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Surgical management of scrotal mast cell tumor in a geriatric dog

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Abstract

A 12-year-old non-descript male dog was presented with a history of progressive swelling in the scrotal region of two months duration, accompanied by concentrated urine. Clinical examination revealed a firm, non-reducible swelling confined to the scrotal tissue, with both testes palpable and normal in size and consistency. Hematological evaluation showed mild anemia and neutrophilia, but no major systemic abnormalities. Based on clinical suspicion, surgical excision with scrotal ablation and bilateral orchiectomy was performed under general anesthesia. The excised mass was submitted for cytopathological examination, which revealed a moderately differentiated mast cell tumor (MCT), categorized as high grade on the Kiupel two-tier system and Grade II on the Patnaik scale. Postoperative recovery was uneventful with no evidence of local recurrence at 30 days. This report highlights the surgical management and pathological features of scrotal mast cell tumors in dogs.

Keywords: Mast cell tumor, dog, scrotal ablation, castration, oncology

Introduction

Mast cell tumours (MCTs) are common tumours of the canine skin, estimated to represent up to 20% of all skin tumours in the species (Dobson and Scase, 2007) [3]. Though a substantial number of dogs present with multiple tumors, tumors are typically solitary. MCT usually impacts older dogs (mean age of 9 years), but it can also happen to puppies younger than a year. Gender distinction does not exist. MCT is frequently observed to occur in boxers, retrievers, pugs, Boston terriers, and pit bull terriers (Blackwood *et al.*, 2012) [1].

It has been reported that mast cell tumors of the preputial, inguinal, and other mucocutaneous sites tend toward more aggressive behavior (Thamm *et al.*, 2007) [8]. More recent reports indicate that tumors in scrotal and inguinal areas behave similarly to tumors in other cutaneous locations, although, when the data are critically evaluated, there is a trend towards more aggressive behavior (Sfiligoi *et al.*, 2005) [7]. Treatment for scrotal tumors and testicular tumors with scrotal adhesions involves scrotal ablation and castration. Three-cm margins on all sides are advised because even distinct MCTs may extend deeply into surrounding tissue (Fossum, 2012) [4].

The present report describes the surgical management of a geriatric dog with a scrotal mast cell tumor, with emphasis on anesthesia, surgical technique, histopathological findings, and short-term outcome.

Materials and Methods

A 12-year-old non-descript male dog was presented to the Small Animal OPD, Department of Veterinary Surgery and Radiology, Veterinary College, Hebbal, Bengaluru, with a firm, progressively enlarging scrotal swelling persisting for two months (Fig. 1). The owner reported concentrated urine but no systemic illness. On clinical examination, both testes were palpably normal in size and consistency, and not directly involved in the swelling. The mass was confined to the scrotal wall, firm in consistency, and non-painful. Vital parameters were within physiological range: temperature 102.2 °F, heart rate 110 beats/min, and respiratory rate 36 breaths/min.

Hematological evaluation revealed all parameters within normal physiological range (Hb 9.6 g/dL, PCV 25.5%, TLC 9,800/ μ L with 85% neutrophils, PLT 2.29×10^5 / μ L), and serum biochemistry revealed normal renal profile (CRT 1.59 mg/dL). These findings indicated suitability for anesthesia and surgery.

The dog was fasted overnight. Pre-anesthetic medication consisted of Inj. Atropine sulfate (0.04 mg/kg, IM) followed by Inj. Xylazine hydrochloride (1 mg/kg, IM) for sedation. Induction was achieved with Inj. Thiopental sodium at 4 mg/kg IV to effect, and anesthesia was maintained with additional doses as required. Perioperatively, Inj. Ceftriaxone (25 mg/kg, IV) and Inj. Meloxicam (0.2 mg/kg, IM) were administered.

The perineal and scrotal regions were aseptically prepared by clipping and scrubbing with 7.5% povidone-iodine scrub solution. A circumscrotal skin incision was made (Fig. 2), and electrocautery was used for hemostasis. Sequential dissection exposed both testicles, which were exteriorized one after the other. Standard orchiectomy technique was followed: the spermatic cord was triple-clamped, transfixation was done proximally with chromic catgut No. 0, and transected distal to the ligature. The same procedure was repeated on the contralateral side.

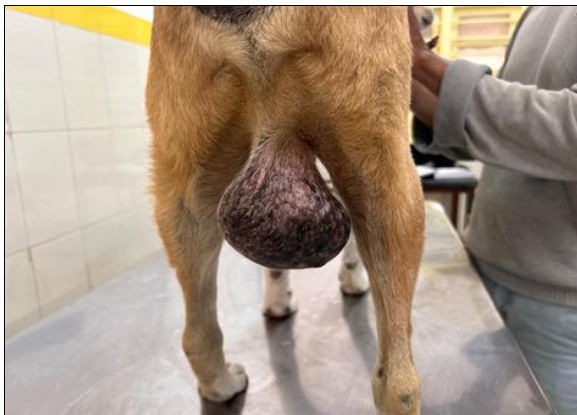


Fig 1: Pre-operative scrotal swelling

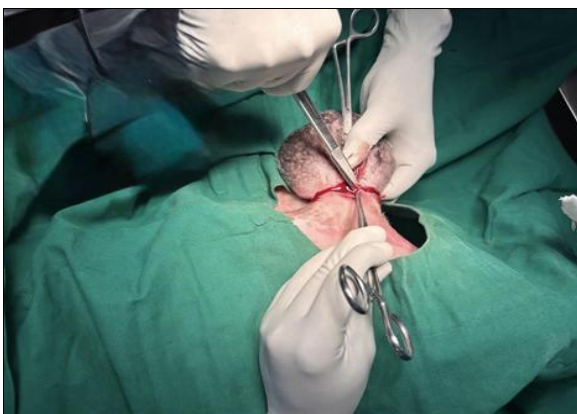


Fig 2: Circumscrotal incision

Following bilateral orchiectomy, complete scrotal ablation was performed (Fig. 3) along with excision of the tumor mass (Fig. 4). Subcutaneous tissue was closed with polyglactin 910 (Vicryl No. 0) in a simple interrupted pattern, and skin closure was performed with polyamide (Trulon No. 0) using simple interrupted sutures.

The excised tissue was submitted for cytological and histopathological evaluation.

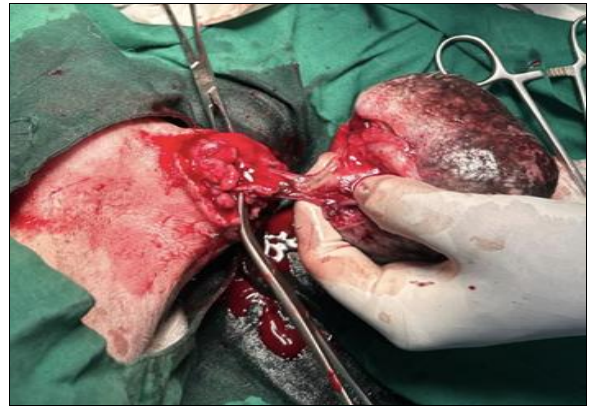


Fig 3: Removal of tumour mass intraoperatively



Fig 4: Excised tumour mass

Microscopic examination revealed moderately differentiated round cell neoplasia composed of pleomorphic mast cells arranged in sheets and cords (Fig. 5). Distinct intracytoplasmic granules, binucleated cells, and 2-3 mitotic figures per high-power field were observed (Fig. 6). Eosinophil infiltration was prominent. No vascular invasion was detected. Grading was assigned as high-grade on the Kiupel two-tier system and Grade II on the Patnaik scale.

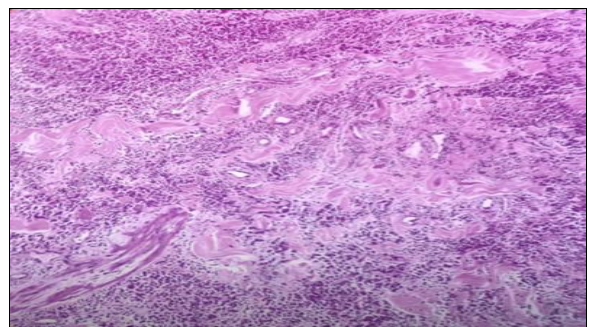


Fig 5: Pleomorphic Mast Cell Neoplasia seen on cytology under 10x

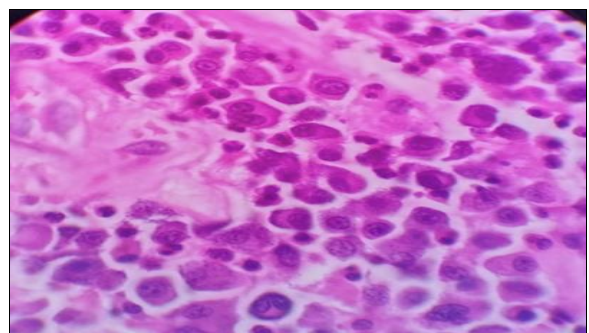


Fig 6: Cytology smear under 40x revealing mitotic figures and intracytoplasmic granules

Postoperatively the dog was maintained on Cephalexin (30 mg/kg, PO, BID for 7 days) and Carprofen (4 mg/kg, PO, SID for 3 days). Wound inspection and owner follow-up were performed regularly.

Results and Discussion

The dog recovered uneventfully from anesthesia, showing sternal recumbency within 30 minutes of surgery. Appetite returned within 24 hours, and wound healing progressed without complications. Sutures were removed on day 10. No signs of local recurrence were detected at 30-day follow-up.

MCTs are easily identified by cytological analysis of stained smears of fine-needle aspirates (FNAs). Although cytology alone cannot grade MCT, it might be able to provide some indication of the tumor cells level of differentiation. Excisional samples ought to be sent for histological grading as a result (Dobson and Scase, 2007) [3].

The grading systems developed by Bostock in 1973 and Patnaik *et al.* in 1984 (Bostock, 1973; Patnaik *et al.*, 1984) [2, 6] were the two most commonly used histologic grading systems for canine cutaneous MCTs. Both systems were 3-tier grading systems; however, they grade MCTs in reverse order to one another, with well-differentiated MCTs being Patnaik grade 1 and Bostock grade 3, intermediately differentiated tumors being Patnaik and Bostock grade 2, and poorly differentiated tumors being Patnaik grade 3 and Bostock grade 1 (Kiupel *et al.*, 2011) [5].

Kiupel *et al.* (2011) [5] proposed a two-tier grading system for canine mast cell tumours where high-grade tumors, as identified in this case, are typically associated with a poorer prognosis due to aggressive behavior and higher metastatic potential. However, wide surgical excision with adequate margins remains the cornerstone of management and can provide good local control, especially in cases without vascular invasion or metastasis (Blackwood *et al.*, 2012) [1].

The absence of systemic metastasis and negative vascular invasion in this case were favorable prognostic indicators. Still, long-term monitoring is recommended, as high-grade MCTs might recur or metastasize months after surgical excision. Adjunctive therapies such as corticosteroids, antihistamines, tyrosine kinase inhibitors (toceranib), or chemotherapy might be warranted in recurrent or disseminated cases (Dobson and Scase, 2007) [3].

Conclusion

The present case describes the successful surgical management of a scrotal mast cell tumor in a geriatric dog through bilateral orchiectomy and complete scrotal ablation. Histopathology confirmed a high-grade mast cell tumor, yet the animal showed favorable short-term recovery without recurrence at 30 days. Early diagnosis, complete excision with wide margins, judicious anesthetic management, and vigilant postoperative care are essential for favorable outcomes in canine mast cell tumors.

Conflict of Interest

Not available

Financial Support

Not available

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