

Histopathological characterization of genital tumors, with emphasis on Transmissible Venereal Tumor in the canine species in Eastern Algeria

Caracterización histopatológica de los tumores genitales, con énfasis en el tumor venéreo transmisible en la especie canina en el este de Argelia

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ABSTRACT

This study aimed to provide data on genital tumors in canines at the Ibn Badis University Hospital Center in Constantine, focusing on tumor localization and histological types in Eastern Algeria. Transmissible venereal tumor, also known as Sticker sarcoma, is a significant cancer in dogs, prevalent across all breeds and primarily affecting urban stray populations. It typically manifests as masses on external genital organs but can also appear on other mucous membranes through direct contact. Transmissible venereal tumor predominantly affects dogs aged 2–5 years with high sexual activity; in males, it occurs in the penis and prepuce (6.66%) (8/120), while in females, it affects the posterior vaginal region and vulva (10%) (12/120). Diagnosis is based on clinical history, chronic discharge, typical lesion locations, and histopathological features confirmed by Hematoxylin & Eosin staining. The immunohistochemical analysis used desmin and myogenin to differentiate Transmissible venereal tumor cells and confirm diagnosis. Vincristine chemotherapy remains the primary treatment, often combined with surgery.

Key words: Stray dogs; epidemiology; diagnosis; treatment; transmissible venereal tumor; histological type; immunohistochemistry

RESUMEN

Este estudio tuvo como objetivo proporcionar datos sobre tumores genitales en caninos en el Centro Hospitalario Universitario Ibn Badis de Constantina, centrándose en la localización tumoral y los tipos histológicos en el este de Argelia. El tumor venéreo transmisible, también conocido como sarcoma de Sticker, es un cáncer significativo en los perros, prevalente en todas las razas y que afecta principalmente a las poblaciones callejeras urbanas. Generalmente se manifiesta como masas en los órganos genitales externos, pero también puede aparecer en otras membranas mucosas por contacto directo. El tumor venéreo transmisible afecta predominantemente a perros de 2 a 5 años con alta actividad sexual; en los machos se localiza en el pene y el prepucio (6,66%) (8/120), mientras que, en las hembras afecta la región vaginal posterior y la vulva (10%) (12/120). El diagnóstico se basa en la historia clínica, la secreción crónica, la localización típica de las lesiones y las características histopatológicas confirmadas mediante tinción con Hematoxilina y Eosina. El análisis inmunohistoquímico utilizó desmina y miogenina para diferenciar las células del tumor venéreo transmisible y confirmar el diagnóstico. La quimioterapia con vincristina sigue siendo el tratamiento principal, a menudo combinada con cirugía.

Palabras clave: Perros callejeros; epidemiología; diagnóstico; tratamiento; tumor venéreo; tipo histológico; inmunohistoquímica

INTRODUCTION

Health issues in dogs have long been a concern for those interested in canine health and well-being. The first description of transmissible venereal tumor (TVT) was recorded by Blaine in 1810 [1], making it the oldest known contagious cancer in dogs (*Canis lupus familiaris*), originally emerging over 10,000 years ago [2, 3, 4]. Extensive research has been conducted to understand the origin and evolutionary mechanisms of this disease [2, 5]. Some countries, such as England in the 20th century, have successfully developed laws and preventive measures against this infectious cancer.

Transmissible Venereal Tumor, commonly referred to as “stick tumor,” is also known as canine transmissible venereal sarcoma, infectious sarcoma, or Sticker’s sarcoma [6]. This highly contagious natural cancer is transmitted horizontally [2] during coitus and through direct contact with viable tumor cells across damaged mucosa, including licking, sniffing, or grooming [7, 8, 9], and is characterized as a benign round-cell neoplasm in dogs [10]. Initially, a small tumor lesion can progress into a large, ulcerated mass with hemorrhagic discharge and a foul odor, typically localized to the external genital mucosa of both sexes across all breeds. Occasionally, TVT may also be found in the uterus.

Transmissible Venereal Tumor is particularly prevalent in dogs aged 2 to 5 years [11, 12, 13], accounting for 23% to 43% of all tumors in dogs, making it the most common tumor in India. Recent epidemiological reviews also confirm that TVT remains one of the most frequent canine neoplasms worldwide [11, 13], with higher prevalence in tropical and subtropical regions [6], primarily affecting populations of unaltered or unsupervised dogs [14]. Both male and female dogs are susceptible, raising global concerns as this benign reticulo-endothelial tumor predominantly affects the external genital mucosa and rarely the internal genital organs [15, 16]. Although tumors can arise at any age, benign tumors are more frequent in younger dogs, while malignant tumors are more prevalent in older dogs [17]. Recent investigations estimate that TVT represents a significant proportion of canine tumors, particularly in tropical and subtropical regions, where it continues to pose a major veterinary health problem [18].

Immunocompromised animals are more susceptible to severe manifestations of TVT. Recent genomic investigations have revealed numerous mutations and adaptive mechanisms that enable this cancer to evolve and persist in canine populations [19]. The host’s immune response plays a critical role in tumor progression, with younger, sexually mature animals being more vulnerable as viable tumor cells traverse major histocompatibility complex (MHC) barriers during coitus [19]. Distinct cellular changes have been observed during different stages of tumor development [13]. Over time, downregulation of MHC expression further facilitates horizontal transmission to other dogs [6], although no natural cases have yet been reported in wild canids [20]. TVT is primarily transmitted through sexual contact, affecting the genital system of sexually mature animals. However, neoplasia can also be transferred through licking or sniffing, leading to extragenital transmission and, in severe cases, metastasis to internal organs [21].

Tumors in progressive stages exhibit round cells with microvilli, while regressing tumors contain transitional spindle-shaped cells. TVTs can develop slowly or become invasively malignant and metastasize [22]. Loss of mucosal integrity enhances transmission. Sterilization plays a key role in controlling disease spread, although this method has limitations. Initial clinical evaluations can raise strong suspicions, with further analyses aiding in the diagnosis of less evident cases. Several therapeutic options exist, including chemotherapy, which will be detailed, as affected animals generally have a favorable prognosis with low metastatic potential.

A recent epidemiological survey updated global data on TVT distribution based on questionnaires sent to veterinary practitioners in the study region. Results indicate that TVT has an endemic evolution in certain geographic areas and is a common disease among dogs worldwide. Its distribution correlates with the presence of free-ranging dogs, with transmission occurring through both mating and experimental cell inoculation. The disease has been reported on all continents, with no race, age, or sex sensitivity identified; however, breeding systems, population density, and uncontrolled contact are significant transmission factors, particularly in Africa and Asia, where prevalence exceeds 1% but remains below 10% [23]. In regions like the Bahamas, Japan, and India, it is the most frequent tumor in dogs [24]. Some areas appear free of the disease, likely due to effective management of canine populations, though accurate incidence rates for reproductive tumors are challenging to ascertain due to high rates of castration and lack of histopathological examinations [20].

Only domestic dogs are significantly affected by this disease across all breeds [25], primarily among stray or semi-stray populations. In cases involving domestic dogs, 75.5% occurred after an escape episode, with 41.3% being guard dogs and 41.5% hunting dogs. Companion dogs, living indoors and under supervision, account for only 4% of cases [25]. No specific breed predisposition exists, and the only affected species is the dog [24]. Other wild canids including foxes, coyotes, and wolves have been shown to develop typical CTVT lesions following experimental transplantation of viable tumor cells, but no natural transmission has been documented in these species [26, 27].

The average age of contamination is 3 years, typically between 2 and 5 years, but can range from 2 to 8 years [1, 25]. Sexual maturity and periods of activity are directly linked to this age range. Cases are relatively high among sexually mature dogs, with an incidence of 2% to 43% in temperate regions [28]. Young, sexually immature dogs can still contract the disease through direct contact [29]. Most affected animals are stray dogs, but unsprayed females in heat often seek mates, increasing the risk of transmission. If owners opt against sterilization for breeding purposes, they should take precautions to prevent accidents, such as comprehensive genital examinations before breeding, awareness of heat cycles, and proper fencing [29].

While sterilization is crucial in combating Sticker sarcoma, some cases have been reported in operated animals [27]. Natural TVT has frequently been observed in external genital organs [30]. Although there is no specific predisposition based on age, sex, or breed, larger breeds are often more affected [11, 12] and transmission can occur through licking, biting, and sniffing the affected areas. TVT is enzootic in regions with poor breeding control and a high number

of sexually active free-ranging dogs [11]. Primary extragenital TVT is rare, with the most common sites being the nasal and oral cavities, skin, and rectum. The regional lymph nodes remain the most frequent site of metastasis [31]. Genital TVT often proliferates as a cauliflower-like mass with ulceration, while extragenital forms typically present as nodular or ulcerative lesions, sometimes with multiple lobules or firm solitary nodules capable of invading the mucosal and submucosal layers [32].

Transmissible venereal tumor is most frequently observed in young adult dogs aged 2–5 years and can spread rapidly within households, even among neutered or spayed animals. Transmission occurs mainly through sexual contact, but also via licking, biting, or sniffing the affected regions. Clinically, affected dogs may develop anorexia, dehydration, and progressive polydipsia, while histological examinations of regressing tumors reveal strong T-cell infiltration, which promotes regression through immune-mediated differentiation and apoptosis [33, 34]. Risk factors, particularly in females, include poor nutritional status and oxidative stress, which can increase susceptibility and influence tumor progression [35].

The clinical manifestations of TVT usually begin with pruritus, mucosal inflammation, and small gray granulations that evolve into red nodules. These may coalesce into single or multiple masses [35]. Genital TVT typically appears in the penile or preputial regions of males and the vulvar area of females. Affected dogs often lick the tumor, leading to bleeding or discharge. Larger tumors may obstruct urination, while oral lesions can interfere with feeding, and nasal tumors may cause discharge, sneezing, and congestion [35].

Clinical signs vary by tumor location but typically include purulent, bloody discharge from the external genitalia, often accompanied by a foul odor indicating bacterial superinfection, alterations in estrous cycles, and changes in sexual behavior, along with non-specific symptoms such as abdominal distension, perineal ulceration, tenesmus, dysuria, hematuria, and dermatological changes. Less common signs include lethargy, anorexia, constipation, paraphimosis, refusal to mate, and weight loss [34].

Sticker sarcoma is a histio-round-cell tumor affecting somatic cells most likely of histiocytic or immature myeloid origin and is generally considered low-grade in aggressiveness. It belongs to the broader category of round cell tumors, which includes lymphoma, mastocytoma, histiocytoma, plasmacytoma, and melanoma. Uniquely, the tumor itself is the causal agent, transmitted through the direct transfer of viable neoplastic cells, and thus behaves as a clonally transplanted allograft rather than a virally induced cancer [26, 36, 37, 38, 39]. As a parasite, it can manipulate its host to favor its transmission, potentially affecting sexual receptivity, reproductive cycles, and female preferences [27, 38]. The primary transmission route is mating, where direct transfer of viable cancer cells occurs due to abrasion of contacting genital mucosa [11, 27, 39, 40]. Direct contact with nasal, oral, or ocular mucosa is also possible. Dogs unsupervised outdoors are at higher risk of encountering infected individuals [11, 25, 26, 27, 29].

Symptoms typically appear 2 to 6 months' post-exposure [11, 41, 42]. Overall, the tumor has minimal impact on the animal's general health (few systemic repercussions and limited biochemical anomalies). Rare cases of necrotic masses, urethral obstruction, or metastases.

The objective of study is to describe the clinical manifestations and the pathological aspects of transmissible venereal tumor cases in dogs. Histology was used to confirm clinical suspicion and highlight the characteristics of the tumor under investigation. Immunohistochemical techniques facilitate the identification of the cell type involved in the neoplasm.

MATERIALS AND METHODS

A total of 120 dogs (*Canis lupus familiaris*) were presented to Veterinary clinics across various regions of Eastern Algeria between January 2020 and September 2022 for various health issues. Among them, 20 cases (8 males and 12 females) showing lesions of the reproductive system were identified and selected for this study. The epidemiological profile was assessed through a questionnaire, where owners answered specific questions to guide the diagnosis. Key questions focused on tumor location, sex, age, breed, onset time of the tumor, sterilization status, medical history, concurrent diseases, and previous treatments. The study included dogs aged between 5 to 8 years, and none of them were sterilized. No breed or sex predisposition was observed, although the condition appears more common in large-breed dogs [19, 32].

For surgical intervention, all animals underwent wide local excision of the tumor, including safety margins, as the standard treatment approach. Prior to surgery, all dogs received a full physical examination and complementary tests, including complete blood counts, biochemical profiles, and, when necessary, radiographic and ultrasound examinations. These tests were performed to assess the animals' general health status and to rule out any contraindications for anesthesia and surgery. However, detailed results of these evaluations are not presented here as they did not reveal any abnormalities relevant to the objective of this study.

Surgical procedures were performed using basic soft tissue surgery instruments (Shankang stainless steel surgical kits, Shankang Medical Instrument Co., Ltd., China) under inhalation anesthesia. Anesthesia was delivered using a veterinary inhalation anesthesia machine (YUESHEN YSA-1V, Yuesen Med Equipment Co., Ltd., China). The surgical treatment involved the complete excision of accessible tumor cells, with tumor tissue fragments preserved in 10% formaldehyde for histopathological examination, subject to the owner's consent. Cytological examination (data not shown) was conducted only in animals clinically suspected of having TVT, as it provided a rapid, low-cost diagnostic aid before histopathological confirmation. Among the 20 dogs studied, 19 cases were diagnosed as TVT, while 1 case corresponded to a vaginal adenocarcinoma. Cytological smears were prepared, stained using a quick Romanowsky-type stain kit (Baso Wright-Giemsa Stain Kit, Baso Diagnostics Inc., China), and examined under a light microscope (Sunny L3000, Ningbo Sunny Instruments Co., Ltd., China).

The diagnostic approach for macroscopically identifying Sticker's sarcoma is based on a clinical examination of the animal, which includes both a general and individual assessment of the health status of all dogs, even those without specific clinical signs. Initially, data are collected through history-taking and case reviews, followed by general clinical data such as temperature, heart and respiratory rates, mucosal status, and lymph node condition. This

step is followed by a specialized examination focused on inspecting the genital area in both sexes to determine tumor location, size, shape, color, consistency, and adhesion [11, 25, 41].

The clinical signs of TVT in dogs are depicted in FIGS. 1–8 for both male (FIGS. 1, 2, and 3) and female (FIGS. 4, 5, 6, 7, and 8) dogs. The aggressive character of the lesion is demonstrated by the hemorrhaged, ulcerated, and inflamed nodule on a male dog's penile region in FIG. 1. A large, hard mass at the base of the penis with numerous regions of ulceration and inflammation, indicative of advanced TVT, is shown in FIGS. 2 A and B. Hemorrhagic, polypoid tumors on the prepuce and penis mucosa are and which also shows the tumor's characteristic friable and vascularized surface. A nodular lesion with a hard, bell-clapper-like appearance in females is depicted in FIGS. 3 A and B, suggesting deep tissue invasion. A polypoid tumor that resembles cauliflower and is prone to bleeding and bruises is seen in 3B, the soft, reddish-violet vegetal mass with incomplete pedunculation in FIGS. 4 A and B, is typical of the vaginal vestibule as TVT progresses. A big, friable, hemorrhagic, pedunculated mass with lobulated structure is depicted in 4B, which frequently causes discomfort and secondary infections. A polypoid, hemorrhagic, and ulcerated mass in the vaginal vestibule with lesion extension into the breast region is shown in FIG. 5, indicating local invasion outside of the genital canal.

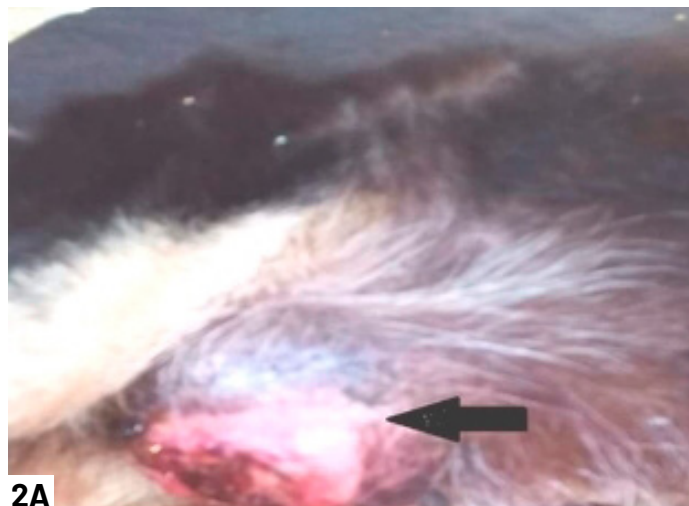
Although the image does not clearly show the penile lesion due to technical limitations at the time of capture, it illustrates the clinical presentation of an affected patient. More detailed gross lesions are shown in FIGS. 2 to 5.



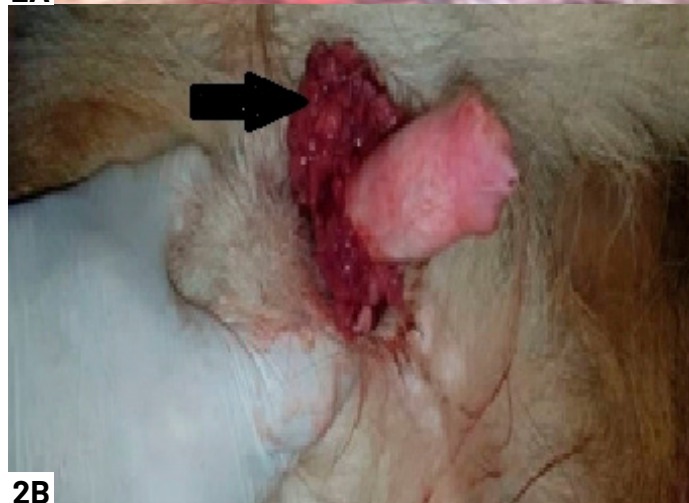
FIGURE 1. External view of a male dog affected by TVT

Histopathological technique

The study focused on tumor samples from the genital tract obtained during surgical procedures in both male and female dogs (FIGS. 6 A and B). These samples were processed at the histopathology laboratory of Ibn Badis Hospital in Constantine and classified according to their nature, anatomical site, and breed. A routine histopathological examination using the Hematoxylin & Eosin (HE) method was performed on the collected tissue fragments to establish the diagnosis, particularly to confirm cases of TVT and to identify other genital tumor types.

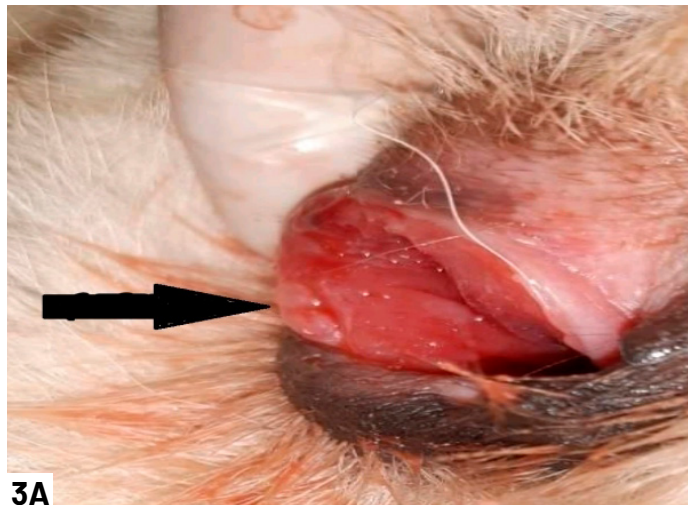


2A



2B

FIGURE 2. A: Mass at the base of the penis showing ulcerated and inflamed areas, consistent with advanced transmissible venereal tumor. B: Polypoid lesion of the penis and prepuce with a friable, vascularized surface. Image quality is limited and does not allow detailed appreciation of all features, but the photographs are included for illustrative purposes



3A



3B

FIGURE 3. A: Inflamed nodule with a hard and firm appearance resembling a bell clapper. Demonstrates a typical firm lesion found in female dogs, suggestive of deeper tissue penetration. **B:** Polypoid appearance resembling cauliflower, friable and easily bruised. Shows the irregular, fragile tumor surface often associated with increased risk of trauma and bleeding



4A



4B

FIGURE 4. A: Hemorrhagic, red-violet mass with partial pedunculation, located in the vaginal vestibule. Due to deformation and image cropping, the exact anatomical location is not fully appreciable, but the picture illustrates the gross aspect of the lesion. **B:** Mass larger, friable, red, hemorrhagic, and with a pedunculated appearance. Emphasizes the size and fragile texture of advanced tumors, prone to secondary infection and discomfort



FIGURE 5. Tumoral mass with a polypoid and ulcerated appearance, located in the vaginal vestibule of a female dog, with extension toward adjacent tissues. The image illustrates the gross morphology of the lesion, although the anatomical details are difficult to appreciate due to image quality and cropping limitations

RESULTS AND DISCUSSIONS

Histopathological analyses

Clinical history, clinical signs, and cytological characteristics often provide useful information, but the definitive diagnosis of genital tumors was established through histopathological examination. Tissue samples were processed, sectioned, and stained with HE, and diagnoses were made based on the morphological characteristics observed under light microscopy.

Vaginal tumors are the second most common reproductive tumors in female dogs, following mammary tumors. The two most frequently encountered types of vaginal tumors are leiomyomas (or fibromas), which develop from smooth muscle, and transmissible venereal tumors, also known as Sticker sarcomas. Fibromas or fibropapillomas, also referred to as vaginal polyps, are benign tumors that occur during the late stages of the estrous cycle.

Histologically, Sticker sarcoma consists of cells arranged or grouped in chains, interspersed with delicate connective tissue stroma when stained with HE. Tumor cells are typically arranged radially around blood and lymphatic vessels and exhibit a high nucleus-to-cytoplasm ratio, with rounded nuclei and chromatin ranging from fine to coarse, along with prominent nucleoli. These

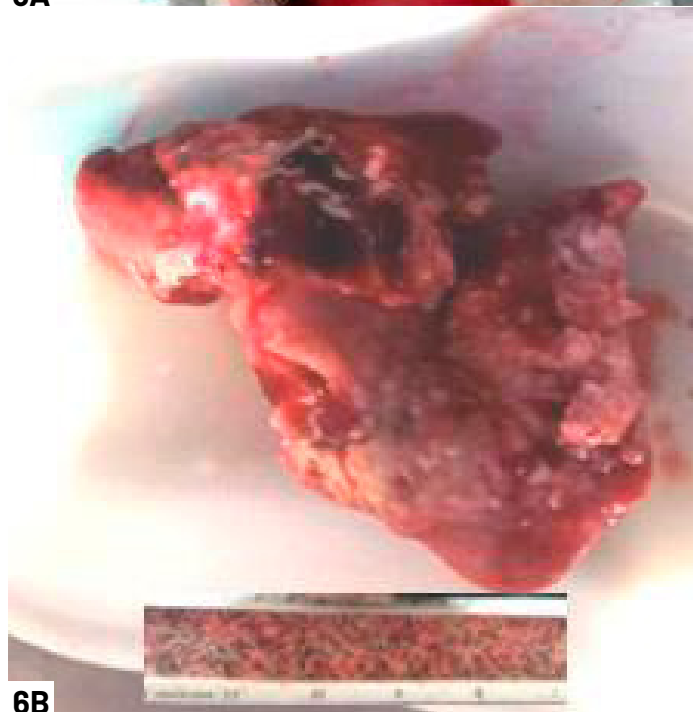


FIGURE 6. A: Removed tumoral mass from a male dog's penile area. A recently removed tumor mass from a male dog's penis is depicted in this image. The lesion's lobulated, vascularized appearance, uneven surfaces, and necrotic patches are all in line with the general appearance of a TVT. **B:** Tumoral tissue excised from a female dog's vaginal vestibule. A surgical specimen taken from a female dog's vaginal vestibule is seen in this picture. The mass exhibits characteristics of an advanced TVT, including being polypoid, soft, and hemorrhagic

cells contain a large amount of slightly eosinophilic cytoplasm with poorly defined boundaries.

The tumor can be classified according to stages of development and phases of initial or final progression or regression. The progression phase shows round cells diffusely arranged, separated by delicate connective stroma, with frequent mitotic structures. In the initial regression phase, lymphocytes infiltrating the tumor appear and are widely distributed or associated with the stroma.

The final regression phase involves the collapse of neoplastic tissue and the frequent presence of apoptotic bodies.

According to the histological classification of tumors in the genital system [42], two histological types of genital tumors were identified in both sexes (FIGS. 7 and 8). Optical microscopy observation at 400x magnification after HE staining of a transmissible venereal tumor located in the vagina and penis.

The tumor displays a sheet-like proliferation of monomorphic round to polyhedral tumor cells, generally arranged radially around blood and lymphatic vessels, featuring basophilic and vacuolated cytoplasm (red arrow). The cells have large, round vesicular nuclei with variably organized chromatin that can appear dusty or granular, with well-defined nucleoli (yellow arrow). These cells are separated by sparse, well-vascularized connective stroma (green arrow) and form clusters with the presence of capillaries

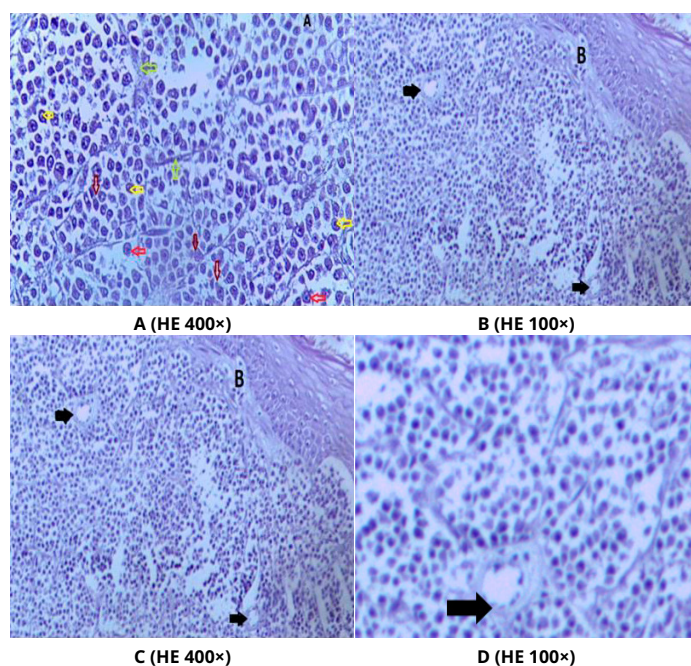


FIGURE 7. Histological section of Canine TVT (Sticker Sarcoma) in male dog (A - B) female dog (C - D). HE: Hematoxylin-eosin

(black arrow). The mitotic index is high, and pleomorphism is also observed (brown arrow), while the epithelial surface is often hyperplastic and ulcerated.

The carcinoma shows an infiltrative proliferation of tubular and canalicular structures, varying in shape and size (red arrow). The tumor cells are cylindrical with abundant eosinophilic cytoplasm (green arrow) and large hyperchromatic nuclei, exhibiting moderate mitotic activity (brown arrow). Solid tumor foci organized in clusters centered around necrosis are also observed (black arrow). In this study, no other histological types of genital tumors were identified beyond TVT and adenocarcinoma. Although leiomyomas and fibromas are frequently reported in the literature as common vaginal tumors, they were not observed among our cases.

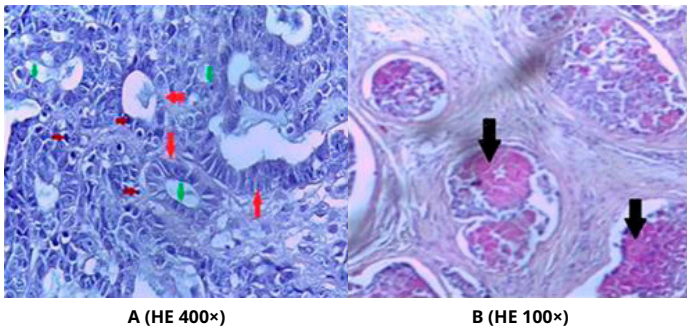


FIGURE 8. Histopathological features of an adenocarcinoma in the vaginal area of a female dog. HE: Hematoxylin-eosin

Complementary techniques in histology: Immunohistochemistry

The interpretation of immunostaining analysis is based on both the intensity and quality of membranous staining, determining the percentage of labeled cells in relation to all cancerous cells within the invasive component, and assessing the average intensity of this staining. Myogenin and Desmin are transcription factors considered sensitive and specific IHC markers for Sticker's sarcoma.

The immunohistochemical results for Sticker's sarcoma reveal a strongly positive brown staining with the desmin marker (A and B), while the myogenin marker (C and D) exhibits a less intense brown staining in epithelial cells. Utilizing these antibodies enhances diagnostic precision for Sticker's sarcoma and will ultimately improve the characterization of the disease's biological behavior and clinical outcomes (FIG. 9).

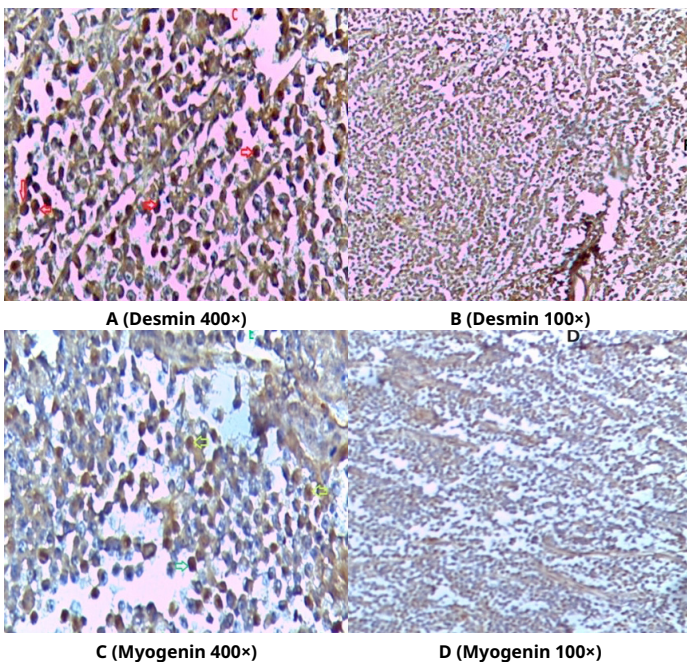


FIGURE 9. Immunohistochemical staining of Sticker sarcoma: A strong brown positive staining is observed with the desmin marker (A and B), while the myogenin marker (C and D) shows a less intense brown staining in the epithelial cells using Harris hematoxylin

Retrospective studies in oncology are important for identifying certain characteristics of tumors, their biological behavior, and factors that may potentially affect responses to various treatments, thus posing a therapeutic challenge [43]. This study reports a variety of information related to sexual and racial predisposition as well as the age of dogs affected by genital tumors, in association with the histological type and location of these tumors, which aligns with findings from other authors. In the current study, most of the affected dogs were older than five years (74%), and the majorities were mixed-breed (59.8%), followed by German Shepherds (38.2%).

Some researchers have reported that dogs aged 2 to 5 years are susceptible to venereal tumors [11], which contrasts with our findings that dogs over five years old (74%) were the most affected, with mixed-breed dogs (59.8%) being the most prevalent. According to some sources [44], in certain regions where dog breeding is poorly controlled and where stray dogs are in high concentration (urban areas), Sticker sarcoma is the most common canine tumor. Significant rainfall and average annual temperature are positively correlated with prevalence.

Generally, the main breeds exhibiting genital tumors include the German Shepherd, Poodle, Boxer, and Yorkshire Terrier [45]. In this study, related breeds showed significant prevalence, but did not surpass the high incidence found in mixed-breed animals. Overall, the incidence of venereal tumors is more frequent in sexually active dogs. The disease is classified as high in certain dog breeds in tropical and subtropical countries [11, 46]. Cases of venereal tumors are found in some countries in South and Central America, Africa, and Asia. Venereal tumors are endemic in at least 90 countries worldwide [27]. The global spread of venereal tumors indicates that most dog breeds, regardless of sex and age, can be infected by this disease [11].

A comparative analysis between male and female dogs regarding the most affected reproductive organs revealed that the incidence of vulvo-vaginal tumors (12 out of 120, 10%) is significantly higher than that of other organs. Likewise, the number of females (12 out of 20, 60%) presenting genital tumors in our study exceeded that of affected males (8 out of 20, 40%). These results corroborate reports from various authors [47, 48].

TVT is most often spread during coitus through the transfer of neoplastic cells from one dog to another, rather than by cellular transformation in the affected host [49]. This unique mode of transmission, by allografting, has been widely reported [44].

Clinical signs are less pronounced in males, where the tumor may be discovered incidentally, which aligns with our observations. In our study, tumor masses resembling cauliflower, friable and vascularized, were observed in the vaginas and vulvas of female dogs, while other masses were located on the penile area of male dogs. TVT typically presents with extragenital masses associated with serohemorrhagic discharge, with tumor mass sizes ranging from 2 to 10 cm. The tumors observed in this study exhibited the same macroscopic characteristics reported in prior studies [29, 44].

The following results pertain to animals where histopathological examination can be used to confirm the diagnosis of TVT. The genital tract is a complex system composed of various organs

capable of generating different types of tumors, which is why the reproductive system of dogs shows varying incidences based on the tumor's origin. TVT is a common tumor of the external genital organs in young, stray, and sexually active animals [50]. The following results pertain to animals where histopathological examination confirmed the diagnosis of TVT. The genital tract is composed of various organs capable of generating different tumor types; however, in this study, the tumors were restricted to the external genital organs. Among the 120 dogs examined, 20 cases of genital tumors were selected, with 12 out of 20 (60%) females showing the highest prevalence compared to 8 out of 20 (40%) males. In the male reproductive system, the most frequently found histological type was penile Sticker sarcoma (6.66%). In females, the most common histological types were vulvar and vaginal TVT and vaginal adenocarcinoma [11, 48, 49].

Chemotherapy with vincristine sulfate is the treatment of choice for transmissible venereal tumor and has been documented for decades as the most effective approach, with high remission rates and low recurrence [44]. Surgical excision, while sometimes used, carries a significant risk of relapse because TVT is a transplantable tumor and residual cells can easily remain at surgical margins. In this cases, vincristine was not available in Algeria; therefore, surgery was performed as an alternative, although the limitations of this approach are acknowledged.

Canine transmissible venereal tumor is generally considered a curable cancer when appropriate protocols are applied. Nonetheless, rare cases of metastasis, drug resistance, or fatal outcomes have been reported in endemic areas, particularly among immunocompromised dogs. Chemotherapy remains the treatment of choice, with vincristine sulfate (0.5–0.7 mg·m² IV, once weekly for 3–6 weeks) being highly effective. Alternative protocols combining vincristine with cyclophosphamide or methotrexate have also demonstrated favorable outcomes [11]. Surgical excision alone is less satisfactory because of the high recurrence risk associated with the transplantable nature of this tumor. Canine transmissible venereal tumor is highly responsive to vincristine sulfate chemotherapy, which remains the treatment of choice. Recent studies confirm remission rates above 95% when vincristine is administered weekly for 4–8 sessions. Combination protocols, including the use of intratumoral Bacillus Calmette–Guérin (BCG) with vincristine, have also shown enhanced tumor regression and improved immune response, although they are less frequently applied in clinical practice [51, 52].

CONCLUSIONS

In this study, genital tumors in dogs were limited to the external genital organs, with TVT being the most frequently diagnosed lesion. Histopathology proved essential for confirming the diagnosis and characterizing tumor types. Although surgery was performed due to the unavailability of vincristine in Algeria, chemotherapy remains the treatment of choice because of its high efficacy and lower recurrence rates. These findings underline the importance of systematic diagnosis and appropriate therapy in managing canine genital tumors.

Conflict of interest

The authors declare that they have any conflict of interest.

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