



Integrative Therapy in the Management of Canine Bone Tumor: A Case Report

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Abstract: - Bone tumors in dogs are of high clinical relevance due to their aggressive biological behavior and significant impact on patients' quality of life. Given the therapeutic limitations imposed by anatomical location and tumor progression, multimodal approaches have been considered as a palliative management strategy. This study reports the case of a canine patient diagnosed with a thoracic vertebral neoplasm with an infiltrative process extending from T9 to T12, highlighting clinical findings, complementary examinations, therapeutic management, and clinical progression. Considering the inoperability of the neoplasm, the patient's advanced age, and the owners' priority to preserve quality of life, an integrative therapeutic protocol was implemented in association with conventional management using prednisolone. Treatment included injectable *Viscum album*, whose immunomodulatory and cytotoxic properties have been described in the literature, phytocannabinoids, acupuncture, and supportive care. During six months of follow-up, relevant clinical improvement was observed, including increased mobility, appetite, and overall behavior, as well as temporary stabilization of tumor progression based on clinical and complementary assessments. Subsequent progression resulted in the patient's death, consistent with the aggressive nature of the neoplasm. These findings suggest that integrative veterinary medicine protocols may contribute to palliative management and maintenance of quality of life in cases where curative conventional interventions are not feasible.

Keywords: *Viscum album*, bone neoplasm, integrative medicine, quality of life, dog.



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Introduction

Bone tumors in dogs represent a significant clinical and oncological challenge in veterinary medicine due to their aggressive biological behavior, high local invasiveness, and substantial metastatic potential, particularly to the pulmonary parenchyma in certain histological subtypes (DALECK et al., 2016). These neoplasms account for a considerable proportion of musculoskeletal tumors in dogs and are frequently associated with severe pain, functional impairment, and progressive deterioration in quality of life (WITHROW; VAIL; PAGE, 2019).

Among bone tumors, vertebral neoplasms present particular diagnostic and therapeutic complexity, as their anatomical location involves critical structures of the central and peripheral nervous systems. Clinically, these tumors may present with persistent axial pain, locomotor abnormalities, and progressive neurological

deficits, including paresis, ataxia, and proprioceptive changes, often mimicking other degenerative, inflammatory, or traumatic orthopedic or neurological conditions (DALECK et al., 2016). Definitive diagnosis typically requires advanced imaging modalities such as computed tomography (CT) or magnetic resonance imaging (MRI), along with histopathological confirmation to determine tumor type and guide prognosis and therapeutic strategies (THRALL et al., 2012).

From a therapeutic perspective, management of vertebral bone tumors becomes particularly challenging when lesions are deemed inoperable due to tumor extension, neurological risk, or unfavorable anatomical location. In such cases, conventional treatment options are limited and often focus on pain control, reducing inflammation, and preserving quality of life (WITHROW; VAIL; PAGE, 2019). Thus, the search for complementary therapeutic approaches that may contribute to clinical management

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and patient well-being has become increasingly relevant in contemporary veterinary oncology (VALLE & VALLE, 2025).

In this context, integrative veterinary medicine has gained increasing attention. It incorporates evidence-based complementary therapies aimed at symptom relief, physiological stress reduction, and quality of life improvement in patients with chronic or neoplastic diseases (KHALSA; ZELTZMAN, 2021). These approaches include phytotherapeutic therapies, immunomodulatory therapies, and metabolic support and are particularly indicated in situations in which conventional surgical or chemotherapeutic treatment is limited or contraindicated.

Among these therapies, *Viscum album* (European mistletoe extract) has been widely used in integrative oncology, particularly in Central European countries such as Germany and Switzerland (LOEF; WALACH, 2019). Its bioactive compounds, including lectins and viscotoxins, have demonstrated cytotoxic effects on tumor cells and immunomodulatory properties, such as activation of natural killer cells and stimulation of T-cell-mediated immune responses (GARDIN; SCHLEIER, 2009).

Experimental and clinical studies suggest that *Viscum album* therapy may contribute to the modulation of inflammatory responses, induction of tumor cell apoptosis, and improvement of quality of life in oncological patients, making it a promising adjunctive treatment when conventional options are limited or not viable (KIENLE; KIENE, 2010).

Thus, the aim of this study is to report a clinical case of an inoperable vertebral tumor in a dog, describing clinical and neurological findings, imaging results, integrative therapeutic strategy, and clinical outcome.

Case Report

A 10-year-old female dog (Figure 1) was presented for evaluation to Bem Me Quer Veterinary Clinic (Rio Claro, SP, Brazil) in August 2023 with a primary complaint of severe pain on palpation in the T9-T11 region, with an approximate duration of seven days.

According to the owner, the patient exhibited significant discomfort during walking, sitting, and lying down. Physical

examination revealed normal mucous membranes, capillary refill time of 2 seconds, heart rate of 140 bpm, respiratory rate of 30 breaths per minute, body temperature of 37.4°C, non-palpable lymph nodes, marked abdominal sensitivity, and significant discomfort upon thoracolumbar palpation, with no pain detected in the cervical region.

An acupuncture session (dry needling) was performed during the initial consultation at the following points: GV14, BL23, BL60, ST36, LV3, KI3, and Bai Hui. The patient had been previously evaluated by another clinician who prescribed prednisolone (2 mg/kg, oral solution, 1 mL BID) and pregabalin (5 mg/kg, oral solution, 1 mL BID).



Figure 1. Photograph of the patient.

One week later, the patient returned with persistent clinical signs, and another acupuncture session was performed. Radiographic examination of the cervical, thoracolumbar, and lumbosacral spine was requested.

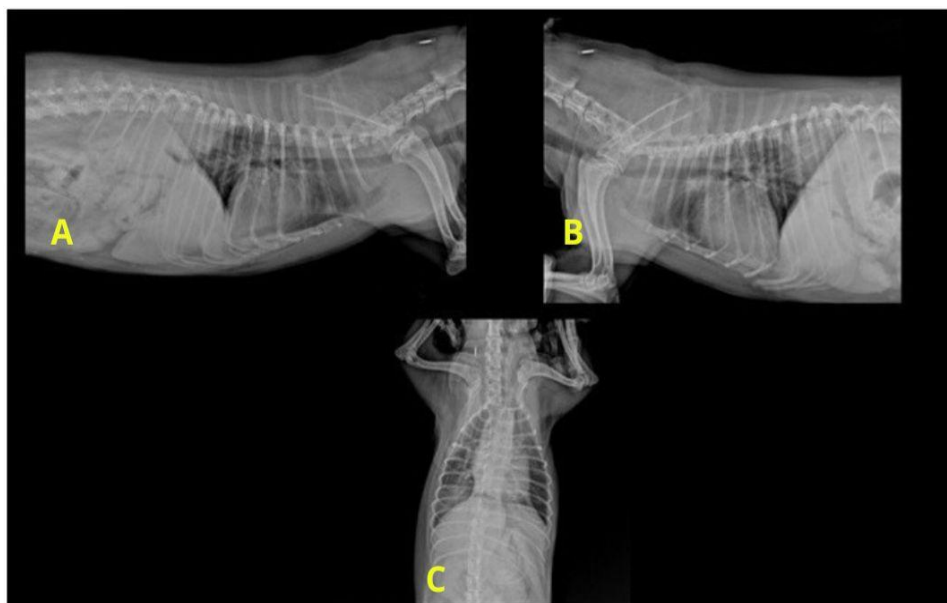


Figure 2 – Radiographic images. A. Right lateral projection; B. Left lateral projection; C. Ventrodorsal projection.

Radiographic findings revealed morphological changes in T11, including reduced vertebral dimensions compared to adjacent vertebrae, a circumscribed radiolucent area in the ventral region of T10, narrowing of the intervertebral space between T10-T11, and irregular ventral bone proliferation in T11. Additionally, an oval-shaped structure with altered radiopacity measuring approximately 0.5×3.9 cm was observed in the caudodorsal thoracic cavity, with apparent retraction of adjacent pulmonary lobes.

Diagnostic impression: the findings are suggestive of pulmonary neoplasia, with pleural neoplasia and granuloma considered as differential diagnoses. Changes observed in the thoracic vertebrae may be associated with vertebral neoplasia (Figure 2).

After 30 days of treatment, including weekly acupuncture sessions, moxibustion, and conventional pharmacological therapy (prednisolone and pregabalin), as prescribed by the clinician previously responsible for the case, a CT scan of the spine was performed. The examination revealed an extensive soft tissue-attenuating mass with a coarse hypodense and amorphous appearance, located in the dorsocaudal portion of the right hemithorax and the median region adjacent to the diaphragmatic pillars, extending across the 7th to 11th intercostal spaces.

Following contrast administration, marked heterogeneous enhancement was observed, with improved delineation of the lesion margins and a lobulated contour. The mass caused ventral displacement of the thoracic aorta and diaphragmatic pillars, reducing the volume of the dorsocaudal portion of the right caudal lung lobe and resulting in focal atelectasis. It was in contact with the caudal third of the thoracic aorta and the esophagus, as well as with the insertion of both the right and left diaphragmatic pillars. The azygos vein was observed coursing within the mass. Additionally, the mass measured approximately 3.2 cm in height,

6.6 cm in width, and 5.0 cm in length, and was in close contact with the ventral portion of the vertebral bodies of T9, T10, T11, and T12. It exhibited an infiltrative pattern with marked osteolysis affecting the ventral portions of the vertebral bodies of T10 and T11. A focal area of alveolar consolidation was identified in the right cranial and middle lung lobes, as well as focally in the dorsocaudal portion of the left caudal lobe, with associated air bronchograms.

Following CT evaluation, the owners declined surgical intervention, and palliative treatment was initiated. The integrative protocol included subcutaneous injectable *Viscum album*, with the first administration at D2 dilution, followed by the combinations D3+D6, D9+D12, and D30+D3, administered as one ampoule (1.1 mL) of each dilution, twice weekly (Injectcenter®); cannabidiol (full-spectrum 5%, 1:3, Associação Alternativa de Apoio à Cannabis Medicinal do Brasil – AAACMB); prednisolone (2 mg/kg, oral solution, 1 mL BID); pregabalin (5 mg/kg, oral solution, 1 mL BID); omega-3 supplementation; and Bach flower remedy (Rescue; one drop in drinking water nightly).

Two weeks after initiating treatment, the patient developed dyspnea secondary to pulmonary edema, requiring repeated thoracic drainage procedures performed every 4 to 5 days (approximately 200 mL per procedure) to provide respiratory relief, as well as eventual placement of a thoracic drain (Figure 3).

The therapeutic protocol was subsequently reassessed and modified because of the current clinical condition. Additional medications were introduced, including *Viscum album* (one ampoule of each potency in combination), *Aurum metallicum* D35, *Viscum album* D4 + *Viscum album* D30 + *Lachesis* D15, and *Phosphorus* D12 + *Arsenicum album* D35 + *Viscum album* D30, all administered subcutaneously three times per week.

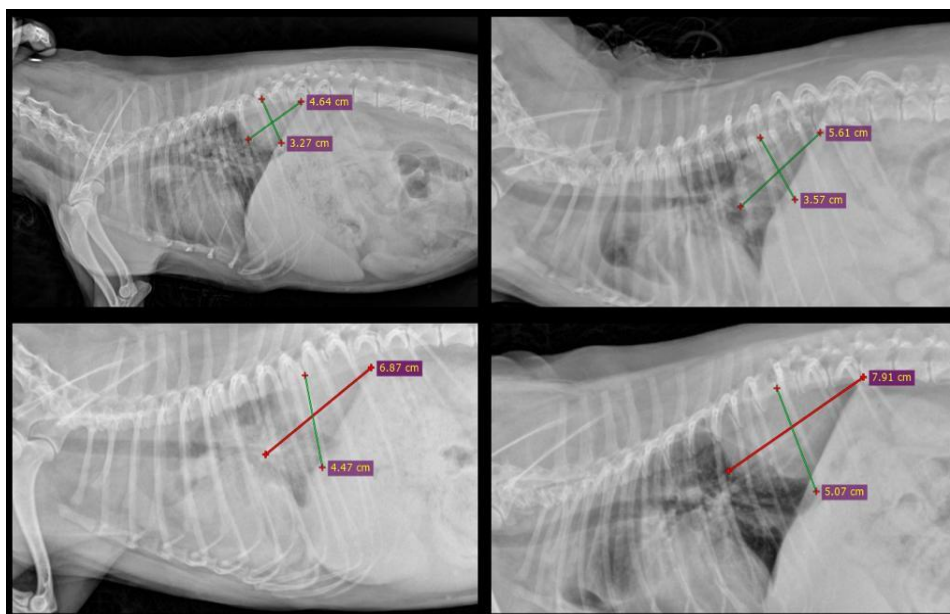


Figure 3. Tumor growth progression: A. Aug 19 – 4.64×3.27 cm; B. Sep 2 – 5.61×3.57 cm; C. Sep 4 – 6.87×4.47 cm; D. Sep 11 – 7.91×5.07 cm.

Following protocol modification, a significant reduction in pleural effusion was observed, with drainage volume decreasing from approximately 200 mL to 3 mL per procedure. Radiographic follow-up also suggested a reduction in tumor size (Figure 4).

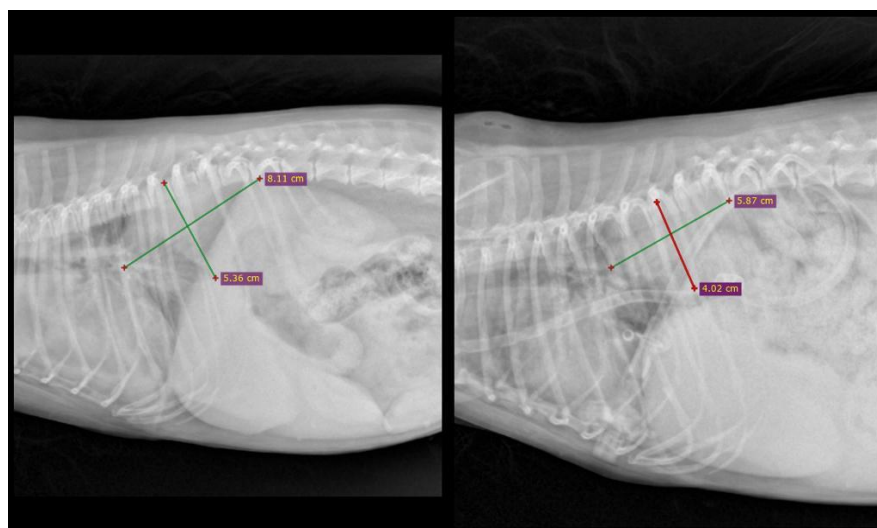


Figure 4. Tumor growth reduction after new protocol initiation: A. Sep 29 – 8.11 × 5.36 cm; B. Oct 20 – 5.87 × 4.02 cm.

Following the change in therapeutic protocol and the marked reduction in tumor size (21 days between radiographic evaluations, including 18 days after initiation of the new protocol), the patient showed improved respiratory function, with a significant enhancement in quality of life. On December 31, 2023, an episode of extreme stress due to fireworks triggered severe respiratory distress. The patient was treated in an emergency setting and received a bronchodilator (Aerodini® – salbutamol sulfate, one puff via inhalation mask), resulting in clinical improvement.

The patient remained stable until February 14, 2024, when she developed hemorrhagic gastroenteritis associated with severe respiratory distress. Due to the new respiratory condition, the patient required home oxygen therapy and bronchodilator use (salbutamol, one puff every 6 hours via nasal administration). Ultrasound and radiographic examinations revealed disease progression, including pulmonary infiltration, mesenteric involvement, enteritis, colitis, and ascites. Due to clinical deterioration and poor prognosis, euthanasia was elected on February 16, 2024.

Discussion

Primary bone tumors in dogs represent an important entity in veterinary oncology, with osteosarcoma being the most commonly reported malignant bone neoplasm (DALECK; DE NARDI, 2016; FOSSUM, 2014). However, it predominantly affects large-breed dogs and long bones of the appendicular skeleton, such as the distal humerus, distal radius, and proximal tibia, whereas axial involvement, including vertebrae, is less frequent (DALECK et al., 2006).

In this case, although clinical and imaging findings were consistent with an aggressive bone neoplasm, histopathological confirmation was not obtained, although histopathology is considered the gold standard for diagnosis (EHRHART et al., 2013). Therefore, the neoplasm was conservatively classified as a vertebral bone tumor. This diagnostic caution is relevant considering that the patient was a small-breed dog and the neoplasm was located in the vertebral column, characteristics less commonly associated with the classical epidemiological profile of appendicular osteosarcoma. Although osteosarcoma is the most common primary bone neoplasm in dogs,

its occurrence in the vertebral column is less frequent when compared to the long bones of the appendicular skeleton (DALECK; DE NARDI, 2016).

Bone neoplasms of the axial skeleton may include different histological types, such as osteosarcoma, chondrosarcoma, fibrosarcoma, and primary bone hemangiosarcoma, among others, with differentiation dependent on histopathological examination (DALECK; DE NARDI, 2016). Regardless of histological classification, vertebral bone tumors often exhibit aggressive biological behavior, with progressive local invasion and potential spinal cord compression, resulting in pain and neurological deficits, as observed in this patient.

Radiographically, malignant bone tumors typically are characterized by osteolysis, irregular proliferation, and possible cortical destruction, with potential invasion of adjacent tissues (THRALL, 2018). In the present report, radiographic and tomographic findings demonstrated an expansive osteolytic neoplasm with vertebral structural involvement, supporting the suspicion of an aggressive primary bone neoplasm.

The treatment approach consisted of a multimodal integrative protocol combined with conventional corticosteroid therapy. Integrative therapies included *Viscum album*, homeopathic preparations, cannabidiol, acupuncture, and moxibustion. *Viscum album* has been used as a complementary therapy in oncological patients, with reports indicating an impact on quality of life (BIEGEL et al., 2017; FREUDING et al., 2019; VALLE and CARVALHO, 2022; VALLE and VALLE, 2025).

Previous studies have suggested that *Viscum album* extracts exhibit immunomodulatory effects and cytotoxic activity against tumor cells, potentially contributing to improved quality of life and modulation of tumor progression (JANTAN et al., 2024). Cannabidiol has also been reported as an adjunctive therapy for pain management and reducing inflammation in veterinary oncology, contributing to improved well-being and appetite in patients with neoplasia (PEYTON et al., 2021).

Acupuncture and moxibustion are described as complementary tools for pain management and immune modulation (RUIXIN; LIXING, 2012). Although the scientific evidence remains

heterogeneous regarding its direct impact on tumor progression, its use may improve quality of life and symptomatic control.

The prognosis for vertebral malignant bone tumors is generally poor, particularly in cases where surgical intervention is not feasible (DALECK; DE NARDI, 2016). However, in this case, the therapeutic strategy prioritized pain control, functional preservation, and quality of life, highlighting the importance of individualized, patient-centered care.

Conclusion

Integrative approaches for the management of canine bone neoplasms may be a relevant strategy in palliative care, particularly when surgical or chemotherapeutic interventions are not feasible. In this case, the combination of complementary therapies and conventional pharmacological management was associated with significant clinical improvement, including reduced respiratory distress, pain control, temporary stabilization of tumor progression, and maintenance of quality of life for approximately six months after the onset of clinical signs, a period that was longer than the average reported for similar cases in the literature. Although a direct causal relationship between the therapeutic protocol and clinical outcomes cannot be established, these findings suggest that integrative veterinary medicine may contribute meaningfully to symptom control and overall well-being in oncological patients receiving palliative care.

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