

TESTICULAR TUMOR IN A GERIATRIC DOG WITH CARDIOVASCULAR DISEASE AT MY VETS CLINIC

Laporan Kasus: Tumor Testis pada Anjing Usia Lanjut dengan Gangguan Kardiovaskular di Klinik Hewan My Vets

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How to cite: Rahayu RP, Vibowo H, Zaenab S, Wulansari DS. 2026. Testicular tumor in a geriatric dog with cardiovascular disease at My Vets clinic. *Bul. Vet. Udayana*. 18(4): 1051-1061. DOI: <https://doi.org/10.24843/bulvet.2026.v18.i04.p29>

Abstract

Testicular tumors are neoplasms that frequently occur in older male dogs and may be accompanied by cardiovascular disorders that increase the risks associated with anesthesia and surgery. This study aims to identify diagnostic support measures, surgical management, perioperative monitoring, and postoperative care. The research method employed a case study with a qualitative descriptive approach. Data were obtained through medical history, physical examination, hematology, blood chemistry, PT-aPTT, fine needle aspiration (FNA), echocardiography, histopathology, and monitoring during and after surgery. Examination results indicated that the dog had a mass on the testicle with a histopathological diagnosis of soft tissue sarcoma accompanied by a grade 1 mast cell tumor. Fine needle aspiration examination showed mesenchymal cell proliferation and inflammation, while echocardiography revealed cardiac dysfunction, necessitating strict anesthetic monitoring during surgery. Management involved surgical removal of the mass along with antibiotic, analgesic, anti-inflammatory, and hepatoprotective therapy. Wound healing proceeded well until suture removal. This study demonstrates that comprehensive diagnostic workups and proper anesthetic monitoring play a crucial role in the successful surgical management of testicular tumors in geriatric dogs with cardiovascular disorders

Keywords: fine needle aspiration, soft tissue sarcoma, mast cell tumor, mitral valve regurgitation

Abstrak

Tumor merupakan pertumbuhan massa atau jaringan tubuh yang bersifat abnormal dan padat. Tumor bersifat neoplastik dengan pertumbuhan sel yang abnormal dan berlangsung secara terus-menerus. Tumor testis merupakan neoplasia yang sering terjadi pada anjing jantan usia lanjut dan dapat disertai gangguan kardiovaskular. Laporan kasus ini bertujuan untuk mengetahui tindakan penunjang diagnosis. Seekor anjing berjenis kelamin jantan berusia lanjut dibawa ke klinik oleh pemiliknya dengan keluhan adanya perumbuhan massa bersifat bilateral pada area testis dan mengganggu aktivitas harian anjing tersebut. Anjing akan melakukan pengangkatan massa dan sebelum massa diangkat terdapat beberapa pemeriksaan penunjang diagnosa sebelum dilakukan operasi. Pemeriksaan penunjang berupa pemeriksaan darah yang meliputi hematologi, kimia darah, PT-aPTT, pemeriksaan echocardiograf, FNA, dan histopatologi. Hasil pemeriksaan hematologi dan PT-aPTT menunjukkan tidak adanya kelainan, sedangkan hasil pemeriksaan kimia darah menunjukkan adanya peningkatan ALT dan GGT. Pemeriksaan echocardiograf menunjukkan adanya gangguan regurgitasi katup mitral dan penurunan fungsi sistolik. Pemeriksaan FNA menunjukkan adanya sel tumor mesenkim dan sel inflamasi seperti neutrofil dan makrofag. Diagnosis dari hasil pemeriksaan histopatologi berupa *soft tissue sarcoma* disertai *mast cell* tumor. Penanganan dilakukan melalui pembedahan pengangkatan massa disertai terapi antibiotik, analgesik, antiinflamasi, dan hepatoprotektor. Proses penyembuhan luka berlangsung baik hingga pelepasan jahitan. Laporan studi kasus ini menunjukkan bahwa pemeriksaan penunjang yang lengkap dan monitoring anestesi yang baik berperan penting dalam keberhasilan operasi tumor pada anjing usia lanjut dengan gangguan kardiovaskular.

Kata kunci: *fine needle aspiration*, *soft tissue sarcoma*, *mast cell tumor*, regurgitasi katup mitral

INTRODUCTION

Neoplasia is a process of new growth characterized by abnormal cell proliferation resulting from genetic alterations that cause cells to lose responsiveness to normal growth control mechanisms. This process gives rise to a neoplasm, defined as a tissue growth resulting from uncontrolled cell proliferation. Neoplasms may be benign or malignant based on their biological characteristics and growth behavior. Benign neoplasms generally remain localized within the tissue of origin and do not invade surrounding tissues or metastasize, whereas malignant neoplasms may exhibit local invasion and the ability to metastasize (Zachary, 2022).

The development of neoplasia is influenced by various factors that may be intrinsic or extrinsic. Intrinsic factors may include genetic predisposition, breed, age, and sex, whereas extrinsic factors may include exposure to infectious agents, carcinogenic substances, radiation, and other environmental factors (Mango *et al.*, 2016). In dogs, the incidence of neoplasms tends to increase with advancing age. The aging process is accompanied by the accumulation of cellular and genetic alterations, as well as exposure to various factors throughout life, which may increase the risk of neoplasia. Therefore, geriatric dogs have a higher risk of developing neoplasms than younger dogs.

One of the neoplasms that may occur in male dogs is testicular tumor. Testicular tumors are neoplasms originating from various cellular components of the testicular tissue and can be classified according to their cellular origin. The three most common types of testicular tumors in dogs are seminoma, which originates from germ cells; Sertoli cell tumor, which originates from the supporting cells of the seminiferous tubules; and Leydig cell tumor, which originates from the interstitial cells of the testis. These three types represent the most frequently reported testicular tumors in dogs (Nascimento *et al.*, 2020).

Testicular tumors are among the common neoplasms affecting the male reproductive system in dogs. Testicular tumors have been reported to occur at a relatively high proportion compared with other neoplasms of the male genital tract in dogs, with seminoma, Sertoli cell tumor, and Leydig cell tumor being the most frequently identified types. The development of testicular tumors in dogs is associated with several predisposing factors, particularly age and cryptorchidism. Testicular tumors are more frequently observed in older dogs, whereas cryptorchidism is known to increase the risk of developing certain types of testicular tumors, particularly Sertoli cell tumors (Nascimento *et al.*, 2020).

The aging process in geriatric dogs may result in declining functions of various body systems, thereby increasing susceptibility to various diseases. These changes include reduced immune response and cognitive function, as well as decreased functional reserves of the cardiovascular, respiratory, and renal systems (Prastika, 2020). Such conditions should be considered when evaluating and managing cases of testicular tumors in geriatric dogs. Ancillary examinations, such as complete blood count, fine-needle aspiration (FNA), histopathology, and ultrasonography (USG), may be performed as indicated to support diagnosis and evaluate the patient's condition. This case study aimed to describe the ancillary examinations performed in a case of testicular tumor and to identify aspects that should be considered in the evaluation and management of a geriatric dog.

RESEARCH METHODS

Signalment and History

An 11-year-old male Labrador Retriever dog with a golden coat was presented by its owner to My Vets Animal Clinic, Kemang, South Jakarta, with a complaint of a lump in the testicular area that had progressively increased in size and interfered with the dog's daily activities. The dog exhibited aggressive behavior when not accompanied by its owner and was scheduled for surgical removal of the mass/tumor on September 15, 2025.

Physical Examination

A clinical examination was performed through inspection, palpation, and auscultation, followed by an assessment of the present status, including body weight and body temperature. Inspection was performed to assess the overall condition of the animal, including its activity level, mucous membranes, and the condition of the testicular mass. Palpation was performed on the testicular area, while auscultation was performed over the thoracic region using a stethoscope to evaluate the patient's cardiac condition.

Ancillary Examinations

Ancillary diagnostic examinations were performed prior to surgical removal of the testicular mass. The examinations included hematology, blood chemistry, PT-aPTT, echocardiography, FNA, and histopathology.

For blood examination, the required equipment and materials included blood collection tubes, with EDTA tubes used for hematological examination, heparin tubes for blood chemistry analysis, and sodium citrate tubes for PT-aPTT examination, as well as a 3-mL syringe, and alcohol swabs. Blood collection was performed with the animal placed in lateral recumbency, and blood was collected from the saphenous vein. Blood was collected into the tubes in the following order: 2 mL into a sodium citrate tube, 0.5 mL into a heparin tube, and 0.5 mL into an EDTA tube, followed by gentle homogenization. Hematological examination was performed using an Abaxis HM5®, blood chemistry analysis was performed using an Abaxis VetScan VS2®, and PT-aPTT analysis was performed using a Zoetis® analyzer.

Echocardiography was performed by first turning on the ultrasound system. The stabilizer and uninterruptible power supply (UPS) were turned on, followed by pressing the ultrasound on/off button. The appropriate probe was then selected and the patient's data were entered into the system. The animal was positioned in right lateral recumbency, and the examination area was clipped until clean and free of remaining hair, followed by application of ultrasound gel. Echocardiographic examination was performed at the fourth and fifth intercostal spaces. The examination was performed by a veterinarian using a phased-array probe with a frequency of 2–9 MHz. The probe was placed over the designated examination area, followed by examination using short-axis and long-axis views. The resulting thoracic images were displayed on the ultrasound monitor. After completion of the examination, the ultrasound system was turned off by pressing the on/off button and selecting the shutdown option. Once the ultrasound system was turned off, the UPS button was pressed for approximately 3 seconds, and the stabilizer was subsequently turned off after the UPS had completely shut down.

FNA was performed using a sterile 23G needle, cotton, alcohol, and glass slides. The tumor surface was swabbed with an alcohol-soaked cotton swab, and the sterile needle was inserted into the tumor at an angle of approximately 45°. The needle was then withdrawn, and the puncture site was compressed with cotton to prevent bleeding. The needle was attached to an air-filled syringe, and the sample was expelled onto a glass slide by pushing air through the syringe. The sample was then smeared and stained using the Diff-Quik staining method and examined under a microscope at 40×10 magnification.

For histopathological examination, approximately 2 cm of tumor tissue was collected through an incision during the surgical procedure. The tissue sample was placed in a container containing 10% neutral buffered formalin (NBF) and subsequently submitted to the Siera Veterinary Diagnostic Laboratory, located at Ruko Cibinong City Center Blok E-26, Jalan Tegar Beriman, Pakansari, Cibinong. The histopathological examination results were expected to be available within 15 working days.

RESULTS AND DISCUSSION

Results

Physical examination was performed in the dog examination room. The dog weighed 42.35 kg and had a body temperature of 38.5°C. The physical examination findings included a quiet, alert, and responsive (QAR) demeanor, slightly pink mucous membranes, and a capillary refill time (CRT) of <2 s. The scrotum was swollen and showed areas of skin desquamation. Cardiac auscultation revealed an additional heart sound consistent with a murmur; therefore, further cardiac examination using ultrasonography (USG) was performed.

The ancillary examinations included a complete blood count (Table 1), which showed results within normal limits. Blood chemistry examination (Table 2) showed an ALT value within the normal range, at 257 U/L. Blood chemistry analysis was repeated on the following day, and the results (Table 3) showed increased ALT and GGT levels. Blood coagulation testing (PT-aPTT) was performed prior to surgery, and the results were within normal limits. Fine-needle aspiration (FNA) examination (Figure 1) revealed mesenchymal tumor cells surrounded by inflammatory cells. Echocardiography (Figure 2) showed mitral valve regurgitation and decreased EF and FS values.

The mass was subsequently evaluated by histopathology. Based on microscopic evaluation, the sample was considered to represent a malignant tumor originating from connective tissue cells, accompanied by proliferative growth of mast cells, with a diagnosis of intracellular soft tissue sarcoma with MCT grade 1.

Discussion

Blood chemistry examination showed increased ALT and GGT levels in the dog. ALT increased to 291 U/L, whereas GGT reached 11 U/L. ALT is an enzyme found in the cytosol of hepatocytes and is released into the bloodstream when hepatocellular injury occurs (Liu *et al.*, 2014; Hadad, 2020). Increased ALT activity is generally associated with necrosis, inflammation, or increased hepatocyte membrane permeability (Hadad, 2020). Although ALT is also present in small amounts in skeletal muscle, kidneys, heart, and pancreas, it remains a sensitive indicator of hepatocellular injury (Dirksen *et al.*, 2017). However, an increase in ALT of up to 1.5 times the upper reference limit does not necessarily indicate liver disease because this enzyme has a relatively long half-life in the circulation (Hadad, 2020).

Gamma-glutamyltransferase (GGT) is a membrane-bound protein that, similar to ALP, is located along the biliary surface and within periportal hepatocytes (Satvika, 2021). According to Ettinger *et al.*, (2017), GGT is present in the cell membranes of the kidneys, pancreas, biliary epithelium, hepatocytes, intestines, spleen, liver, lungs, and muscles. Increased GGT levels may indicate disease affecting the liver and biliary tract. GGT is predominantly produced in the liver and plays an important role in assessing hepatobiliary system function, including hepatic inflammation, fatty liver disease, medication use, and drug abuse (Iswari *et al.*, 2020).

FNA examination revealed mesenchymal tumor cells surrounded by pyogranulomatous inflammatory cells. Mesenchymal tumors include tumors originating from the supporting mesenchymal tissues of the dermis and subcutis, including fibrous connective tissue, blood vessels, lymphatic vessels, nerves, adipose tissue, and smooth muscle, as well as round cell tumors of mesenchymal origin that present as cutaneous masses (Hendrick, 2017). Mesenchymal tumor cells exhibiting atypical features, including moderate to high cellularity, spindle to stellate cell morphology, round to oval nuclei with fine to clumped chromatin, and varying degrees of anisocytosis and anisokaryosis, are generally interpreted as diagnostic of soft tissue sarcoma in both cytological and histopathological samples (Masserdotti & Drigo, 2021).

Echocardiographic examination revealed mitral valve regurgitation and decreased ejection fraction (EF) and fractional shortening (FS) values. Mitral regurgitation is defined as the backward flow of blood from the left ventricle into the left atrium through the mitral valve (Purwowiyoto & Hosea, 2023). Mitral regurgitation represents blood leakage across the mitral valve caused by degeneration and hypertrophy of the mitral valve leaflets. On cardiac auscultation, it is characterized by a left apical systolic mitral regurgitation murmur (Summerfield, 2018). The severity of mitral regurgitation (MR) is routinely assessed using multidimensional indices such as effective regurgitant orifice area (EROA) and regurgitant fraction (RF), which consider not only diastolic cardiac dimensions but, more importantly, forward flow, mitral flow, and systolic function (Larouche-Lebel *et al.*, 2019).

The EF value was 46.47%, whereas the FS value was 18.80%. Ejection fraction (EF) and fractional shortening (FS) are important indicators of left ventricular systolic function (Madron *et al.*, 2015; Yen, 2025). EF is expressed as the percentage of blood ejected from the left ventricle during each contraction, whereas FS represents the percentage change in left ventricular dimension during contraction (Rahmianti & Trisna, 2020). The normal EF range is 55–85%, while the normal FS range is 25–45% (Corda *et al.*, 2019). According to Murtiningrum (2023), EF and FS values can be used to determine the type of cardiomyopathy present. EF and FS values above the normal range indicate hypertrophic cardiomyopathy (HCM), whereas values below the normal range indicate dilated cardiomyopathy (DCM). Hypertrophic cardiomyopathy is characterized by thickening of the cardiac muscle in the left

ventricle, resulting in reduced ventricular chamber dimensions (Ferasin, 2012; Permata *et al.*, 2024). Dilated cardiomyopathy is characterized by thinning of the ventricular wall, and in some cases, dilation of all four cardiac chambers may occur, resulting in reduced cardiac pumping capacity (Dutton & Alvarez, 2018).

Histopathological examination showed that, based on microscopic evaluation, the sample was considered to represent a malignant tumor originating from connective tissue cells, accompanied by proliferative growth of mast cells, with a diagnosis of intracellular soft tissue sarcoma with MCT grade 1. The histopathological findings showed sections of skin tissue with pathological lesions distributed throughout the superficial dermis and extending into the deep dermis, characterized by proliferation of mononuclear cells with mild to moderate anisocytosis and anisokaryosis. Numerous mononuclear cells were observed in the intercellular areas and were infiltrated by eosinophilic inflammatory cells in both aggregated and individually scattered distributions, accompanied by multifocal hemorrhage. A second population of atypical cells was also observed, characterized by spindle-shaped morphology with round to elongated nuclei and relatively prominent anisocytosis and anisokaryosis.

The development of a neoplastic mass or testicular tumor in this geriatric dog is closely associated with its major predisposing factors. In addition to age-related decline in cellular function, intact male status, or being an unneutered dog, represents a fundamental risk factor for the development of testicular tumors. As long as the reproductive organs remain intact, the animal continues to produce reproductive hormones over an extended period. This intact status may contribute to the development of disease, as prolonged hormonal exposure in geriatric dogs may increase the susceptibility to uncontrolled cellular proliferation, ultimately contributing to the formation of a neoplastic mass.

CONCLUSION AND SUGGESTIONS

Simpulan

Sky, an 11-year-old Labrador Retriever dog, was diagnosed with soft tissue sarcoma based on physical and clinical examinations, as well as ancillary examinations including hematology, blood chemistry, coagulation testing, FNA, ultrasonography, and histopathology. The hematological and PT-aPTT examinations showed no abnormalities, whereas the blood chemistry examination revealed increased ALT and GGT levels. FNA examination revealed mesenchymal tumor cells and inflammatory cells. The role of veterinary paramedics in assisting veterinarians in the management of this case is important, particularly in surgical preparation, patient monitoring, and postoperative care.

Saran

Considering the increased risk of neoplasia in intact geriatric male dogs, particularly large-breed dogs, owners are advised to consider castration at an appropriate early age. Preventive intervention through surgical castration may help reduce the risk associated with the development of testicular masses or tumors later in life. In addition, routine health examinations are important for the early detection of reproductive disorders and declines in the function of other organ systems.

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Tables

Table 1. Hematological examination results

Parameter	Results	Reference range	Unit
WBC	12.22	6.00-17.00	10 ⁹ /l
LYM	2.19	1.00-4.80	10 ⁹ /l
MON	0.39	0.20-1.50	10 ⁹ /l
NEU	9.16	3.00-12.00	10 ⁹ /l
EOS	0.35	0.00-0.80	10 ⁹ /l
BAS	0.13	0.00-0.40	10 ⁹ /l
LYM%	17.9	0.0-100.0	%
MON%	3.2	0.0-100.0	%
NEU%	74.9	0.0-100.0	%
EOS%	2.9	0.0-100.0	%
BAS%	1.1	0.0-100.0	%
RBC	6.19	5.50-8.50	10 ¹² /l
HGB	14.4	12.0-18.0	g/dl
HCT	42.59	37.00-55.00	%
MCV	69	60-77	fl
MCH	23.2	19.5-24.5	pg
MCHC	33.8	31.0-39.0	g/dl
RDWc	18.4	14.0-20.0	%
RDWs	39.8		fl
PLT	307	165-500	10 ⁹ /l
MPV	10.1	3.9-11.1	fl
PCT	0.31		%
PDWc	37.8		%
PDWs	15.6		fl

Abbreviations: WBC= White blood cell, LYM= Lymphocyte, MON= Monocyte, NEU= Neutrophil, EOS= Eosinophil, BAS= Basophil, RBC= Red blood cell, HGB= Hemoglobin, HCT= Hematocrit, MCV= Mean corpuscular volume, MCH= Mean corpuscular hemoglobin, MCHC= Mean corpuscular hemoglobin concentration, RDWc= Red cell distribution width - calculated, RDWs= Red cell distribution width – SD, PLT= Platelet, MPV= Mean platelet volume, PCT= Plateletcrit, PDWc= Platelet distribution width – calculated, PDWs= Platelet distribution width – SD.

Table 2. Preoperative blood chemistry results

Preoperative blood chemistry results				
Parameter	Results	Reference range	Unit	Remarks
ALB	2.9	2.5-4.4	g/dL	Normal
ALP	61	20-150	U/L	Normal
ALT	257	10-118	U/L	Increased
AMY	624	200-1200	U/L	Normal
TBIL	0.4	0.1-0.6	mg/dL	Normal
BUN	10	7-25	mg/dL	Normal
CA	9.8	8.6-11.8	mg/dL	Normal
PHOS	3.7	2.9-6.6	mg/dL	Normal
CRE	0.7	0.3-1.4	mg/dL	Normal
GLU	103	60-110	mg/dL	Normal
Na ⁺	142	138-160	mmol/L	Normal
K ⁺	4.6	3.7-5.8	mmol/L	Normal
TP	7.0	5.4-8.2	g/dL	Normal
GLOB	4.1	2.3-5.2	g/dL	Normal
Postoperative blood chemistry results				
Parameter	Results	Reference range	Unit	Remarks
ALP	83	20-150	U/L	Normal
ALT	291	10-118	U/L	Increased
GGT	11	0-7	U/L	Increased
BA	4	0-25	umol/L	Normal
TBIL	0.4	0.1-0.6	mg/dL	Normal
ALB	2.7	2.5-4.4	g/dL	Normal
BUN	12	7-25	mg/dL	Normal
CHOL	5.0	3.2-7.0	mmol/L	Normal

Abbreviations: ALB= Albumin, ALP= Alkaline phosphatase, ALT= Alanine aminotransferase, AMY= Amylase TBIL= Total bilirubin, BUN= Blood urea nitrogen, CA= Calcium, PHOS= Phosphate, CRE= Creatinine, GLU= Glucose, Na⁺= Natrium, K⁺= Kalium, TP= Total protein, GLOB= Globulin, GGT= Gamma-glutamyl transferase, BA= Bile acids, CHOL = Cholesterol.

Table 3. PT-aPTT examination results

Parameter	Results	Reference range	Unit
Prothrombin time (PT)	18.9	14-19	seconds
Activated partial thromboplastin time (aPTT)	97.3	75-105	seconds

Figures

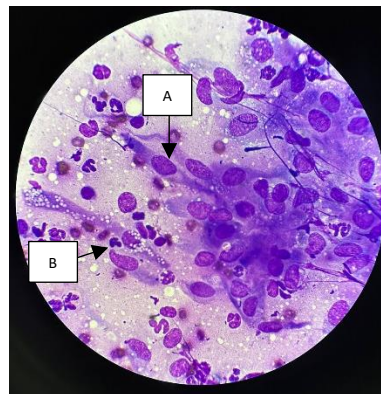


Figure 1. FNA findings. (A) Mesenchymal tumor cells; (B) Inflammatory cells.

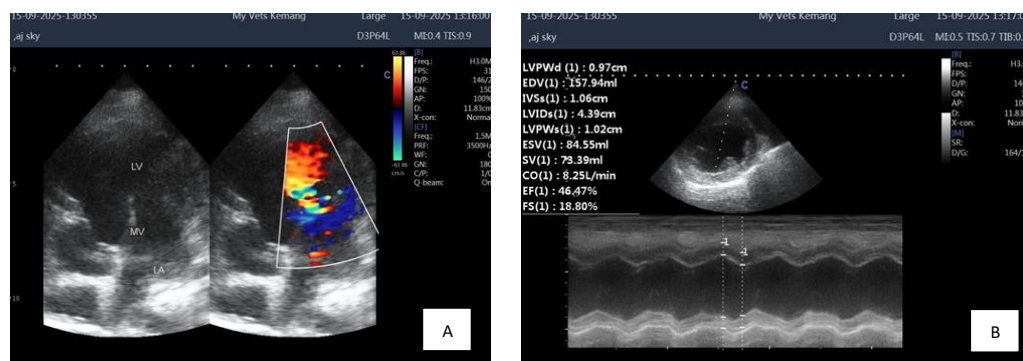


Figure 2. Echocardiographic findings. (A) Mitral valve regurgitation; (B) Decreased EF and FS values.

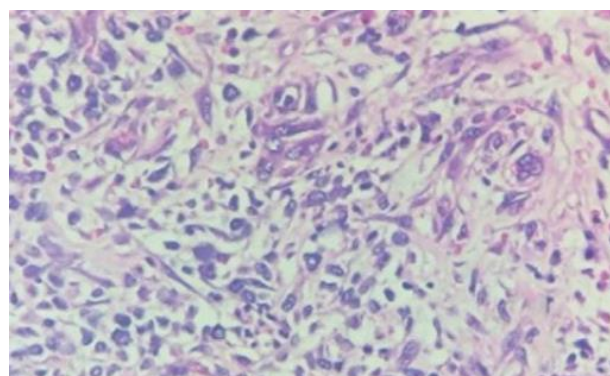


Figure 3. Histopathological findings.