



ISSN: 2456-2912

VET 2025; 10(1): 04-07

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www.veterinarypaper.com

Received: 12-11-2024

Accepted: 16-12-2024

Afreed Muhammed NV
Ph.D. Scholar- Veterinary
Physiology, ICAR-IVRI,
ICAR-NIANP, Bengaluru,
Karnataka, India

Saniyya A
Final Year MVSc– Veterinary
Surgery and Radiology Student,
College of Veterinary and Animal
Sciences, Pookode, Kerala, India

Joju Johns
Veterinary Surgeon, District
Veterinary Center, Kozhikode,
Kerala, India

Jinesh Kumar NS
Assistant Professor, Veterinary
Surgery and Radiology Students,
College of Veterinary and Animal
Sciences, Pookode, Kerala, India

Aiswarya M Bijoy
Final Year BVSc Students,
College of Veterinary and Animal
Sciences, Pookode, Kerala, India

Aju Alexander
Final Year BVSc Students,
College of Veterinary and Animal
Sciences, Pookode, Kerala, India

Corresponding Author:
Afreed Muhammed NV
Ph.D. Scholar- Veterinary
Physiology, ICAR-IVRI,
ICAR-NIANP, Bengaluru,
Karnataka, India

Surgical management of testicular tumour in a senior dog

Afreed Muhammed NV, Saniyya A, Joju Johns, Jinesh Kumar NS, Aiswarya M Bijoy and Aju Alexander

DOI: <https://dx.doi.org/10.22271/veterinary.2025.v10.i1a.1981>

Abstract

This case report details the surgical management of testicular tumour in a 9 year old male Spitz dog. The animal was presented at DVC, Kozhikode with a history of a fluctuating pendulous swelling at caudo-ventral abdominal region since the past few months. There was generalized alopecia without signs of pruritus except for the head. Palpation of the mass did not elicit any pain reflex and the mass appeared to be hard, but mildly fluctuating. Ultrasonography showed that the mass was an undescended testicle. Fine needle aspiration cytology of the mass revealed spermatozoa and abnormal cells. The condition was diagnosed as testicular tumour of the undescended testicle. Surgical removal of the testicular mass under general anaesthesia was done and the dilated inguinal hernia ring was apposed using PGA No. 0. On histological examination, the tumour was confirmed as Sertoli cell tumour. Post-operative antibiotics and pain medications were administered for 7 days. The surgical wound was cleaned and dressed aseptically. Sutures were removed 14 days post the surgery. The animal had an uneventful recovery. Clinical signs of feminization were found to be disappearing with regrowth of body hairs.

Keywords: Feminising tumor, Sertoli cell tumor, cryptorchidism, sebaceous gland atrophy, orchietomy

1. Introduction

Primary testicular tumors are the most prevalent neoplasms in male dogs, accounting for approximately 90% of all tumors affecting the male genitalia (Liao *et al.*, 2009) [1]. According to the World Health Organization (WHO) classification of tumors in domestic animals, the primary types of testicular tumors in dogs include sex cord stromal tumors, germ cell tumors, and mixed germ cell sex cord stromal tumors (Nielsen and Lein, 1974) [2]. Among these, Sertoli cell tumors (SCTs) and interstitial cell tumors (ICTs) are the most common within the sex cord stromal category. Several factors contribute to the development of testicular tumors in dogs, including advanced age, specific breeds, cryptorchidism, and exposure to environmental carcinogens. Older male dogs, particularly those aged nine years or older, are at greater risk. Cryptorchidism significantly increases the likelihood of tumor development, as undescended testes are more prone to neoplasia. Certain breeds, such as Boxers, German Shepherds, Afghan Hounds, Weimaraners, and Shetland Sheepdogs, are also more predisposed to these tumors.

Clinically, affected dogs often present with unilateral or bilateral testicular enlargement, along with firmness or irregularities in the testicular structure. Systemic signs include feminization syndrome, which occurs in approximately 25-50% of cases and is attributed to excessive estrogen secretion by neoplastic Sertoli cells (Padaliya *et al.*, 2023) [3]. This dysregulated endocrine activity leads to overproduction of estrogenic hormones such as estradiol-17 β . Elevated estrogen levels disrupt the hypothalamic-pituitary-gonadal (HPG) axis, suppressing testosterone production by Leydig cells through feedback inhibition. Additionally, increased inhibin secretion by Sertoli cells exacerbates the suppression of follicle-stimulating hormone (FSH), further impairing testicular function.

The systemic effects of hyperestrogenism include notable skin changes, such as atrophy of sebaceous glands, alterations in hair follicle cycling, bilateral symmetrical alopecia, and hyperpigmentation (Gokulakrishnan *et al.*, 2023) [4].

Importantly, these clinical signs are generally reversible with the surgical excision of the tumor. The present paper details the diagnosis and surgical management of a Sertoli cell tumor in a senior male Spitz dog, highlighting the clinical presentation, diagnostic approach, and successful therapeutic intervention.

2. Case History and Clinical Examination

A 9 year old male Spitz dog weighing 8.5 kg was presented at DVC Kozhikode with a history of a pendulous tumour at caudo-ventral abdominal region since last few months and generalized alopecia, except for the head. Clinical examination revealed a respiratory rate of 32 breaths per minute, pulse rate of 120 beats per minute, pale roseate mucous membrane and a rectal temperature of 102.1oF. On palpation of caudal ventral abdomen, a mass could be found

which was hard in consistency. Only one testicle was descended.

Complete haemogram was unremarkable except for a mild elevation of total leukocyte count and low platelet count (Table). Ultrasound examination of the abdomen was performed and the mass was identified as identified as an undescended testicle (Figure 1). The lack of testicle inside scrotum helped to confirm the mass as undescended testicle. Further the diagnosis was confirmed by a fine needle aspiration cytology of the mass which revealed the presence of spermatozoa and abnormal cells.

Based on history, clinical sign, physical examination and ultrasonography and cytological examination findings, the condition was diagnosed as testicular tumour of the undescended testicle.



Fig 1: The case on day of presentation, showing distended mass in the caudo-ventral abdomen

Table 1: Haematological Parameters

Parameter	Result	Parameter	Result
Total Leucocyte Count ($\times 10^3/\mu\text{L}$)	21	Mean Corpuscular Volume (fL)	63.1
Granulocyte ($\times 10^3/\mu\text{L}$)	17	Mean Corpuscular Haemoglobin (pg)	20.6
Lymphocytes ($\times 10^3/\mu\text{L}$)	3	Mean Corpuscular Haemoglobin Concentration (g/dL)	32.8
Monocyte ($\times 10^3/\mu\text{L}$)	1	Red cell Distribution Width (%)	17.7
Total Erythrocyte Count ($\times 10^6/\mu\text{L}$)	5.51	Platelet count ($\times 10^3/\mu\text{L}$)	94
Haemoglobin (g/dL)	11.4	Mean Platelet Volume (fL)	7.8
Volume of Packed Red Cells (%)	34.7		
Plateletcrit (%)	0.073		

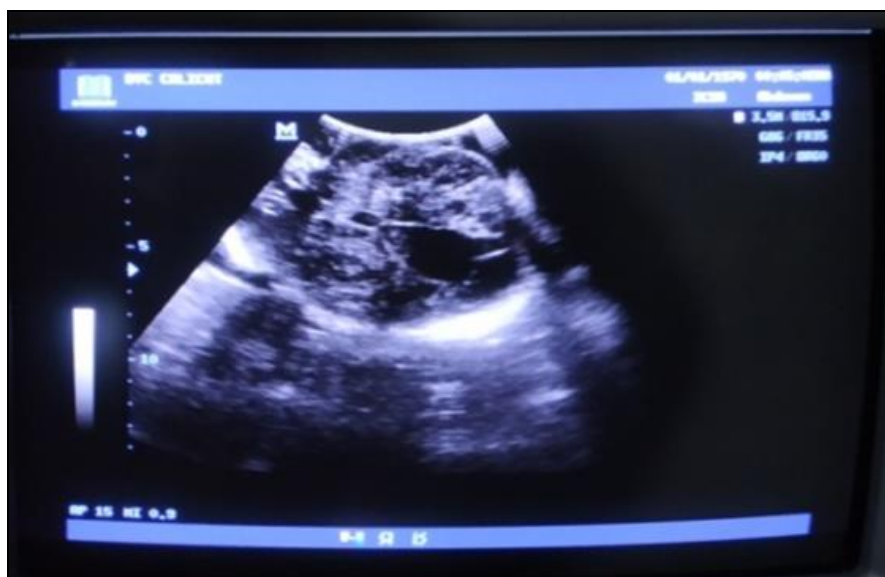


Fig 2: Ultrasonogram of the mass

3. Surgical correction

3.1 Preoperative Care

The owner was advised to withhold food and water for 12 hours and 6 hours prior to surgery, respectively. The skin above the tumour mass was clipped, shaved, surgically scrubbed and aseptically prepared with tincture of iodine solution. Prior to the surgery, the animal was given Ceftriaxone tazobactam at the dose rate of 20mg/kg body weight intravenously and meloxicam at the dose rate of 0.2 mg/kg s/c. Animal was premedicated with injections Inj. Atropine at the dose rate of 0.045 mg/kg S/c and Xylazine (20mg/mL) at a dose rate of 1mg/kg body weight im. General anaesthesia was induced with Propofol at a dose rate of 4mg/kg bodyweight iv, Ketamine (50mg/mL) at a dose rate of 5mg/kg body weight iv and midazolam (1mg/mL) at a dose rate of 0.2mg/kg iv. The anaesthesia was maintained with intermittent bolus dose of ketamine and midazolam at the dose of 2.5 mg/kg and 0.1 mg/kg body weight respectively. The dog was placed on lateral recumbency, the thoracic limbs were fixed cranially and the pelvic limbs were fixed caudally in a relaxed position.

3.2 Surgical procedure

The skin incision was made using a No 22 BP blade over the inguinal region. The incision was extended to exteriorize the tumour mass (Figure 3, Figure 4), after exteriorizing the tumour, the vascular bundle and spermatic cord was separated and double ligated using suture PGA No. 0. The dilated inguinal canal was corrected using PGA No 0 in simple interrupted pattern without obliterating the vascular structures. The dead space was obliterated including muscle layer using Polyglactin (2/0) along with subcutis in a simple continuous pattern. The skin incision was apposed in horizontal mattress pattern using No 1 Nylon.



Fig 3: Tumour mass and spermatic cord descended through the inguinal canal

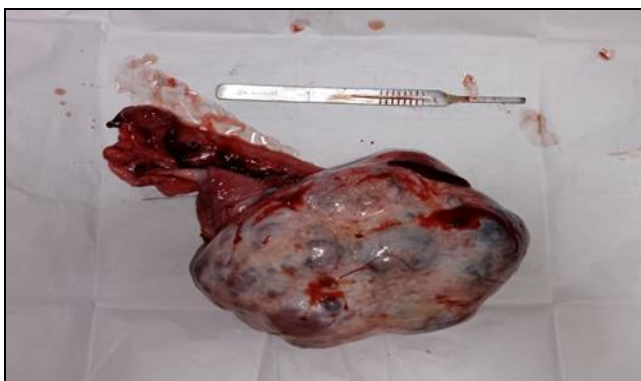


Fig 4: Resected testicle weighing 800 grams

3.3 Post-Operative Recovery

Postoperatively, tincture benzoin was applied over suture line. Supportive therapy including antibacterials, analgesics, multivitamins and multi minerals were continued for 5 more days. The animal made an uneventful recovery and suture was removed on day 14 postoperatively. By one month the hairs started regrowing and by three months (Figure 5) the hair coat had returned to normalcy. By six months post orchiectomy the animal had regained its original hair coat pattern (Figure 6).



Fig 5: Hair re growth three months post-surgery



Fig 6: Six months post-surgery

4. Discussion

Sertoli cells, located within the seminiferous tubules of the testes, provide structural and nutritional support for spermatogenesis. They also maintain the blood-testis barrier, secrete inhibin to regulate follicle-stimulating hormone (FSH) levels, and produce androgen-binding protein to concentrate testosterone, essential for spermatogenesis (O'Donnell *et al.*, 2022). Testicular tumors are among the most common neoplasms in older intact male dogs, with Sertoli cell tumors (SCTs) being one of the primary types. These tumors arise from the disordered, uncontrolled growth of Sertoli cells, which are responsible for supporting spermatogenesis. While testicular tumors involving scrotal testes are often benign, tumors in cryptorchid testes have a higher risk of malignancy (Thorup *et al.*, 2024) [6].

Sertoli cell tumors can produce excessive estrogen, leading to feminization. This manifests as systemic effects such as bilateral alopecia, hyperpigmentation, gynecomastia, and testicular atrophy. Hyperestrogenism also disrupts the hypothalamic-pituitary-gonadal (HPG) axis, causing reduced testosterone production, atrophy of sebaceous glands, and impaired spermatogenesis (Herzog *et al.*, 2023, Welle, 2023) [7, 8]. These systemic effects significantly impact the overall health and well-being of affected animals.

In the present case the preanaesthesia involved a combination of atropine and xylazine. The combination provides

significant advantages, including sedation, analgesia, and reduced salivary and bronchial secretions, which improve the safety and comfort of the surgical procedure (Adami *et al.*, 2023) ^[9]. Xylazine also offers muscle relaxation, making it easier to manage the patient during surgery (Hasan and SM Alnajjar, 2023) ^[10].

Induction with a combination of propofol and ketamine is advantageous for maintaining stable anesthesia with minimal cardiopulmonary depression. Propofol provides rapid induction and recovery (Walters *et al.*, 2022) ^[11], while ketamine ensures prolonged analgesia and prevents sudden arousal during surgery (Guzel *et al.*, 2022) ^[12]. The intermittent bolus administration of ketamine and midazolam effectively maintained anesthesia throughout the procedure.

Surgical excision via castration is the definitive treatment for testicular tumors. The surgical technique varies based on the location of the tumor. For scrotal tumors, scrotal ablation or standard orchietomy is typically performed, while for tumors involving cryptorchid testes, inguinal or abdominal approaches are necessary. In this case, an inguinal approach was used to exteriorize and remove the tumor. Careful ligation of the vascular bundle and spermatic cord, along with correction of the inguinal canal, was critical in preventing complications. The inguinal canal was closed in a manner that preserved vascular structures, which minimized postoperative risks. Among the surgical techniques, the inguinal approach for cryptorchid testes is considered optimal due to better accessibility, minimal invasiveness, and reduced complications compared to abdominal surgery (Faulkner *et al.*, 2024) ^[13]. Recovery rates following surgical correction are typically excellent, with most dogs showing significant improvement in clinical signs within weeks to months. Physiologically, the removal of the tumor eliminates the excessive production of estrogen. This cessation allows the hypothalamic-pituitary-gonadal axis to regain normal function, leading to the resumption of testosterone production and the resolution of hyperestrogenic effects. In the present case, the animal exhibited an uneventful recovery, with the surgical site healing well and hair regrowth beginning by one month postoperatively. By three months, the dog's coat had returned to normalcy, indicating complete resolution of feminization syndrome.

Postoperative recovery can be assessed through the resolution of clinical signs, such as the normalization of hair growth, disappearance of hyperpigmentation, and improvement in overall health. Hormonal assays measuring estrogen and testosterone levels provide objective markers of recovery. Additionally, regular follow-ups to monitor surgical site healing and the absence of any systemic complications.

5. Conclusion

In conclusion, Sertoli cell tumors represent a significant health concern in older male dogs, particularly those with cryptorchidism. This case highlights the importance of early diagnosis and surgical intervention in managing testicular tumors. The successful surgical excision of the tumor not only alleviated the clinical signs associated with hyperestrogenism but also restored normal hormonal balance, leading to a complete recovery. The use of a combination of anesthetic agents ensured a safe surgical procedure, while the inguinal approach provided optimal access for tumor removal. Regular follow-up and monitoring are essential to ensure the long-term health and well-being of affected dogs, emphasizing the need for awareness and prompt veterinary care in similar cases.

Conflict of Interest: Not available

Financial Support: Not available

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How to Cite This Article

Muhammed ANV, Saniyya A, Johns J, Kumar JNS, Bijoy AM, Alexander A. Surgical management of testicular tumour in a senior dog. *International Journal of Veterinary Sciences and Animal Husbandry.* 2025;10(1):04-07.

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