Case Report

Neoplasia of glandular and blood vessel origin in *Canis familiaris*: diagnostic and therapeutic approach

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Abstract

Cutaneous neoplasms in dogs are common findings in routine veterinary practice, especially in older animals. Among these, adenoma and hemangioma stand out, both of benign nature but capable of causing discomfort and the risk of secondary complications. This paper reports the case of a 7-year-old mixed-breed male dog weighing 5 kg, which presented two distinct nodular formations: a

subcutaneous lesion on the right dorsal region and another at the base of the tail. The first was identified as a hepatoid cell adenoma, and the second as a hemangioma, both confirmed by histopathological examination after surgical excision. The clinical case highlights the importance of early evaluation of skin masses, precise surgical management, and diagnostic differentiation between tumor types, in accordance with current veterinary oncology guidelines.

Keywords: benign neoplasm, cutaneous tumor, dog surgery.

Introduction

Dermatological routine has a high caseload, and among these pathologies, one group that deserves attention is skin neoformations, especially in elderly patients. This higher frequency of oncological consultations is a result of numerous factors, including the longevity of companion animals. These skin tumors represent between 30% and 40% of all neoplasms in dogs (15).

The perianal region, or hepatoid glands, is composed of diverse sets of cells and glands that can give rise to various types of tumors, the most common of which originate from the sebaceous and sweat glands typical of the area. It can also be affected by transmissible venereal tumors, such as lipoma, mast cell tumor, squamous cell carcinoma, melanoma, lymphoma, and soft tissue sarcomas (12).

Adenoma and hemangioma are common benign tumors, especially in older dogs. Although non-metastatic, these lesions can grow and ulcerate, leading to pain, secondary infection, or mechanical difficulties that justify their removal (3, 7).

Adenomas are tumors that originate from epithelial glandular tissue and can occur in various locations in the canine body, such as the skin, adrenal glands, thyroid, liver, and sebaceous glands (8). They are more prevalent in male dogs between 8 and 12 years of age, including German Shepherds, Siberian Huskies, Shih Tzus, Samoyeds, and Alaskan Malamutes (12).

Hemangiomas are neoplasms of mesenchymal origin, resulting from the proliferation of endothelial cells that form well-organized vascular structures (6). Clinically, they present as firm, reddish to purplish nodules, most frequently in areas exposed to the sun or subject to trauma, such as the extremities, flanks, and tail (9, 10, 13). They are relatively common in dogs, especially in adult and older animals, with a higher prevalence in breeds with light and short coats, such as Whippets, Dalmatians, and Pit Bulls (6).

In the case of both adenomas and hemangiomas, staging should include a physical examination, complete blood count, serum biochemistry, radiographs, ultrasound, fine-needle aspiration cytology (FNAC), and confirmation by histopathological examination, according to protocols recommended by Avallone et al. (1). The treatment of choice in both cases is complete surgical excision with clean margins, and recurrence is rare when the procedure is performed correctly (3, 7).

This study aims to report a clinical surgical case of benign neoplasms in different regions of the same patient, highlighting the diagnostic and surgical management as recommended by the most current guidelines.

Case description

At the Professor Mário Dias Teixeira Veterinary Hospital of the Federal Rural University of the Amazon, a fertile male mixed-breed dog, approximately seven years old and weighing 5 kg, was treated. The animal presented with two nodules, one located in the subcutaneous region of the right side of the dorsal spine and the other located at the base of the tail (Fig. 1).

On clinical inspection, the dorsal nodule appeared firm, non-adherent, mobile, and painless. The lesion at the base of the tail was exophytic, rounded, well-defined, with a tense-elastic consistency, light in color, and with dark, crusted, irregular areas. The animal was beginning to ulcerate, and the animal presented painful sensitivity in the area. FNA was performed on both lesions;

78 the dorsal nodule revealed a probable vascular origin, while the caudal nodule suggested an epithelial
79 pattern consistent with adenoma.
80 A complete blood count, biochemical profile, cytology, abdominal ultrasound, and chest X-ray
81 were performed to determine the presence of lung metastasis. The erythrogram revealed mild
82 hyperchromic normocytic anemia (hematocrit 33.2% (RV: 37-55%), hemoglobin 12.4 g/dL (RV: 12-
83 18), red blood cells 4.94 × 106/µL (RV: 5.5-8.5), MCV 67 fL (RV: 60-77), and MCHC 37.3 g/dL
84 (RV: 31-35), along with anisocytosis. The leukogram and platelet count showed no abnormalities.
85 The biochemical examination revealed only decreased globulins (2.4 g/dL).
86 The diagnostic impressions on the ultrasound examination suggested the presence of an oval-
87 shaped structure with slightly irregular contours, hypoechoic and heterogeneous, with extensive
88 vascularization on color Doppler flow, located at the base of the tail. In addition to the oval-shaped
89 structure, with contours Regular, hypoechoic, and homogeneous lesions were observed in the dorsal
90 subcutaneous region on the right side, with no vascularization on color Doppler flow. Prostatic
91 hyperplasia was associated with intraprostatic cysts and testicles with a degenerative process. The
92 chest radiograph did not reveal any pulmonary metastasis, but a nodular lesion was observed on the
93 left lateral aspect of the 5th and 6th coccygeal vertebrae, suggesting a neoplastic and/or inflammatory
94 process (Figs. 2A, B) and at the base of the tail (Fig. 2C).
95
96 *Surgical Intervention*
97 Following the recommendations of the literature (3, 7), the treatment of choice in both cases
98 was complete surgical excision and orchiectomy. Preoperatively, the patient was sedated and
99 underwent a wide shave. Subsequently, in the surgical setting, anesthesia was induced, and a
100 lumbosacral epidural block was performed. The animal was then placed in the prone position for
101 antisepsis of the surgical fields, followed by excision of the dorsal nodule and tail removal.
102 The dorsal lesion was removed through a geographic (square) incision using a No. 23 scalpel,
103 ensuring and maintaining wide surgical margins. A zigzag suture was performed to reduce the

subcutaneous tissue using 2-0 Polyglactin 910 suture, and a simple, separate suture using 2-0 nylon was used for dermorrhaphy (Fig. 3).

For perineal surgery, a purse-string suture was performed around the anus to reduce intraoperative contamination. Due to the compromised base of the tail, a total caudectomy at the third coccygeal level was indicated, respecting the anatomical planes and with meticulous hemostasis (Fig. 4).

The neoplastic samples were sent for histopathological analysis. During the macroscopic evaluation of the neoplasms, it was possible to observe in the neoplasm ventral to the base of the tail, a rounded, well-defined shape, tense-elastic consistency, light color, with dark, crusted and irregular areas, with beginning of ulceration, measuring 4.1 × 3.2 × 3.5 cm (Fig. 5A). Upon cut, it presented a whitish-yellow coloration, with darkened, reddish areas, with a shiny and septate appearance (Fig. 5B). The second neoplasm was located below the skin, surrounded by fat, with a flattened rounded shape, dark red coloration and shiny appearance, whitish lacework, measuring 2.5 × 2.6 × 1.6 cm (Figs. 5C, D, E).

Histopathological Analysis

The nodules were fixed in buffered formalin for 24 hours and sent to the Animal Histology and Embryology Laboratory (LHEA) of the Federal Rural University of the Amazon, for histological processing and for histopathological analysis. The samples were routinely processed (14), with histological sections stained with hematoxylin-eosin (HE) and Gomori's trichrome.

The nodule at the base of the tail was composed of large, polygonal cells with ample acidophilic cytoplasm and loose chromatin, forming multiple, well-defined lobules, forming nests of cells with a keratinocyte pattern, adjacent to areas composed of small, dense chromatin-dense cells with little cytoplasm, corresponding to neoplastic cells in the early and intermediate stages of development. The area was highly vascularized. Furthermore, diffuse horny pearls of varying sizes were present, along with neoplastic cells in dyskeratosis and areas of degeneration and necrosis, with vacuole formation,

as well as lymphoplasmacytic inflammatory infiltrate. The mitotic index revealed two mitoses per field. Analysis identified a hepatoid cell adenoma (Fig. 6).

The neoplasm in the subcutaneous region revealed large blood-filled vascular spaces. The vessels presented a normal endothelial lining, with intervascular connective tissue of varying thickness, with thick and thin collagenous regions. Some regions exhibited lymphoplasmacytic aggregates in the intervascular tissue. There were no signs of thrombosis or other secondary changes. Analysis identified a hemangioma (Fig. 7).

Postoperative

After the surgical procedure, the patient was transferred to the observation ward and later released to home care, as his guardian could not afford hospitalization. The following medications were prescribed postoperatively: Amoxicillin 400mg + potassium clavulanate 57mg (20 mg/kg, orally, twice daily, 14 days), Meloxicam (0.1 mg/kg, subcutaneously, once daily, 5 days), Dipyrone drops 500mg/mL (25 mg/kg, orally, twice daily, 5 days), Glicopan Gold® (0.5 mL/kg, orally, once daily, 6 days), and topical chlorhexidine digluconate 2% spray (24 days). The use of an Elizabethan collar was recommended until the stitches were removed. Four days after surgery (January 29, 2024), the patient returned with complications such as suture dehiscence in the tail resection wound, as the animal had accessed the lesion (Fig. 8). The previously prescribed medications were not administered. During this evaluation, the animal was apathetic and had hyperemia and dirt in the surgical wounds. The wounds were cleaned, and antibiotics and anti-inflammatories were administered on an outpatient basis. The animal was again advised on the importance of medications for infection control and analgesia.

Twelve days after surgery (February 6, 2024), the surgical stitches were removed (Fig. 9). However, the animal was apathetic and still had dirt in the surgical wound and nearly encapsulated surgical stitches. The person responsible revealed that she had been applying Jucá (in folk medicine, *Caesalpinia ferrea* var. *ferrea* is widely used for its healing properties, in the treatment of bruises and

wounds) to the wounds for healing and as an anti-inflammatory. The animal was discharged from surgery and sent to the internal medicine department with requests for new hematological and imaging tests.

Discussion

This case presents an unusual but clinically significant situation, in which a patient presents with two distinct and simultaneous benign neoplasms in different topographies. Although both presented passive behavior, the location of the caudal mass required a more aggressive surgical approach. Tumor development and progression can be influenced by hormones, with growth being stimulated by androgenic hormones and suppressed by estrogenic hormones (12). Furthermore, testicular interstitial tumors can facilitate the development of perianal tumors due to increased androgen concentrations in the blood.

The patient underwent surgery with satisfactory results, with no major complications occurring during the period during which he was clinically monitored by the veterinarian responsible for the case. Fine needle aspiration cytology is a complementary examination that aids in screening suspected cancer patients and provides valuable information for diagnostic determination and the establishment of therapeutic protocols. Histopathological examination is a conclusive tool for diagnosing perianal tumors (16). The hemangioma was treated with simple excision (3), as it is non-invasive. Recurrence is rare when removal is complete, as observed in this case (8).

According to Withrow et al. (15), differentiating between hemangioma and hemangiosarcoma is crucial, and histopathological examination is essential, as was performed in this case. The prognosis is excellent when removal is complete, without tissue infiltration or signs of malignancy (9), as observed in the histopathological analysis of the right dorsal nodule of the canine in this report.

The hepatoid cell adenoma, on the other hand, posed a greater risk due to its location and bleeding. In this case, the location of the caudal mass and its extension necessitated a more aggressive

surgical approach. Caudectomy is indicated in cases of large, ulcerated, or recurrent lesions at the caudal base (7), based on the need to preserve animal welfare and prevent infections.

As hepatoid adenomas are hormone-dependent, the vast majority experience complete remission a few months after orchiectomy, and recurrence is low (4, 5). Isolated, asymptomatic perianal adenomas in males do not require surgical removal; orchiectomy alone is indicated. In this case, the animal presented with ulceration of the tumor mass, which affected its quality of life.

Surgical excision is indicated for perianal adenomas in females and in males that present ulcerated nodules that promote continuous bleeding and secondary bacterial infection, as it reduces the patients' quality of life (4).

In this report, the animal presented testicular degeneration and prostatic hyperplasia, which in the future could be a triggering factor for the formation of malignant testicular neoplasms (2), hence the need for orchiectomy surgery. Tumor monitoring and staging, even after surgical excision, is extremely important; its need aims to promote greater longevity and quality of life for the animal (4, 11).

Early identification and treatment of skin lesions in dogs is essential to prevent complications, even in cases of benign neoplasms. This case reinforces the importance of an individualized surgical approach, considering location, tumor behavior, and the patient's general condition. The correct use of FNA combined with histopathological examination enabled assertive procedures and an effective recovery, with no recurrence or complications in the months following surgery.

Reports like this are important for expanding the caseload of benign neoplasms in dogs, alerting professionals to the diversity of presentations and approaches. The use of evidence-based protocols, such as the AAHA and ACVIM guidelines, provides greater confidence in clinical and surgical decision-making. Postoperative follow-up and periodic evaluation are essential to ensure the patient's health and longevity, even when dealing with benign tumors.

Conflict of Interest

The authors declare no competing interests.

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Figure 1. Cutaneous neoplasms in a canine. A. Lesion in the right dorsal region (white arrow). B. Hyperemic lesion and ulcerated part at the base of the tail (yellow arrow).

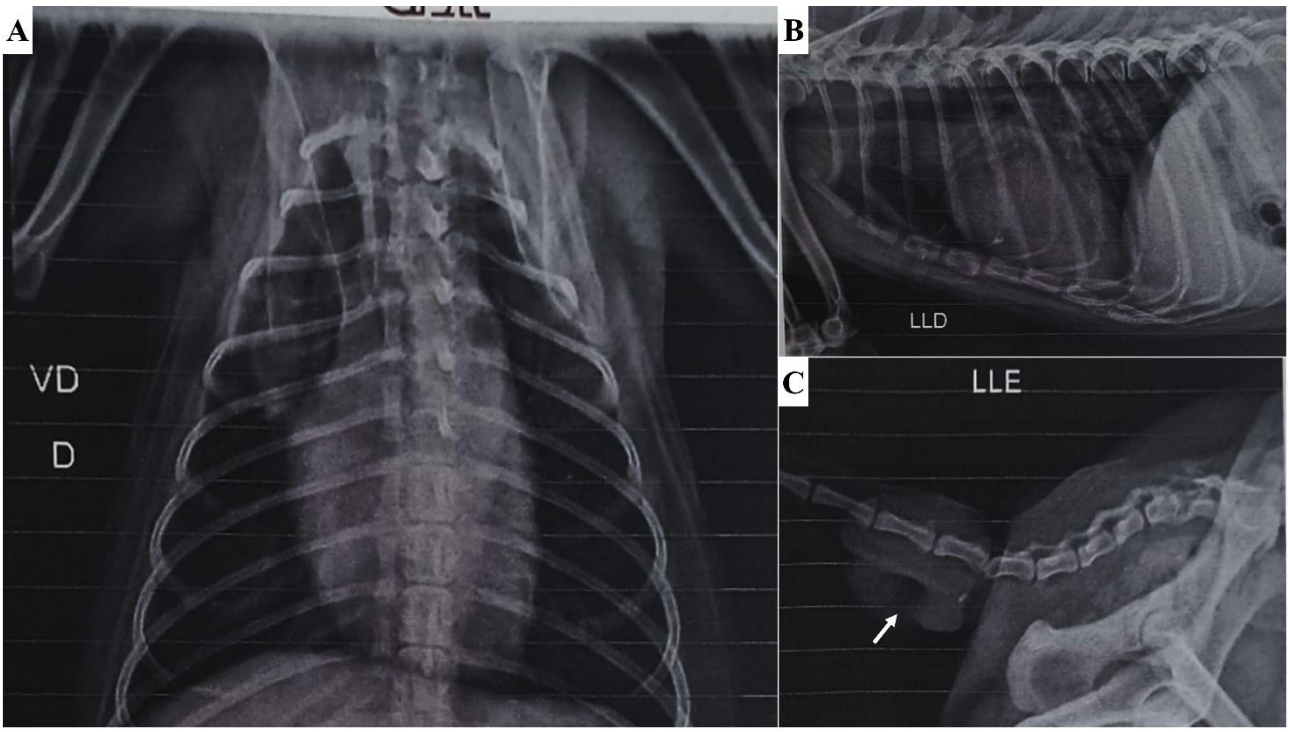

Figure 2. Chest and tail radiograph of a canine. A, B. Absence of lung metastasis. B. Nodular mass at the base of the tail (arrow).

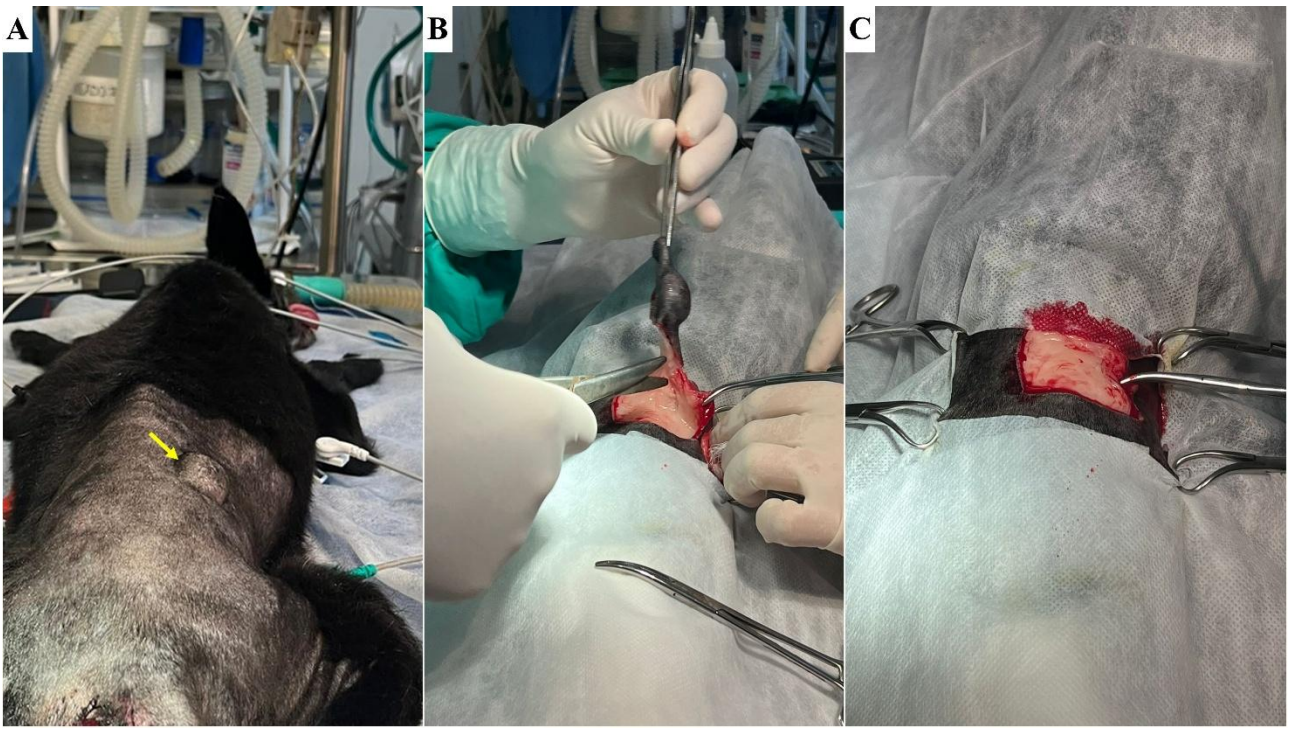

Figure 3. Surgical removal of a nodule in the right dorsal region of a canine. A. Nodulation on the

right dorsal region (arrow). B. Excision of the nodule, observing the nodule not adhered to deep planes. C. Surgical wound with wide margins.

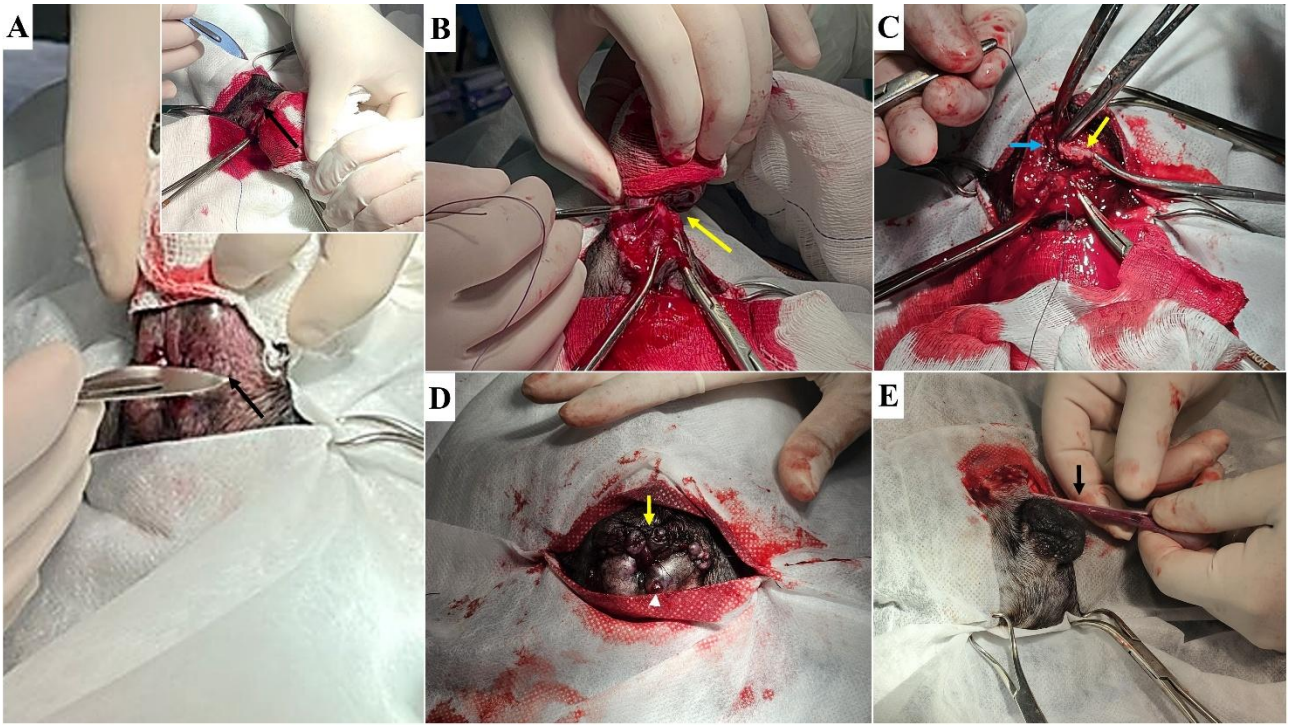

Figure 4. Total caudectomy in a canine. A: After wrapping the tail with a sterile surgical compress, an incision was made around the ventral region of the base of the tail (arrow), in the insert the dorsal incision (arrow). B. Disarticulation of the caudal vertebrae (arrow). C. Disarticulated region (yellow arrow) and ligation of the caudal airways and arteries (blue arrow) with 2-0 Polyglactin 910 suture. D. Suture in a separate simple stitch (arrow) with 2-0 Nylon suture. E. Prescrotal orchiectomy surgery.

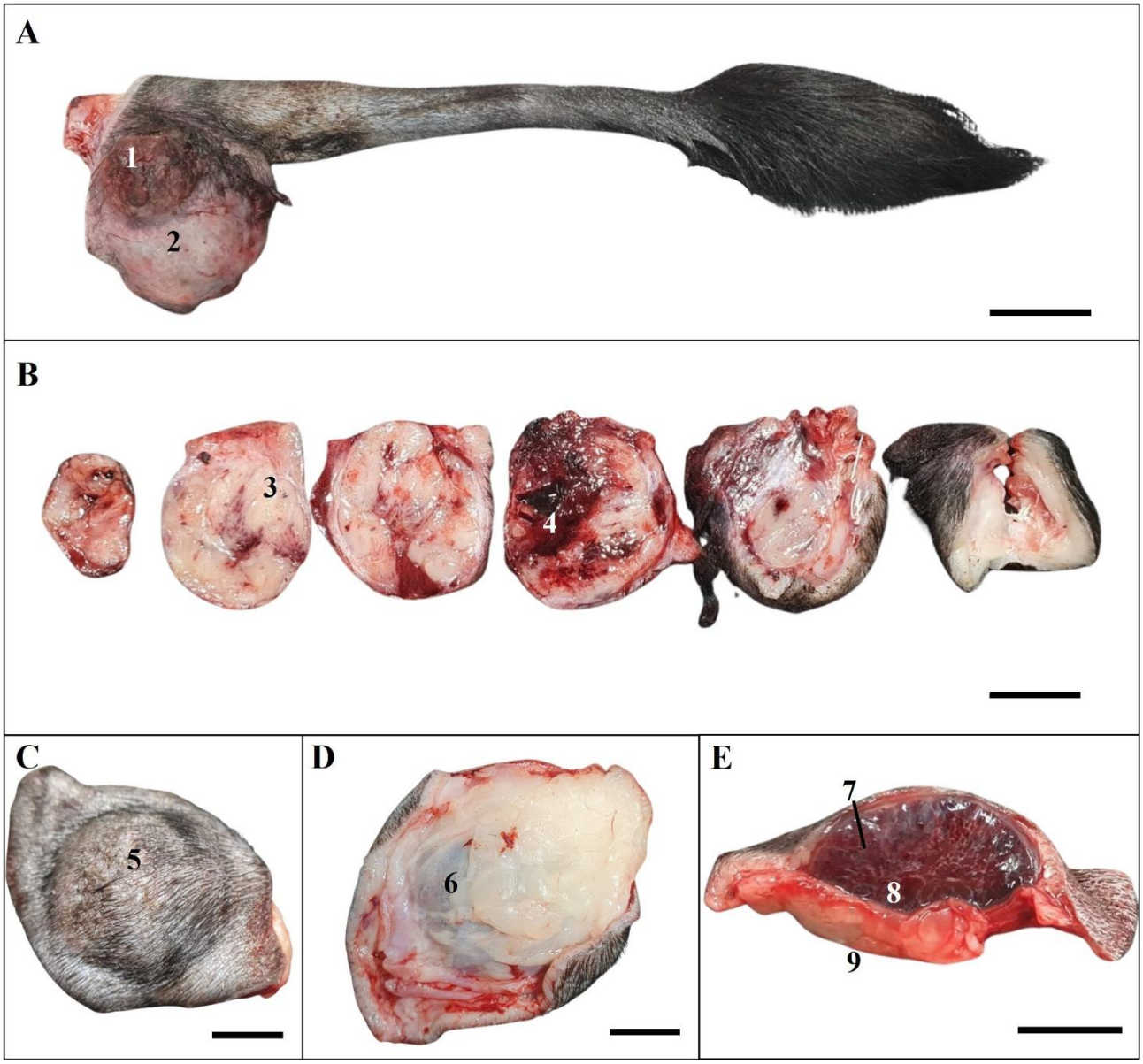

Figure 5. Tail base neoplasm. A. Dark (1) and light (2) crusted areas. B. Serial sections showing whitish-yellowish areas (3) and reddish-dark areas (4). Subcutaneous nodule (C, D, and E). C. External view of the skin over the neoplasm (5). D. Internal view of the fat surrounding the neoplasm (6). E. Section showing the skin (7), dark red neoplasm with a lacy appearance (8), and fat (9). Scale bar: 2 cm.

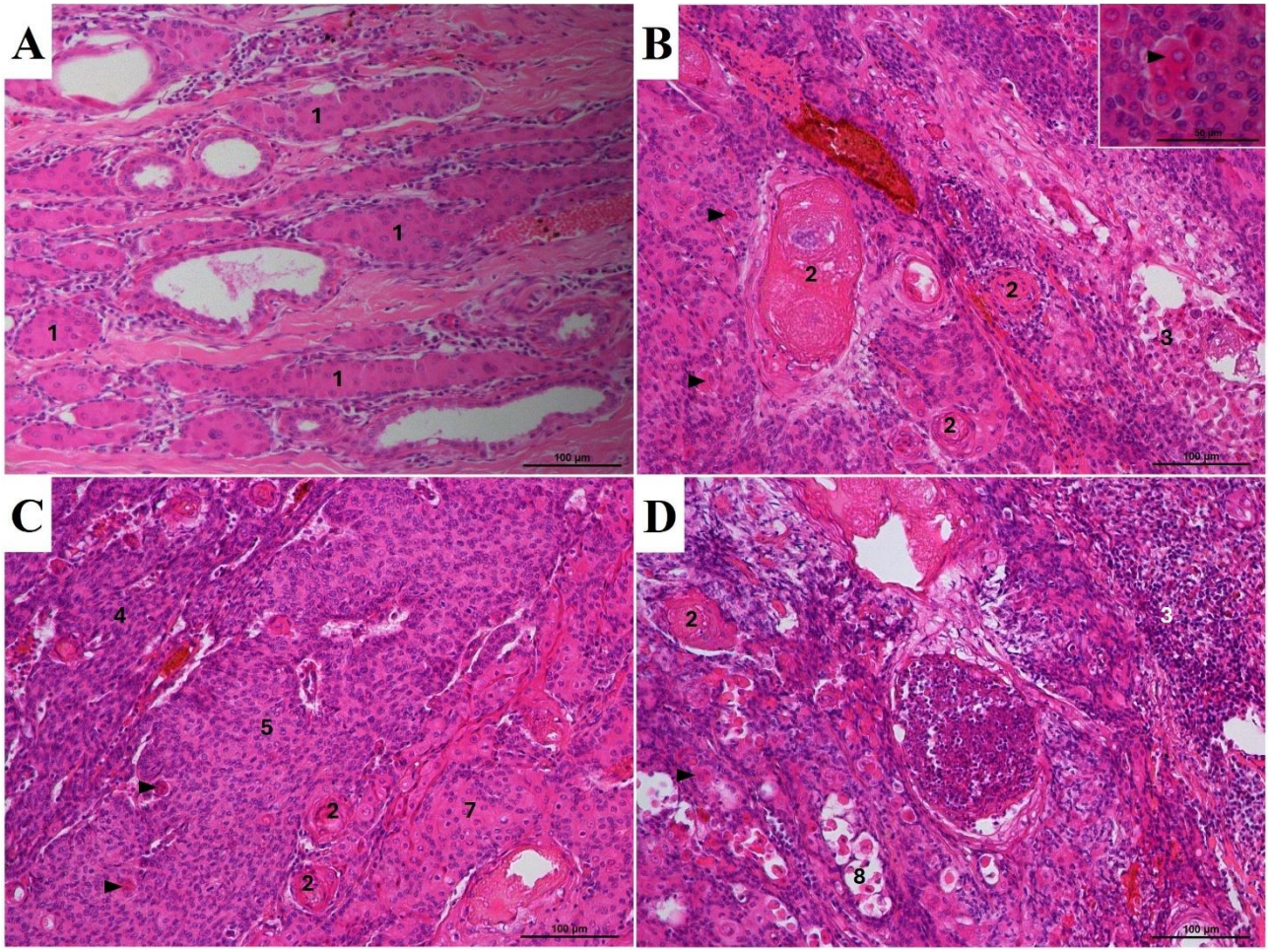

Figure 6. Hepatoid cell adenoma. A. Lobules of polygonal bulky cells in superficial dermis (1). B, C and D. Neoplastic cells in deep dermis. Horny pearls (2), dyskeratotic cells (arrowhead), lymphoplasmacytic infiltrate (3). C. Cells in early (4), intermediate (5) and mature (7) stages of development.

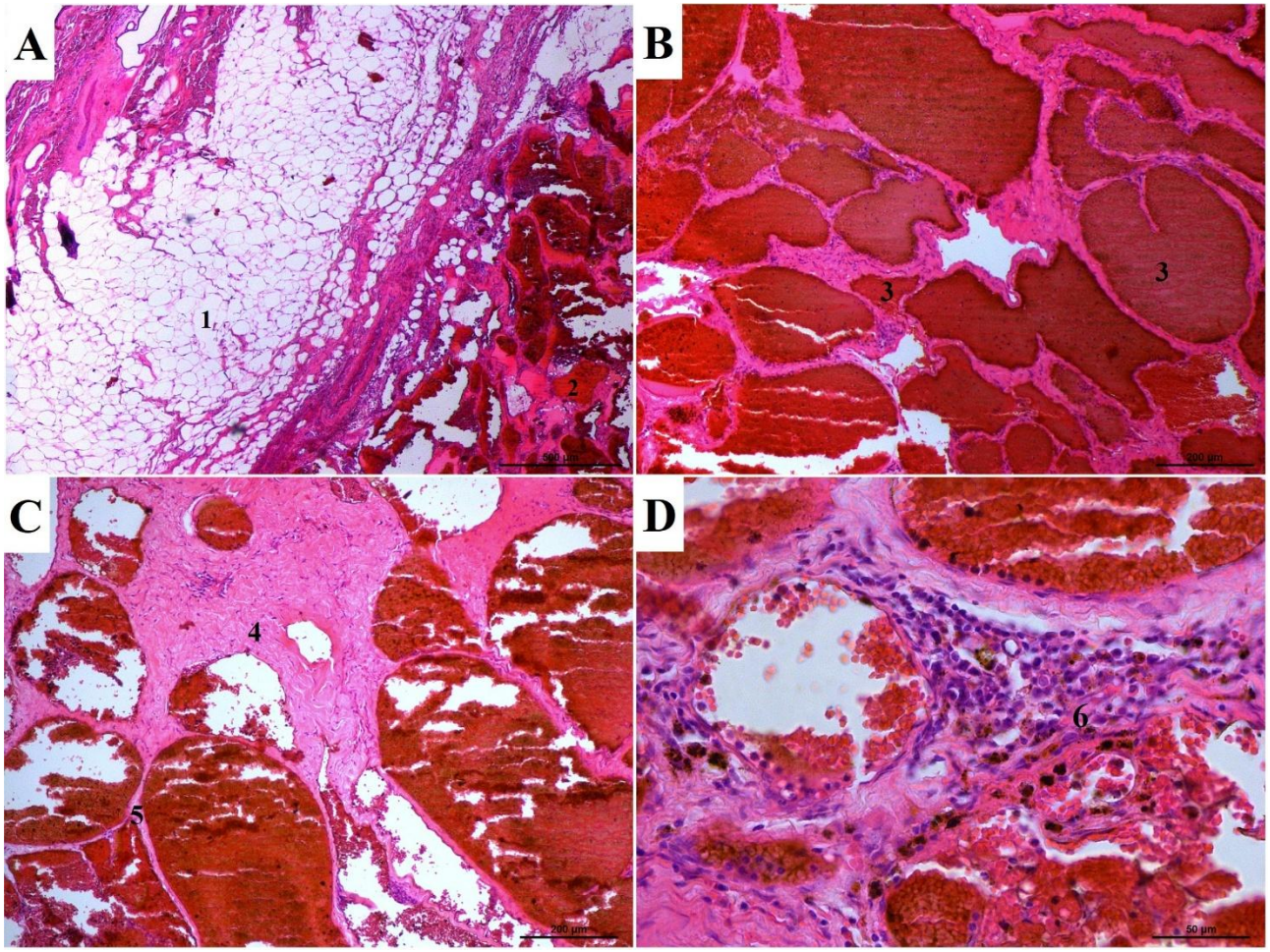

Figure 7. Subcutaneous hemangioma. A. Subcutaneous tissue composed of adipocytes (1) adjacent to the neoplasm (2). B. Vascular spaces of varying sizes filled with blood (3). C. Thick (4) and thin (5) intervascular collagenous tissue. D. Lymphocyte infiltrate in the intervascular space.

Figure 8. Patient's return visit four days after surgery. A. Surgical wound with suture dehiscence due to licking, intense inflammatory process with greenish secretion (arrow) and crusts in the wound region (*), and neoplastic process (arrowhead). B. Hematoma (*) in the right dorsal region and in the suture region (arrow). C. Region with hematoma (*) and edema in the surgical wound (arrow).

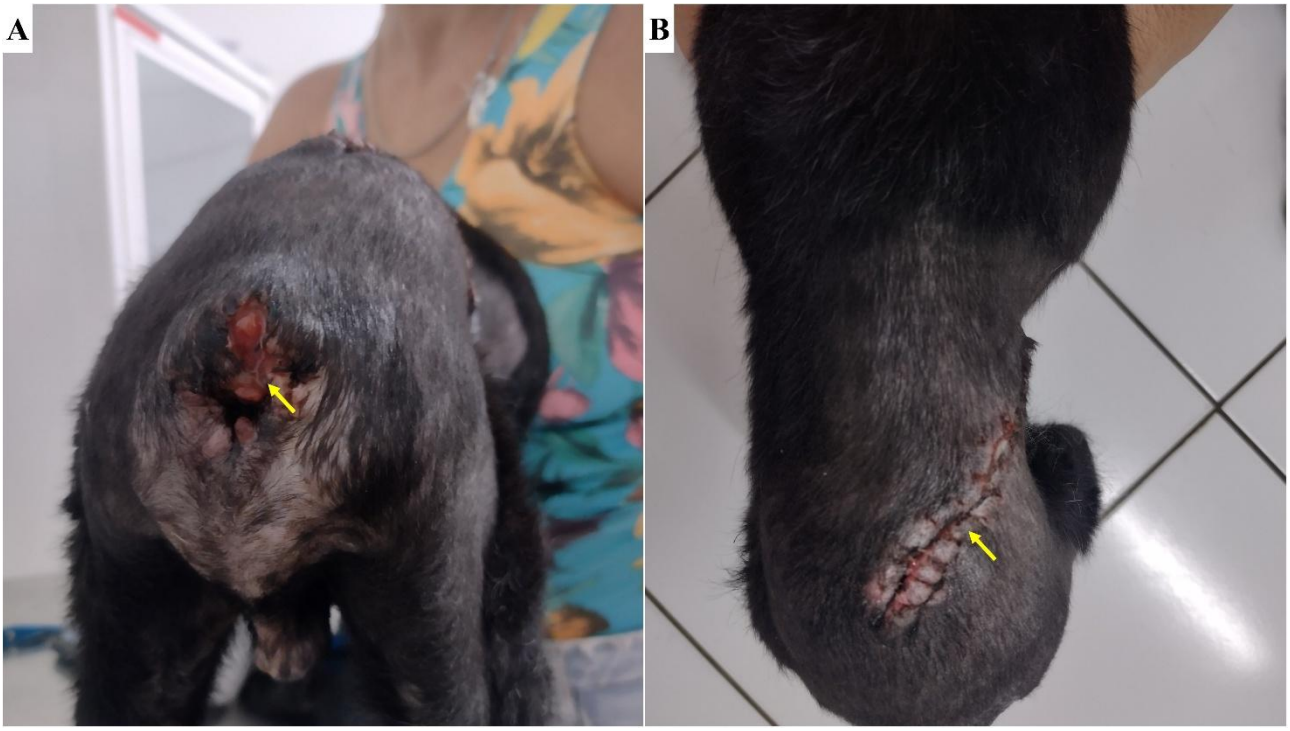

Figure 9. Patient's return visit twelve days after surgery. A. Surgical wound in the tail base region healing by secondary intention (arrow). B. Removal of stitches from the surgical wound in the right dorsal region, with a cut in the area caused by the sutures (arrow).