Short Communication

CYSTITIS CYSTICA ET GLANDULARIS IN A DOG AND ITS MANAGEMENT: A CASE REPORT

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ABSTRACT

Cystitis cystica et glandularis (CCEG) with inverted papilloma are rare, benign bladder lesions in dogs, often arising from chronic irritation. Though non-neoplastic, they may mimic malignancies like transitional cell carcinoma, necessitating thorough investigation. A nine-years-old intact male Labrador retriever, was presented with the history of persistent hematuria and dysuria unresponsive to medical therapy. Ultrasonography revealed thickened bladder wall and mucosal projections suggestive of neoplasia. Cystotomy exposed multiple sessile proliferations, which were excised. Histopathology confirmed cystitis cystica et glandularis with inverted papilloma, featuring urothelial cords and von Brunn nests. The animal had an uneventful recovery..

Key words: Cystitis cystica et glandularis, inverted papilloma, dog

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INTRODUCTION

Cystitis cystica et glandularis (CCEG) is a rare, benign proliferative lesion of the urinary bladder epithelium marked by urothelial invaginations (von Brunn nests) and gland-like metaplastic transformations due to chronic irritation or inflammation (Pope *et al.*, 2017). Proliferative bladder lesions like these are found in up to 60–80% of canine bladder samples, with cystitis cystica composing about 60% of those cases, commonly seen in middle-aged to older dogs with a median age of 8.5 to 10 years (Mutsaers *et al*., 2003; Allen *et al.*, 2019). Males represent roughly 70–75% of affected cases, attributed partly to hormonal factors and higher incidence of urinary tract infections and uroliths in intact males (De Cock *et al*., 2007; Meuten, 2017). Although

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no breed predisposition is firmly established, Labrador Retrievers and German Shepherds are commonly reported, likely reflecting their popularity (Allen *et al.*, 2019). Untreated CCEG can cause persistent urinary symptoms such as hematuria and dysuria, lead to recurrent infections, urolithiasis, and bladder wall thickening, and rarely, progress to preneoplastic or mimic malignancy, necessitating early diagnosis and management (Hernandez *et al.*, 2007; Ryu *et al*., 2023). This condition may co-occur with inverted papilloma, a rare lesion complicating diagnosis and treatment, as described in geriatric Labrador Retrievers (Allen *et al.*, 2019). This report presents a rare case of cystitis cystica et glandularis with inverted papilloma in a geriatric Labrador retriever, highlighting the diagnostic challenges and successful surgical management of this uncommon condition.

CASE HISTORY AND OBSERVATIONS

A nine-years-old intact male Labrador retriever weighing 40 kgs was presented with the history of hematuria and dysuria. The pet had been under long-term management for osteoarthritis for two years with daily administration of Elite Flex Forte, a joint supplement containing glucosamine and chondroitin, to support joint health. Carprofen, an NSAID, was administered only as needed (SOS) for a brief duration of five days early in treatment to manage acute inflammation. After two years of osteoarthritis therapy, the pet developed new urinary symptoms of hematuria and dysuria, prompting further diagnostic evaluation. Ultrasonography revealed 0.8 cm bladder wall thickening and multiple small sessile mucosal projections (Fig. 1.1), raising concern for urothelial carcinoma, increasingly reported in older dogs (Meuten, 2017; Foster, 2017). Chronic inflammatory bladder lesions may present similarly and mimic neoplastic growths in geriatric dogs (Hernandez *et al*., 2007). Plain radiography was performed and showed no urinary stones; contrast studies were avoided due to anesthetic risks associated with the pet's cardiac condition. Urine was collected by cystocentesis and submitted for analysis and culture; results were negative, excluding infection. Chest X-rays revealed mild cardiomegaly without pulmonary edema, and echocardiography showed stable cardiac function with mild mitral valve insufficiency. Hematobiochemical evaluation prior to osteoarthritis treatment showed mild anemia with normal renal and hepatic parameters, whereas post-treatment tests revealed slightly elevated liver enzymes, likely attributable to short-term NSAID use, with renal function remaining stable. This comprehensive assessment aided in differentiating chronic inflammatory bladder lesions from neoplastic disease in a complex geriatric patient.

TREATMENT AND DISCUSSION

Diagnostic evaluation of the pet revealed persistent leukopenia (WBC: 2.8 $\times 10^3/\mu L$), elevated ALT (75 IU/L), creatinine (1.9 mg/dL), and hypoalbuminemia (2.4 g/dL), indicating chronic systemic illness (Table 1.1). Urinalysis showed inflammation, and cytology revealed degenerated urothelial and squamous metaplastic cells with red blood

cells and coccobacilli but no malignancy (Fig. 1.2). Due to ongoing hematuria and inconclusive cytology, surgical exploration was warranted. Ultrasonography revealed bladder wall thickening (0.8 cm) and multiple sessile mucosal projections (Fig. 1.3), suspicious for cystitis cystica et glandularis or neoplasia. Prostatomegaly was also observed on radiography, suggesting concurrent prostatic disease.

Premedication comprised a combination of xylazine (1 mg/kg IM), butorphanol (0.2 mg/kg IM), and ketamine (10 mg/kg IM), which provided adequate sedation and analgesia for induction. Anesthesia was induced with a ketamine-propofol mixture in a 1:1 ratio at 1 mL per 10 kg IV, followed by isoflurane in oxygen for maintenance. Intraoperative antibiotics included Intacef Tazo (25 mg/kg once daily), continued postoperatively for 14 days, alongside injectable buprenorphine (0.02 mg/kg) for analgesia. Laparotomy revealed an irregular bladder with vascular striations (Fig. 1.5), and cystotomy exposed multiple papillary mucosal proliferations (Fig. 1.6), which were excised for histopathology. Intravesical adrenaline was instilled to control hemorrhage. Castration was performed given suspected hormonal influence.

Postoperative care consisted of intravenous fluid therapy with ringer's lactate, dextrose normal saline, and metronidazole for 5 days to maintain hydration, electrolyte balance, provide caloric support, and prevent anaerobic infection. Recovery was uneventful, with improvement in urinary signs and suture removal by day thirteen, consistent with outcomes reported for benign bladder lesion surgeries.

RESULTS AND DISCUSSION

In the present case, cystitis cystica et glandularis (CCEG) with inverted papilloma represents a benign yet clinically significant proliferative lesion of the urinary bladder. Contributing factors such as chronic inflammation, infection, urinary calculi, and hormonal influences are implicated in the pathogenesis of such bladder conditions (De Cock *et al*., 2007). Surgical excision in this case served both diagnostic and therapeutic purposes by enabling definitive histopathological diagnosis and providing symptomatic relief. Microscopically, bladder sections revealed polypoidal invaginations of urothelial cords and trabeculae extending into the lamina propria, exhibiting peripheral palisading and central cell streaming. Numerous von Brunn nests arranged in lobular clusters were observed, some forming gland-like lumina lined by cuboidal to columnar epithelium. The tumor cells had uniform, bland nuclei without mitotic figures or cytological atypia, confirming the diagnosis of cystitis cystica et glandularis with inverted papilloma (Fig. 1.7).

Cystitis cystica arises from cystic changes of von Brunn nests, while cystitis glandularis represents metaplasia into gland-like epithelium (Magied *et al*., 2024). Inverted papillomas show an endophytic growth pattern of urothelial cords into the lamina propria (Fang and Delahunt, 2021).

Despite their benign nature, these lesions closely mimic malignant bladder tumors such as transitional cell carcinoma (TCC), the most common bladder malignancy in older dogs (Meuten, 2017; Mutsaers *et al*., 2003). Clinically, these lesions share signs including hematuria, dysuria, and bladder wall irregularities, complicating diagnosis. Histopathological examination remains the gold standard to differentiate benign proliferative lesions from aggressive malignancies, preventing overtreatment. The coexistence of cystitis cystica et glandularis with inverted papilloma in this case emphasizes the complex nature of proliferative bladder lesions and underscores the importance of comprehensive histological evaluation for accurate diagnosis, appropriate management, and prognostication.

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CONCLUSION

This case report documents the successful diagnosis and surgical management of cystitis cystica glandularis with inverted papilloma in a geriatric Labrador retriever with systemic comorbidities.

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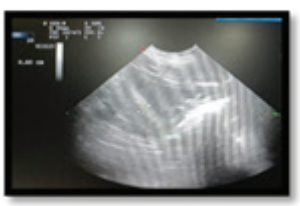

Fig.1.1. Thickened bladder wall

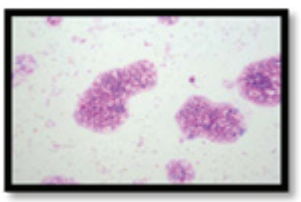

Fig.1.2. Degenerated urothelial cells, RBCs and coccobacillary clusters

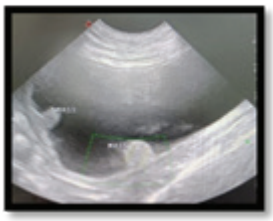
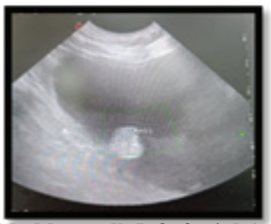

Fig.1.3. Masses attached to bladder wall (left & right)

Fig. 1.4: Enlarged prostate

Fig. 1.5: Bladder outer wall-vascular striations


Fig. 1.6: Multiple small, sessile, inverted papillary proliferations along the bladder mucosa

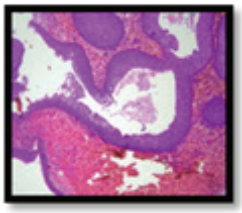

Fig. 1.7: Lobular Von Brunn Nests

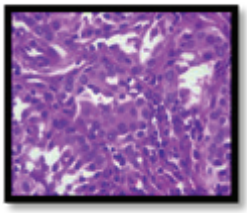

Fig. 1.8: Bland uniform tumor cells

Table 1.1: Hematological and serum biochemistry parameters

Parameters	Results	Reference range
WBC (x103)	2.8	6-17
NQ (%)	89.5	58-85
LQ (%)	7.3	8-21
Mon (%)	3.2	2-10
RBC (x106)	6.4	5.5-8.5
Hb (g/dl)	12.8	12-18
PCV (%)	36.2	37-55
PLT (x103)	280	175-500
Creat (mg/dl)	1.9	0.4-1.4
ALT (U/L)	75	17-78
Albumin(g/dL)	2.4	2.6-4

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