received supportive care for five days, including intravenous fluids and antibiotic therapy. Radical surgery was scheduled on the sixth day. Laparotomy was performed, and the pus-filled uterine loops along with the cystic ovaries were exteriorized (Fig. 4). The dog had previously been diagnosed with transitional cell carcinoma (TCC), confirmed through cytological and cystoscopic examinations. The owner was informed about the TCC and advised medical management with a single intravenous dose of doxorubicin and oral piroxicam for 21 days. The owner later reported via telephone that the dog was doing well but did not return for reappraisal.

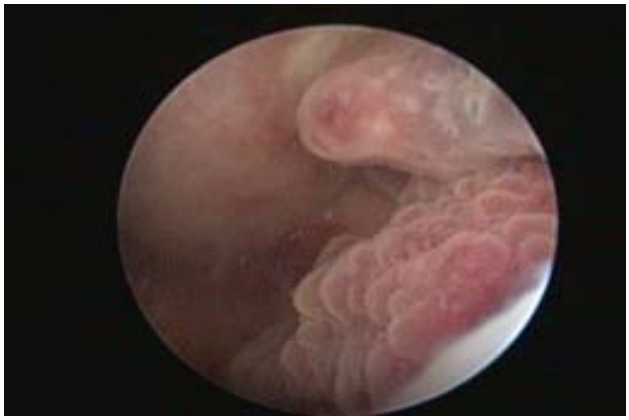

Fig. 3: Transitional cell carcinoma in the urinary bladder lumen obtained with the help of rigid cystoscopy.

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Fig. 4: Cystic structures on ovary and ligation of ovarian vessels.

Pyometra represents the most catastrophic final stage of the slowly evolving CEH–pyometra complex. Ovarian cysts are more frequently observed in dogs over 6-8 years of age, although life expectancy varies among breeds. Possible causes of hormonally active ovarian cysts, which predispose bitches to the development of the CEH–pyometra complex, include occasional hyperestrogenism requiring treatment, insufficient LH surge, intrafollicular changes in gonadotropin receptors, and alterations in growth factor receptors (Sasidharan *et al.,* 2021). During the luteal phase, the uterine environment is favourable not only for pregnancy but also for microbial growth. Progesterone promotes suppression of myometrial contractions, increased secretion, cervical closure, and proliferation of endometrial glands (Cox, 1970). Reduced renal function, leading to urinary dysfunction, may result from immune complex-associated glomerulonephritis or inflammation of the tubulointerstitial region (Gasser *et al.,* 2020). In this study, elevated BUN and creatinine values indicated pyometra-induced renal injury. Altered liver enzyme profiles, likely due to endotoxemia associated with pyometra, suggested intrahepatic cholestasis and impaired hepatocellular function.

The most prevalent bladder cancer in dogs is transitional cell carcinoma (TCC), accounting for 1–2% of all canine cancers and 70–90% of all urinary bladder tumours (Childress *et al*., 2011). Transurethral cystoscopy is a minimally invasive method with a low risk of complications, used to obtain diagnostic-grade tissue samples from lower urinary tract neoplasms (Childress *et al*., 2011). Evidence suggests that certain breeds, such as Scottish Terriers, West Highland White Terriers, Beagles, and Shetland Sheepdogs, are more susceptible to this disease (Knapp, 2001). The development of TCC in dogs has also been associated with female sex, obesity, and pesticide exposure.

The lack of effective treatments for TCC makes it a challenging condition for both pet owners and veterinarians, as tumours often involve the bladder trigone or develop multifocally across the bladder due to intravesical seeding, making them frequently unsuitable for surgical removal (Henry, 2003). Haematuria, stranguria, and pollakiuria are the most common clinical signs in TCC-affected dogs, often persisting for weeks to months before diagnosis (Knapp *et al.,* 2013). Canine TCC has been treated with various chemotherapeutic agents, including carboplatin, cisplatin, doxorubicin, mitoxantrone, cyclophosphamide, and intravesical thiotepa, often in combination with the COX-1/COX-2 inhibitor piroxicam. Piroxicam is considered an important therapeutic adjuvant because it inhibits COX-2, which is expressed in canine bladder TCC tissue but not in healthy bladder epithelium (Khan *et al*., 2000). Currently, chemotherapy in combination with the nonsteroidal anti-inflammatory drug piroxicam is commonly employed (Henry, 2003).

In conclusion, ovariohysterectomy remains the most effective treatment for the majority of uterine disorders, including congenital malformations, pyometra, cystic ovaries with localized or diffuse CEH, uterine prolapse, neoplasia, and rupture.

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