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## **SURGICAL EXCISION OF TRANSMISSIBLE VENEREAL TUMOR FOLLOWED BY VINCRISTINE SULFATE CHEMOTHERAPY IN A MALE LOCAL DOG**

**Penanganan Bedah Eksisi Transmissible Venereal Tumor Disertai dengan Kemoterapi Vincristine Sulfate pada Anjing Lokal Jantan**

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### **Abstract**

Transmissible venereal tumor (TVT) is a malignant tumor that commonly occurs in dogs. It can be transmitted through mating, licking, or sniffing tumor lesions. The purpose of this study was to describe the successful treatment of TVT by surgical excision followed by vincristine sulfate chemotherapy. A 7-year-old local male dog weighing 14 kg presented with a penile mass accompanied by bloody discharge. Histopathological examination revealed a population of tumor cells consisting of lymphoblast-like cells with a homogeneous polyhedral shape. The tumor cells were separated by stroma and exhibited moderate mitotic figures. Treatment consisted of surgical excision of the tumor mass followed by vincristine sulfate chemotherapy at a dose of 0.025 mg/kg administered intravenously three times at one-week intervals. Postoperatively, long-acting amoxicillin was administered as an antibiotic at a dose of 15 mg/kg body weight (BW) intramuscularly every 48 hours on days 0, 2, and 4. For analgesia, meloxicam was administered at a dose of 0.2 mg/kg BW subcutaneously once daily for four days. A hematopoietic stimulant (hematodin) was administered at a dose of 1 mL/5 kg BW intramuscularly once daily for five days. On day 21, the dog showed signs of healing, indicated by dried wounds, disappearance of suture marks, and normalization of penile size, suggesting complete tumor removal. The combination of surgical excision and chemotherapy proved effective in treating TVT in dogs.

Keywords: Excision, local dog, transmissible venereal tumor, vincristine sulfate

### **Abstract**

*Transmissible venereal tumor* (TVT) merupakan tumor ganas yang umum terjadi pada anjing yang dapat ditularkan melalui perkawinan, jilatan atau mengendus lesi tumor. Tujuan penulisan laporan kasus ini untuk mendeskripsikan keberhasilan penanganan TVT dengan pembedahan eksisi tumor disertai pemberian kemoterapi *vincristine sulfate*. Seekor anjing

jantan lokal berumur tujuh tahun dengan bobot badan 14 kg memiliki massa pada penis disertai dengan adanya tetesan darah. Hasil pemeriksaan histopatologi menunjukkan adanya sel tumor berupa limfoblas dengan bentuk polihedral yang cenderung homogen. Sel tumor dipisahkan oleh stroma dan menunjukkan adanya gambaran mitosis sedang. Penanganan dilakukan dengan eksisi massa tumor dan kemoterapi dengan *vincristine sulfate* dengan dosis 0,025 mg/kg BB secara intravena sebanyak tiga kali dengan interval waktu satu minggu. Pascaoperasi diberikan antibiotik amoxicillin *long acting* dengan dosis 15 mg/kg BB secara IM dengan q48h pada hari ke-0, ke-2 dan ke-4. Untuk analgesik, diberikan meloxicam dengan dosis 0,2 mg/kg BB secara SC dengan q24h selama empat hari. Pemberian stimulan hematopoietik menggunakan hematodin dilakukan dengan dosis 1 mL/5 kg BB secara IM dengan q24h selama lima hari. Pada hari ke-21, anjing menunjukkan tanda-tanda kesembuhan, yakni luka yang telah mengering dan bekas jahitan sudah menghilang, serta ukuran penis kembali normal, menandakan tumor sepenuhnya hilang. Penanganan dengan pembedahan dan kemoterapi terbukti efektif dalam menangani kasus TTVT pada anjing.

Kata kunci: Anjing lokal, eksisi, *transmissible venereal tumor*, *vincristine sulfate*

## INTRODUCTION

Dogs are companion animals that are widely kept by humans. They serve various roles, including as companions, guard dogs for homes and livestock, hunting dogs, rescue dogs, and tracking dogs in police work (Faradina *et al.*, 2023). Due to their close contact with other dogs and frequent direct interactions, it is not surprising that dogs are often affected by health disorders. One of the sexually transmitted diseases that affects dogs is a genital tumor known as Transmissible Venereal Tumor (TTV).

TTV is a malignant tumor that affects the genital organs and is highly contagious in dogs. This tumor is commonly transmitted through direct contact such as mating, licking, or even sniffing tumor lesions (Takariyanti *et al.*, 2021). TTV is a naturally occurring tumor transmitted through the transplantation of allograft cells, which subsequently become autonomous and separate from the original host (Abedin, 2020). Dogs of all breeds and ages can be infected; however, the disease is most commonly found in dogs aged 2–5 years. TTV has also been reported in intact (non-neutered) dogs or dogs that are sexually active (Takariyanti *et al.*, 2021).

Based on tumor location, TTV is classified into two types: genital and extragenital. Clinical signs of TTV include a cauliflower-like mass on the genital area or mucosal surfaces, often accompanied by bleeding. In male dogs, lesions are typically located on the cranial aspect of the glans penis, the preputial mucosa, or the bulbus glandis.

Management of TTV may include surgical excision, chemotherapy, radiotherapy, immunotherapy, and biotherapy (Uçmak, Kirşan, Uçmak, Erdoğan Bamaç, & Gürel, 2019). A commonly used and effective approach in the treatment of TTV is a combination of surgical excision and chemotherapy (Darma & Pemayun, 2023). Tumor excision is a surgical procedure aimed at removing part or all of the tumor mass from the body. In early-stage TTV cases—less than one year in duration and without metastasis—the success rate of treatment with surgery followed by vincristine sulfate chemotherapy can reach up to 100%. Surgical treatment combined with chemotherapy is also effective in preventing tumor recurrence (Takariyanti *et al.*, 2021).

The purpose of this case report is to describe the surgical removal of a tumor mass and the application of vincristine sulfate chemotherapy in a case of TTV in a dog.

## RESEARCH METHODS

### Signalment and Anamnesis

A 7-year-old intact domestic male dog weighing 14 kg was presented with a complaint of a mass in the penile region accompanied by bleeding, which had been present for approximately five months. According to the owner, the mass was initially small but gradually increased in size over time. The dog was fed a mixed diet consisting of rice and various side dishes depending on what the owner consumed, and drinking water was provided *ad libitum*. At the time of examination, the owner reported that the dog's appetite, urination, and defecation were normal. The dog was not confined and was allowed to roam freely around the house.

### Physical Examination

Physical examination of the dog, named Edo, was performed using inspection, palpation, and auscultation. Heart rate was assessed using a stethoscope, respiratory rate was evaluated by observing thoracic movements, and body temperature was measured using a thermometer. Capillary refill time (CRT) was assessed by applying pressure to the mucous membranes to evaluate peripheral blood circulation. Examination of the penile region was conducted through visual inspection to detect any abnormalities or swelling, followed by palpation to assess the size, shape, and consistency of the palpable mass (Figure 1).

### Supporting Examinations

#### Tumor Tissue Histopathology

Tumor tissue samples were obtained by excising a portion of the tumor mass using a surgical blade and preserved in 10% neutral buffered formalin (NBF). The samples were then submitted to the Denpasar Bali Veterinary Center for histopathological examination.

#### Hematological Examination

Hematological examination was performed by collecting 1 mL of fresh blood from the cephalic vein and placing it into a tube containing ethylenediaminetetraacetic acid (EDTA) as an anticoagulant. Routine hematological analysis was conducted using an automatic hematology analyzer.

#### Diagnosis and Prognosis

Based on clinical examination and supporting histopathological findings, the dog was diagnosed with transmissible venereal tumor (TVT) with a favorable (*fausta*) prognosis.

#### Preoperative Management

Preoperative preparation included the preparation of instruments, materials, medications, the patient, the operator, and the operating room. Equipment and materials used throughout the preoperative, operative, and postoperative stages included physical examination tools such as a stethoscope and thermometer; infusion supplies such as a clipper, intravenous (IV) catheter, ultrafix, infusion set, and 0.9% NaCl solution; surgical instruments for minor surgery; surgical drapes, underpads, tampons, cotton, 70% alcohol, chlorhexidine, povidone iodine, and 3-0 catgut sutures. All surgical instruments were sterilized using an autoclave. Postoperative equipment included an Elizabethan collar and bandages.

Medications used included xylazine for premedication and ketamine for anesthesia (injectable), vincristine sulfate for chemotherapy, amoxicillin as an antibiotic (injectable), meloxicam as an anti-inflammatory agent (injectable), hematodin as a hematopoietic stimulant (injectable), as well as nebacetin powder and Vetagard spray for topical application.

Animal preparation involved a thorough physical examination and fasting from food for 12 hours and water for 8 hours prior to surgery to prevent vomiting and excessive urination. Premedication consisted of atropine administered subcutaneously at a dose of 0.02 mg/kg body weight, followed by a combination of ketamine (10 mg/kg BW) and xylazine (1 mg/kg BW) administered intramuscularly (IM) for anesthesia. After induction, the dog was placed in dorsal recumbency, and the surgical site was disinfected using povidone iodine on the penile area to be incised.

Preparation of the operator and operating room ensured cleanliness and sterility. The operator wore a head cap, mask, and sterile gloves, and performed hand washing with soap followed by disinfection with 70% alcohol prior to surgery. The operating room was maintained in a clean condition with adequate lighting.

### **Surgical Procedure**

Once the animal was adequately prepared, the surgical procedure was initiated. An incision was made, and the prepuce was retracted caudally until the entire penis and the tumor mass to be excised were fully exposed. The prepuce was then secured using forceps. A reddish, cauliflower-like mass surrounding the base of the penis was observed. Artery forceps were applied to areas of the tumor with visible blood vessels, followed by ligation of these vessels using 3-0 chromic catgut sutures. The tumor mass was then excised using a scalpel blade and surgical scissors. The surrounding area was irrigated with physiological saline (0.9% NaCl) to remove blood and tissue debris, and the excision site was packed with gauze to control bleeding. The penis was then repositioned into the prepuce, and the subcutaneous incision was closed using a simple continuous suture pattern followed by a subcuticular suture pattern with 3-0 chromic catgut. After completion of tumor excision, chemotherapy with vincristine sulfate was administered (Figure 3).

### **Postoperative Management**

Postoperative wound care involved cleaning the surgical site with 0.9% NaCl, followed by topical application of Nebacetin powder (neomycin sulfate and bacitracin) on day 0. The wound was then covered with sterile gauze and secured with ultrafix. From day 1 onward, Vetagard spray (denatonium benzoate 0.2 mg and chlorhexidine gluconate 10 mg) was applied daily until the wound had dried.

The patient received Amoxicillin LA 150 mg/mL at a dose of 15 mg/kg body weight administered intramuscularly every 48 hours on days 0, 2, and 4, with an injection volume of 1.4 mL. Meloxicam 5 mg/mL was administered subcutaneously at a dose of 0.2 mg/kg BW once daily for four days, with an injection volume of 0.5 mL. Hematopoietic support using hematodin was administered intramuscularly at a dose of 1 mL per 5 kg body weight once daily for five days, with a total volume of 2.8 mL. Chemotherapy with vincristine sulfate was administered intravenously at a dose of 0.025 mg/kg BW once weekly for three treatments, with an injection volume of 0.35 mL per dose.

## **RESULTS AND DISCUSSIONS**

### **Results**

Based on the physical examination, the following findings were obtained in the dog, Edo: heart rate of 112 beats/min, respiratory rate of 41 breaths/min, body temperature of 38.3°C, and capillary refill time (CRT) of less than 2 seconds. Clinical signs observed during examination included swelling of the penile region accompanied by bleeding. On palpation, the mass was prominent and soft in consistency (Figure 1).

Histopathological examination revealed tumor cells consistent with lymphoblast-like cells

exhibiting a homogeneous polyhedral shape. The tumor cells were separated by stromal tissue and showed moderate mitotic activity (Figure 2).

Preoperative hematological examination indicated that the dog had normocytic normochromic anemia, characterized by decreased red blood cell (RBC) count, hemoglobin concentration, and hematocrit. Thrombocytopenia was also present, as indicated by a reduced platelet count. In addition, leukopenia was observed, characterized by a decreased leukocyte count, accompanied by lymphocytosis and granulocytopenia. Postoperatively, mild microcytic hypochromic anemia was still detected, indicating a recovery phase following blood loss. Thrombocytopenia persisted and became more severe, possibly influenced by the side effects of vincristine sulfate chemotherapy. Leukocyte counts returned to within normal ranges, accompanied by lymphocytosis, indicating an adequate immune response (Table 1).

Evaluation of the dog on day 21 showed complete closure of the surgical wound, with normalization of penile size, suggesting near-complete resolution of the tumor mass or tumor cells (Figure 4).

## Discussion

Transmissible venereal tumor (TVT) is a common contagious tumor in dogs (Hantrakul *et al.*, 2014). It is an infectious disease affecting sexually mature dogs, most commonly occurring in dogs aged between two and eight years, with no breed predisposition, and it can infect both male and female dogs (Takariyanti *et al.*, 2021). Transmission generally occurs through direct contact, such as mating, licking, or sniffing tumor lesions (Takariyanti *et al.*, 2021).

Physical examination of the case revealed swelling in the penile region, with a soft but protruding mass that bled upon manipulation. In male dogs, TVT lesions are commonly located on the caudal portion of the penis, extending from the crura to the bulbis glandis, around the glans penis, and occasionally involving the prepuce. The tumor often appears as hyperemic papular lesions that later develop into nodular, multilobulated, papillary, cauliflower-like masses, which may reach up to 15 cm in diameter (Faradina *et al.*, 2023).

Histopathological examination of the tumor tissue in this case revealed lymphoblast-like cells with a homogeneous polyhedral shape arranged within stromal tissue and exhibiting moderate mitotic activity. Cells characteristic of TVT typically have round nuclei with coarse, rope-like chromatin and prominent nucleoli, moderate amounts of basophilic cytoplasm, and multiple clear cytoplasmic vacuoles. Several tumor cells observed in this case were undergoing mitosis, further supporting the diagnosis of TVT.

Preoperative hematological examination showed normocytic normochromic anemia and thrombocytopenia, characterized by decreased RBC count and hemoglobin concentration. The anemia was attributed to continuous bleeding resulting from rupture of the tumor mass. Tumor rupture is commonly reported in TVT cases and predisposes affected animals to hemorrhage (Takariyanti *et al.*, 2021). This type of anemia is commonly associated with chronic disease and is closely related to the thrombocytopenia observed in this case. Severe or prolonged blood loss, increased platelet destruction, or impaired bone marrow production can result in short-term (acute) or long-term (chronic) platelet deficiency.

Postoperative hematological evaluation revealed mild microcytic hypochromic anemia, indicated by decreased RBC count, hemoglobin concentration, mean corpuscular hemoglobin (MCH), and mean corpuscular volume (MCV), although values remained close to the normal reference range. Thrombocytopenia persisted, likely because the dog was still in the recovery phase following chronic hemorrhage caused by the tumor and because hematopoietic supplementation was only administered for five days postoperatively.

Case management in this study involved surgical excision combined with chemotherapy using vincristine sulfate. Surgical excision was performed to completely remove the tumor mass and to clear the surrounding tissue at the site of tumor attachment. However, surgical treatment is only indicated when the tumor is accessible and not accompanied by metastasis. Surgery is most effective when TVT is in the early stage, the tumor nodules are small, easily accessible, and non-invasive (Martins *et al.*, 2005). Metastasis of TVT is rare, and when it occurs, it usually involves the regional lymph nodes and surrounding skin tissue (Faccini *et al.*, 2019).

The combination of surgical excision and chemotherapy not only accelerates the healing process but also reduces the total amount of chemotherapeutic agents administered, thereby minimizing potential side effects associated with chemotherapy (Athar *et al.*, 2001). Vincristine sulfate has been widely used as a single-agent chemotherapy or as part of combination therapy for the treatment of TVT. In addition to destroying cancer cells, vincristine sulfate may suppress bone marrow activity, directly affecting erythropoiesis and the development of progenitor cells responsible for platelet production (Mandara *et al.*, 2019). Reported side effects of vincristine sulfate include anemia, leukopenia, thrombocytopenia, constipation, nausea, vomiting, and anorexia (Das & Das, 2000). Therefore, routine hematological examinations should be performed before and after chemotherapy administration.

In this case, the dog also exhibited an increased lymphocyte percentage. Lymphocytosis has been reported in patients experiencing tumor regression as a response to chemotherapy (Lissoni *et al.*, 2006). Lymphocyte count is considered an indicator of tumor suppression; thus, patients with elevated lymphocyte counts may demonstrate stronger antitumor activity, which correlates with a favorable prognosis and increased sensitivity to chemotherapy (Wibisono, Christian, & Adiputra, 2020). Additionally, the increase in leukocyte count indicates improved immune defense, as reflected by postoperative white blood cell (WBC) values returning to normal ranges (Mahindra *et al.*, 2020).

Chemotherapy is generally administered intravenously for a duration of two to seven weeks at a dose of 0.025 mg/kg body weight, depending on the severity of TVT and the dog's tolerance to chemotherapy.

## CONCLUSIONS AND SUGGESTIONS

### Conclusions

The dog diagnosed with TVT was treated with surgical excision of the tumor tissue followed by three cycles of vincristine sulfate chemotherapy. By day 21, the dog showed good clinical recovery, characterized by disappearance of suture marks and normalization of penile size, indicating complete tumor resolution.

### Suggestions

Routine hematological examinations should be performed before and after chemotherapy administration to assess the general health status of the dog and to monitor potential side effects associated with chemotherapeutic agents.

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### Table

Table 1. Results of Routine Hematological Examination in the Case Dog

Parameter	Prior to surgery	Post-surgery	Reference range
WBC	$4.06 \times 10^3 / \mu\text{l}$ (L)	$7.37 \times 10^3 / \mu\text{l}$	6-17
Lymphocytes	$3.26 \times 10^3 / \mu\text{l}$	$6.07 \times 10^3 / \mu\text{l}$ (H)	0.8-5.1
Monocytes	$0.27 \times 10^3 / \mu\text{l}$	$0.51 \times 10^3 / \mu\text{l}$	0-1.8
Granulocytes	$0.56 \times 10^3 / \mu\text{l}$	$0.79 \times 10^3 / \mu\text{l}$ (L)	4-12.6
RBC	$4.13 \times 10^6 / \mu\text{l}$ (L)	$4.39 \times 10^6 / \mu\text{l}$ (L)	5.5-8.5
Hemogoblin	8.7 g/Dl (L)	8.2 g/dL (L)	11-19
MCHC	33.2 g/dL	30.7 g/dL	30-38
MCH	21 pg	18.6 pg (L)	20-25
MCV	63.1 fL	60.8 fL (L)	62-72
RDWCV	12.8%	15.8% (H)	11-15.5
RDWSD	37.3 fL	44.4 fL	35-56
HCT	26.1% (L)	26.7% (L)	39-56
Platelet	$99 \times 10^3 / \mu\text{l}$ (L)	$21 \times 10^3 / \mu\text{l}$ (L)	117-460
MPV	7.5 fL	7.2 fL	7-12.9
PDW	18.2 fL (H)	4.2 fL (L)	10-18
PCT	0.074% (L)	0.015% (L)	0.1-0.5
P-LCR	8.6% (L)	17% (H)	13-43

### Figure



Figure 1. Swelling of the penile region in the dog.

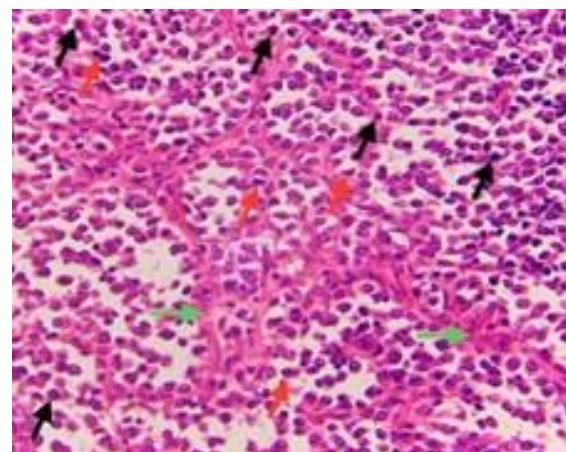


Figure 2. Lymphoblast-like cells with a homogeneous polyhedral shape (black arrows), stromal tissue (green arrows), and mitotic cells (red arrows).

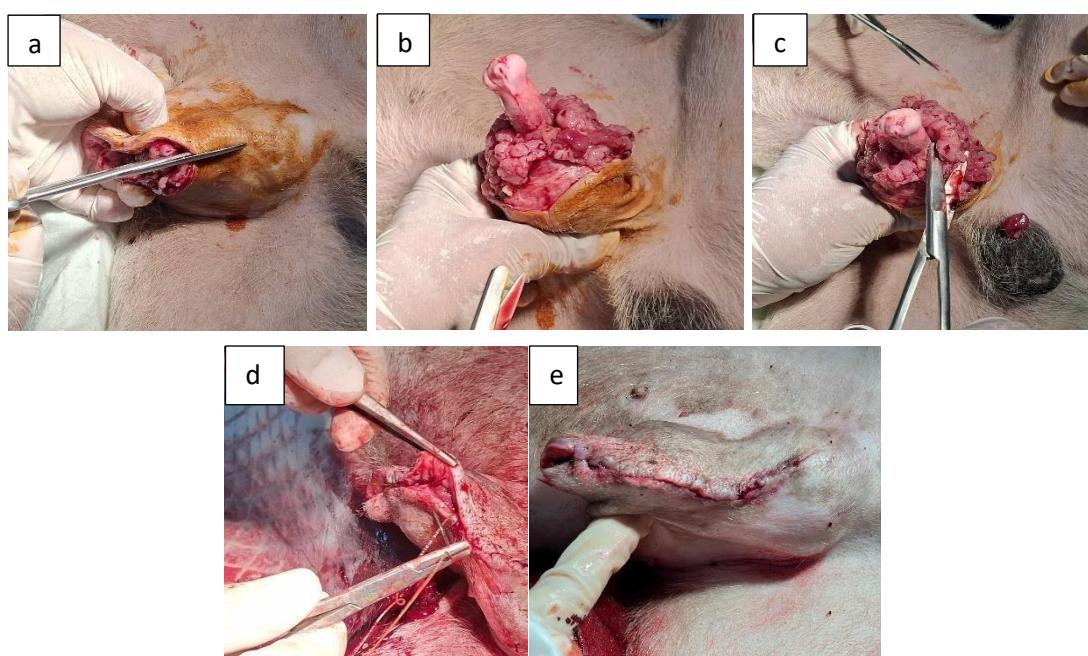


Figure 3. Surgical technique for excision of the TVT tumor mass in the dog Edo.

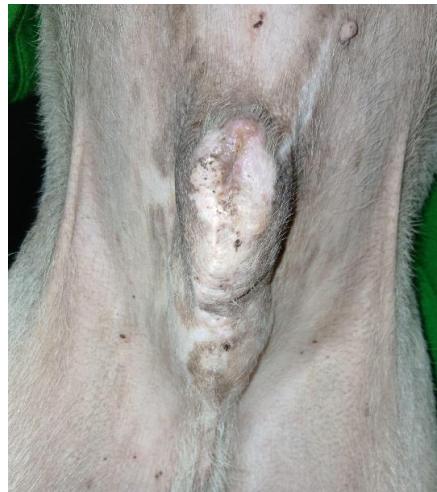


Figure 4. On day 21, suture marks had disappeared and penile size had returned to normal, indicating complete tumor resolution.