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Successful conjunct outcome of non-trigonal transitional cell carcinoma through mitoxantrone-piroxicam with partial cystectomy in a labrador bitch

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Abstract

Transitional cell carcinoma (TCC) is the most common malignant neoplasm affecting the urinary bladder in dogs and is frequently diagnosed in middle-aged to older dogs. Most patients present with a history of hematuria, and urinary incontinence. An 8-year-old female labrador dog presented with the clinical signs of inappetence, dysuria, and pyuria was brought to small animal surgery outpatient ward unit of Madras Veterinary College. Hematobiochemical analysis revealed anaemia, thrombocytopenia, elevated alkaline phosphatase and altered calcium phosphorous ratio. RT-PCR test results showed positive for Babesiosis caused by Babesia gibsoni and Ehrlichiosis caused by Ehrlichia canis infection. Abdominal ultrasonography revealed irregular echogenic mass adhering to the ventral wall of urinary bladder measuring around 3.7 cm in length associated with, bilateral renal cortical hyper echogenicity. The dog was medicated with piroxicam and mitoxantrone for a period of three months preoperatively. Exploratory laparotomy, partial cystectomy involving the tumor mass was performed. Histopathology revealed transitional cell carcinoma of the bladder. The dog had an uneventful recovery following periodic post operative management.

Keywords: Bladder, transitional cell carcinoma, partial cystectomy, canine

Introduction

Transitional cell carcinoma (TCC), also referred to as urothelial carcinoma, is the most common malignant tumour of the urinary bladder in dogs, accounting for approximately 50-75% of all canine bladder neoplasms. It arises from the transitional epithelium lining the urinary bladder and is most frequently observed in middle-aged to older dogs. Certain breeds, including Scottish Terriers, Shetland Sheepdogs, Beagles, West Highland White Terriers, and Labrador Retrievers, are considered predisposed to the disease. The exact etiology of TCC remains unclear; however, genetic susceptibility, environmental carcinogens, and chronic inflammation of the urinary tract have been implicated as contributing risk factors.

Case History

An 8-year-old intact, female labrador dog was brought to the small animal surgery outpatient ward unit of madras veterinary college teaching hospital with a history of inappetence, dysuria, and pyuria past 3 months. On presentation, the dog was found to be lethargic and dehydrated. Abdominal ultrasonography revealed irregular echogenic mass adhering to the ventral wall of bladder measuring around 3.7 cm in length noticed along with thickened and hyperechoic cortex of both the kidneys with normal size and contour. A routine hematobiochemical profile was carried out to ascertain the general health of the animal that revealed anaemia, thrombocytopenia, elevated alkaline phosphatase and altered calcium phosphorous ratio. RT-PCR was performed to diagnose the etiology of anaemia and thrombocytopenia. Blood smears were positive for Babesia gibsoni and Ehrlichia canis infection. Echocardiography revealed normal study without any abnormalities. The dog was medicated with Ringer's lactate, Doxycycline, Metronidazole, Clindamycin, Piroxicam, Mitoxantrone, Prednisolone, Pantoprazole, Syr. aRBCe, Syr. Thromb up and a indwelling urinary catheter was fixed.

Urine analysis revealed dark-brown turbid urine which contained increased red blood cells and clumps of transitional epithelial cells under high-power field (hpf.). Urine cytology and post operative biopsy sample revealed transitional cell carcinoma. Repeat blood profiles were performed to ascertain the normal range for partial cystectomy.

Treatment and Discussion

Mitoxantrone was administered intravenously (5 mg/m²) every 21 days, thrice. While piroxicam was administered orally (0.3 mg/kg/day) for three months preoperatively. The dog was premedicated with butorphanol (0.2 mg/kg) and diazepam (0.25 mg/kg) intravenously. Anaesthesia was induced with propofol (2 mg/kg) intravenously. Following induction, intubation with cuffed endotracheal tube (8.5 mm) was performed and the animal was placed in dorsal recumbency, anaesthesia was maintained under isoflurane with oxygen in rebreathing circuit. The surgical site was prepared aseptically and the site was surgically draped. A caudal ventral midline incision was made and the bladder was exteriorized. The inner mucosa was of the bladder that revealed an irregular highly vascularized mass of 5x3.5 cm

on the ventral bladder mucosal lining. Since the mass was highly extensive and invasive involving all the layers of the bladder, partial cystectomy was planned to prevent recurrence. Minor hemorrhage observed were arrested and major vessels were ligated with 3-0 PGA. Following partial cystectomy, the bladder was opposed with 3-0 PGA swaged round bodied needle in a double layered suture pattern followed by cushioning suture. Leakage test was negative which was performed through retrograde flushing of isotonic normal saline through urinary catheter. Omentalization was done to reinforce the surgical site and augment healing. The abdomen was lavaged with normal saline and the laparotomy site was sutured as per standard protocols and an indwelling urinary catheter was left insitu to confirm patency. Postoperatively Amoxycillin, TBR (Trypsin, Bromelain, Rutoside) and Tramadol was given orally for a period of five days. Post-operative radiography, and ultrasound were carried out to ascertain bladder health and to evaluate bladder filling defects, if any. The pet had an uneventful recovery without any postoperative complications and periodic review of the pet revealed normal urination with normal appetite



Fig 1: Abdominal ultrasonography showing irregular echogenic mass on ventral bladder wall measuring around 3.7 cm length (a) along with thickened and hyperechoic cortex of the left kidney (b).

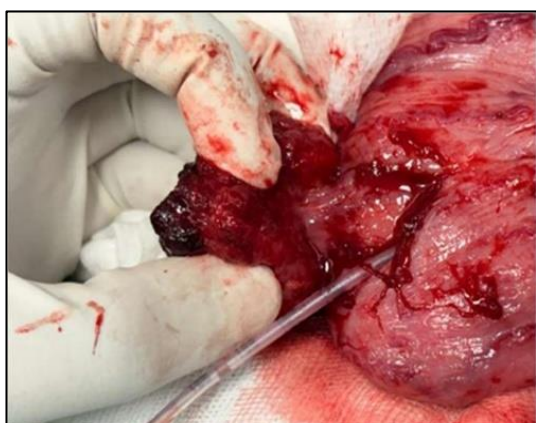


Fig 2(a): Intraoperative image showing tumor mass in the ventral bladder wall mucosa



Fig 2(b): Image showing excised tumor mass along with partial cystectomy.

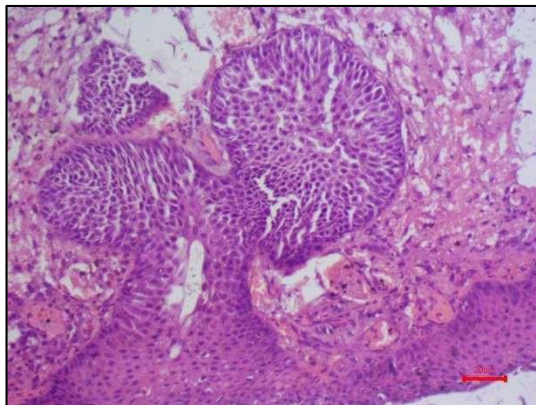


Fig 3(a): Histopathology (Haematoxylin and Eosin) image showing hyperplastic urothelium

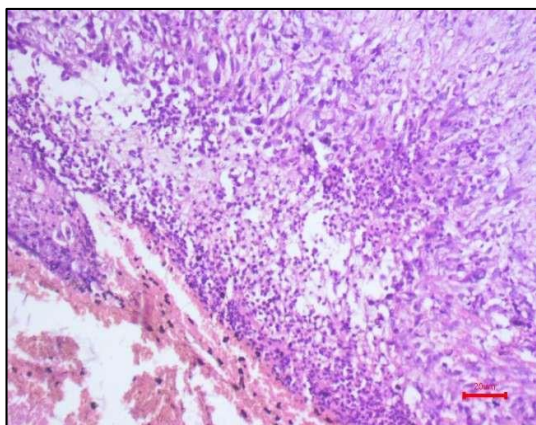


Fig 3(b): Image showing diffuse severe infiltration of numerous neutrophils with haemorrhage.

Transitional cell carcinoma (TCC) is considered the most common malignant tumour of the canine urinary bladder, predominantly affecting middle-aged to older female dogs. The present case involved an 8-year-old female Labrador Retriever, which correlated with Mutsaers *et al.* (2003) [8] described canine TCC as a disease commonly affecting older dogs with clinical manifestations such as hematuria, dysuria, and pollakiuria, all of which were evident in the present case.

Most canine TCCs arise from trigonal region of the bladder, that challenging the surgeon for complete surgical excision due to invasiveness to the ureters and urethra. In contrast, the present case revealed tumor that originated from the ventral non-trigonal region of the bladder, that implicates partial cystectomy. Similar observations were reported by Aoki *et al.* (2012) [2] who demonstrated that dogs with apical or non-trigonal bladder tumours underwent partial cystectomy in combination with piroxicam therapy that showed significant longer survival times in comparison with conservative.

Clinical signs observed in the present case, include dysuria, hematuria, pyuria and lethargy, that were coincidental with Mutsaers *et al.* (2003) [8] describing lower urinary tract signs as the most frequent presenting complaints in dogs with TCC. Ultrasonographic findings of irregular echogenic intravesical mass adherence to the bladder wall also correlated with characteristic imaging findings described in the present case.

The concurrent infection with *Babesia gibsoni* and *Ehrlichia canis* contributed to anaemia and thrombocytopenia in the present case, that complicated the therapeutic management.

Stabilization of hematobiochemical parameters prior to surgery was therefore essential. Such systemic compromise can negatively influence prognosis and tolerance to chemotherapy, emphasizing the importance of comprehensive preoperative evaluation and supportive therapy.

The combination of mitoxantrone and piroxicam administered in the present case has been widely recognized as one of the golden chemotherapy for canine TCC. Henry *et al.* (2003) [6] reported that combined therapy with mitoxantrone and piroxicam resulted in improved clinical response and prolonged median survival time compared with piroxicam alone. The protocol was also associated with acceptable tolerability and improved quality of life in affected dogs. Similar findings were observed with Allstadt *et al.*, 2015 [1] with favourable tumour control.

Partial cystectomy was planned due to invasiveness to the ventral bladder wall and hence complete excision is mandate without the trigone that were in correlation with Marvel *et al.* (2017) [7] Similarly, Aoki *et al.* (2012) [2] suggested that surgical intervention combined with NSAID therapy improved survival in dogs with apical bladder tumours.

Omentalization of bladder augmented and provoked healing and vascular support. The successful recovery in terms of absence of urinary leakage, urinary leakage, stranguria, or recurrence of clinical signs emphasized that combination of surgical excision with adjunct chemotherapy and NSAID therapy in non-trigonal TCC cases.

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