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Case report

CLINICAL DIAGNOSIS OF FIBROLIPOMA WITH MIXED INFECTION IN A 7-YEAR-OLD INTACT MALE ROTTWEILER DOG AND ITS MANAGEMENT: A CASE REPORT

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Summary

Muhammad, S. T., Y. Mamman, A. Binhambali, S. Muhammad, M. Abdurrahman, S. J. Enam, B. H. Dantaro, S. Y. Idris & M. Bisalla, 2025. Clinical diagnosis of fibrolipoma with mixed infection in a 7-year-old intact male Rottweiler dog and its management: A case report. *Bulg. J. Vet. Med.*, **28**, No 3, 525–533.

This case report describes the diagnosis and management of fibrolipoma (FL) with concurrent bacterial and parasitic infections in a 7-year-old intact male Rottweiler at the Veterinary Teaching Hospital of Ahmadu Bello University, Zaria. The dog presented with two sternal subcutaneous swellings, resembling the shapes of a tennis ball and a softball, measuring 7.5×5 cm and 12×9 cm, respectively. Physical examination revealed bilateral mucopurulent ocular discharge and a protruding sternum, although vital parameters remained stable at the time of presentation. Diagnostic investigations, including haematology, serum biochemistry, cytology, microbiology, and radiography were conducted to assess the overall health status and identify the clinical manifestation of the case presentation and the underlying pathology. Cytology revealed moderate neutrophilic leukocytosis and ultrasound demonstrated a solid mass with mixed echogenicity in the lung field. Cytology and histopathology confirmed the diagnosis of FL. The mass was surgically excised, followed by a regimen of chemotherapy and antibiotic therapy. Follow-up assessments indicated evidence of healing and a good quality of life post-treatment.

Key words: benign tumour, canine babesiosis, canine isosporosis, fibrolipoma, pathology

The skin, as a complex organ housing various cell populations, serves as a critical barrier against environmental hazards. Its exposure to carcinogens, particularly ultraviolet radiation from sunlight, makes it a primary site for tumour development in companion animals. Skin tumours are common in dogs and encompass a diverse range of histological types (Dobson *et al.,* 2002; Bronden *et al.,* 2010). Among small animals, subcutaneous tumours rank as the third most prevalent non-lymphoid cutaneous neoplasms in dogs, accounting for 7.1% of cases (Withrow *et al.*, 2013). Moreover, the ventral regions, especially the sternum, are primary sites, with 28.0% of lipoma (LP) occurrences in these areas (Pegram *et al.,* 2020). Although rare, FL represents a distinct histological variant among LP cases in dogs (Phulari *et al.,* 2018).

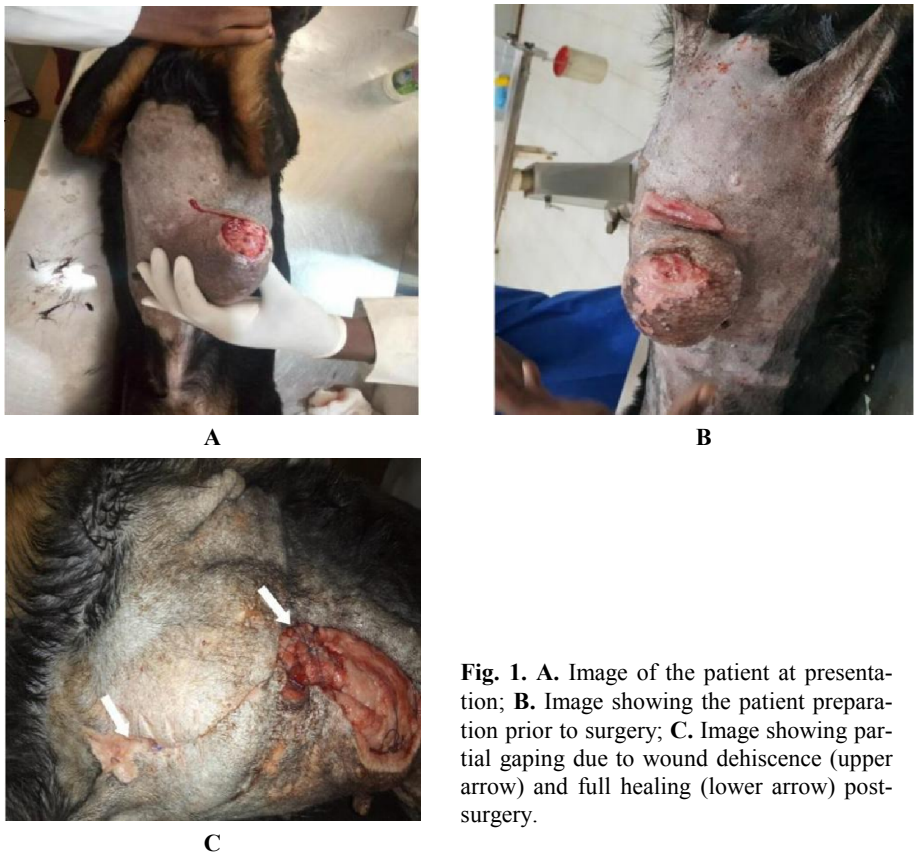
LPs, composed of fatty masses, are among the most common benign tumours found in dogs, typically causing concern due to their appearance rather than posing significant health risks. These masses, made up of mature adipocytes, generally occur in middle-aged to older dogs and can manifest in various regions of the body (Ganakalyan & Kumar, 2015; O'Neil *et al.,* 2018). Skin neoplasms originate from epithelial or mesenchymal tissues, presenting various histological subtypes. While LP in humans is subclassified based on its anatomical origin, a similar classification for dogs has yet to be established (Pereira *et al.,* 2014; Van Nimwegen & Kirpensteijn, 2017).

FL, a rare benign soft tissue tumour characterised by a significant fibrous component intermingled with adipose lobules, is a microscopic variant of LP. FL classifies as an uncommon subtype, where neoplastic fat cells are encased by dense collagen (Mahaffey *et al.,* 1998; Phulari *et al.,* 2018). The etiology of FL remains debated, with potential contributing factors including endocrine, dysmetabolic, genetic, and traumatic influences (Sanders *et al.,* 2007). FL typically exhibit simple expansion within a well-encapsulated structure, with minimal tissue infiltration (Rydholm & Berg, 1983). Primary developmental anomalies or secondary factors, such as trauma or chromosomal rearrangements, may contribute to FL development (Tandon *et al.,* 2023). FL in dogs are rare, exhibiting higher proliferative activity compared to other LP variants, thereby necessitating histological evaluation (Ganakalyan & Kumar, 2015). Fine needle aspiration (FNA) is often utilised for the presumptive diagnosis of LP, with repeated monitoring recommended for slow-growing masses. Cytology often reveals absence of lobular architecture, the presence of prominent fibrotic areas, and multivacuolated adipose cells with indented nuclei (lipoblasts), often associated with liposarcoma (Pereira *et al.,* 2014). Surgical excision may be indicated for larger, rapidly growing masses or those causing functional impairment (Pegram *et al.,* 2020). Surgical excision remains the primary treatment modality for LP, including FL (Smillie, 1974).

Despite their benign nature, surgical excision of FL can be challenging due to their anatomical locations (Jumana *et al.,* 2018). This report presents the surgical management of a FL with mixed infection in a 7-year-old male Rottweiler, detailing the diagnostic approach and surgical procedures used to address the tumour.

Case history and presentation

On September 2, 2019, a 7-year-old male Rottweiler was brought in with a painless subcutaneous mass on the sternum which was first noticed during grooming by the



A **B**

C

Fig. 1. A. Image of the patient at presentation; **B.** Image showing the patient preparation prior to surgery; **C.** Image showing partial gaping due to wound dehiscence (upper arrow) and full healing (lower arrow) post-surgery.

Table 1. Pre- and post-surgical physical parameters of the patient

Parameters	Day 0	Day 1	Day 2	Day 3	Day 4	Reference range
Temperature (^{o}C)	39.9	37.7	37.6	37.6	38.6	38.5–39.4
Pulse rate (beats/minute)	122	168	----	144	132	90–120
Respiratory rate (cycle/minute)	31	16	24	15	36	20–30

Keys: ----- (pulse non-palpable).

owner. The swelling had grown over weeks but caused no discomfort. Physical examination revealed two smooth, painless swellings (about 7.5×5 cm and 12×9 cm of size, respectively) and an open wound (Fig. 1A,B). Vital parameters were not normal on the first day of presentation as depicted in Table 1. Blood samples were drawn for assay of complete blood count and serum chemistry (Table 2). Fine needle aspirate and tissue biopsy were collected for cytology and histopathology, respectively.

Laboratory findings and results. On day 1, bloodwork revealed moderate anaemia, indicated by a low packed cell volume (PCV), along with mild neutrophilic leukocytosis featuring a moderate left shift

Table 2. Bloodwork of the 7-year-old dog on the first and fourth day of presentation along with the serum electrolytes, urea, creatinine and liver function parameters

Parameters	Patient's value (1st day)	Patient's value (4th day)	Reference values
Haemoglobin (µmol/L)	5.4	6.0	5.0–9.3
Packed cell volume (%)	26	29	37–55
White blood cells (10^9/L)	19.0	21.2	6–17
Bands (10^9/L)	0.8	0.0	0.0–0.3
Neutrophils (10^9/L)	16.5	18.02	3.6–13.1
Lymphocytes (10^9/L)	1.1	2.12	0.7–5.1
Monocyte (10^9/L)	0.5	1.06	0.18–1.7
Eosinophils (10^9/L)	0.0	0.0	0.0–0.3
Sodium (mmol/L)	146	144	140–155
Potassium (mmol/L)	4.5	5.2	3.6–5.8
Chloride (mmol/L)	115	110	100–200
Urea (mmol/L)	2.9	3.8	0.3–5.0
Creatinine (µmol/L)	99	85	55–110
AST (IU/L)	12	10.8	13–15
Alkaline phosphatase (IU/L)	141	114	1–114
ALT (IU/L)	9.6	13.9	10–109
Total bilirubin (µmol/L)	7.4	5.8	4.5–12
Conjugated bilirubin (µmol/L)	2.2	3.2	0.3–3.5

and a slight increase in alkaline phosphatase levels (Table 2). By day 4, these findings persisted, showing moderate anaemia and neutrophilic leukocytosis without a left shift. Radiographic examination demonstrated that the bony structures of the ribcage, sternum, vertebrae, humerus, and scapula were intact (Fig. 2). The lung fields displayed mild haziness, with notable masses measuring 7.5×5 cm and 12×9 cm. Cytological (Fig. 3) and histopathological (Fig. 4) analyses confirmed a rare case of FL. Results from the parasitology laboratory revealed the presence of *Babesia canis* and *Isospora canis*, while microbiological analysis identified a *Corynebacterium* spp. isolate from the wound swab sample. This bacterium exhibited resistance to several antimicrobial agents, including, streptomycin, and tetracycline, but not to amoxicillin.

Initial treatment. The initial laboratory findings indicated a secondary bacterial infection, so treatment with injectable Amoxicillin LA (five-AMOX.20@LA®, FIVEVET, Vietnam) at 10 mg/kg IM was initiated. Also, the parasitic infections

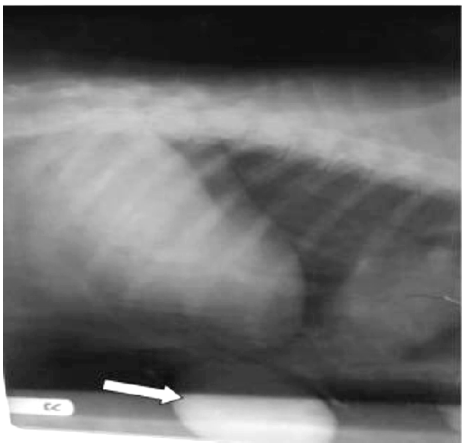
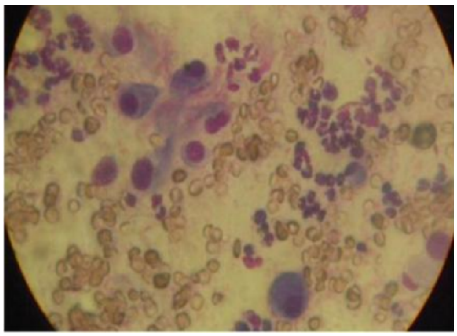


Fig. 2. A right lateral recumbency radiograph showing an enlarged mass on the sternum of the patient.



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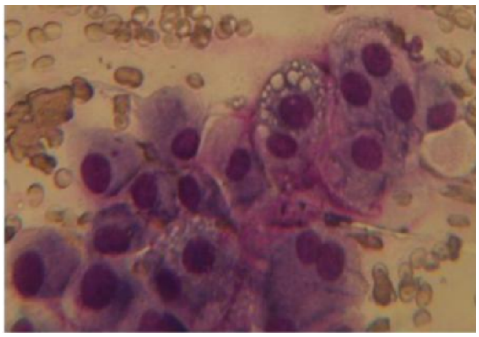

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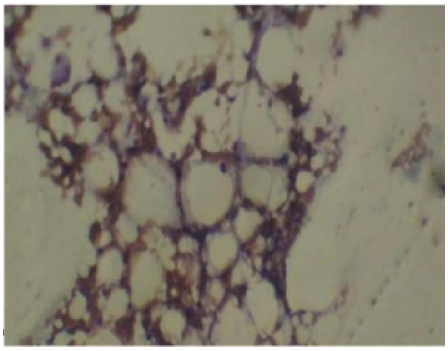
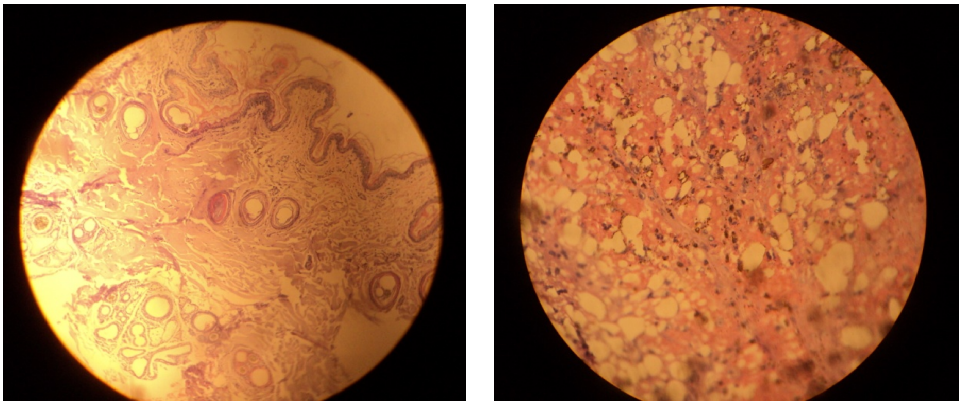


C

Fig. 3. **A.** The smear shows low cellularity of mesenchymal cells, with moderate basophilic cytoplasm and eccentric round nucleus with moderate neutrophils of variable degenerating stages (Wright-Giemsa stain, ×400); **B.** Aggregate of rounded cells with low nuclear to cytoplasm ratio. Often bi- and trinucleation are noted (Wright-Giemsa stain, ×400); **C:** A 3-cm diameter mass: the fine needle aspirate biopsy smear shows mature adipocytes characterised by abundant clear cytoplasm with small compressed elongated nucleus peripherally located (Wright-Giemsa stain, ×400).

were treated with injectable sulphadimidine (Sulfa-333®, Interchemie, Holland) at 50 mg/kg (1150 mg) IM for 5 days, alongside a single injection of 4% diminazene aceturate (Diminashish Plus®, ALS PVT Ltd., India) at 3.5 mg/kg (80 mg) IM to stabilise the patient prior to the surgical management of the tumour. Biochemical analysis and liver function tests on the fourth day, as shown in Table 2, indicated stability and potential improvement, which guided our decision after discussing with the oncologist to proceed with surgical management after addressing the concurrent bacterial and parasitic infections.

Surgical management. The 23 kg patient was managed using the following anaesthetic protocol. Atropine sulfate at 0.02 mg/kg IM, acepromazine at 0.05 mg/kg IV, and butorphanol at 0.4 mg/kg IV were administered as pre-anaesthetic medications. Anaesthesia was induced with propofol at 6 mg/kg IV and maintained with isoflurane (2.5% in oxygen). The surgical site was shaved, scrubbed with povidone-iodine, and a 2 cm incision line was marked. After draping, circular incisions were made around the masses, with careful blunt dissection and vessel ligation. Blunt scissors were used to cut through the normal tissues beneath the small mass, and all blood vessels were ligated using size 2-0 monofilament suture material. Another circular skin incision, 2 cm away from the larger mass, was made, and the subcutaneous tissues were carefully dissected with the blunt end of the scissors to identify and ligate the blood



A **B**

Fig. 4. A. Image shows the typical features of fibrolipoma, with a mix of adipose and fibrous tissue. Presence of mature fat cells interspersed with dense fibrous tissue (H&E, ×400).; **B.** Characteristic features of fibrolipoma, with a mix of mature fat cells and fibrous tissue. The clear vacuoles correspond to adipocytes, while the denser pink areas represent the fibrous tissue (H&E, ×400).

vessels supplying the larger mass. The site was closed with 2-0 Vicryl and nylon sutures. Post-surgical management included pain control with injectable meloxicam at 0.2 mg/kg (4.6 mg) (Metacam®, Boehringer Ingelheim) administered intramuscularly (IM) for three days, and infection control with injectable amoxicillin (Amoxi-Tetra, Ceva®) at 20 mg/kg (460 mg) IM for five days. The patient was hospitalised, and vital parameters were monitored on subsequent days post-surgery. Tissue samples from the masses were sent for histopathological examination (Fig. 4A,B).

Post surgical observation and management. Following the surgical excision of the two masses, a chemotherapy regimen was initiated based on the recommendation of the oncology unit, in order to target any residual tumour cells and reduce the risk of recurrence, as experienced earlier by the patient's housemate. The chemotherapeutic agent used was doxorubicin (Adriamycin, Pfizer®), administered at a dosage of 30 mg/m² intravenously (IV) every three weeks for a total of four cycles. Supportive care included antiemetic administration of ondansetron (Zofran, GlaxoSmithKline®) at 0.1 mg/kg IV prior to chemotherapy to prevent nausea and vomiting, and gastroprotectants, with omeprazole (Gastrocare, Eden U.K Pharmaceuticals Ltd®) at 1 mg/kg orally (PO) daily to protect the gastric mucosa. Haematologic monitoring was conducted through a complete blood count (CBC) before each chemotherapy session to assess bone marrow suppression and adjust dosages as needed.

One week after surgery, partial gaping was observed at the incision site, likely due to tension, and the wound was managed as an open wound. Post-operative antibiotics were continued to prevent infection. By the twelfth day, the cranial part of the suture site showed evidence of good healing, while the caudal aspect remained slightly gapped, with granulation tissue formation (Fig. 1C). Follow-up treatment protocols were implemented to ensure optimal recovery and effective management of the patient. Close moni-

toring and adjustments to the treatment plan were made based on the patient's response and observed clinical parameters. Forty days post-surgery, the gap had fully closed, and one year after the surgery, there was no sign of tumour recurrence.

Excision of a FL in the ventral thoracic wall, particularly in the cranial sternum region in dogs, presents unique challenges due to the proximity of critical structures such as the sternum, ribs, nerves, and major blood vessels. Unlike simpler cutaneous or subcutaneous neoplasms, which involve straightforward removal of the tumour with a margin of healthy tissue, FLs in this area demand meticulous dissection to avoid damage to these vital structures. Precise surgical techniques are crucial to preserving thoracic integrity and avoiding complications.

In the cranial sternum, the intercostal nerves and anterior intercostal blood vessels must be carefully identified and preserved during tumor removal as noted by Shah (Shah *et al*., 2022). The integrity of the intercostal nerves, phrenic nerve, internal thoracic artery and vein, brachial plexus, sternal lymph nodes, pericardium, heart, lungs, and pleura must be maintained to ensure effective patient recovery. These structures are vital for maintaining normal respiratory function, preventing life-threatening complications, and achieving a successful surgical outcome. The complexity of the surgery lies in balancing adequate tumour removal with minimising invasiveness and preserving these critical structures.

Precise dissection around the tumour, avoiding invasion of these structures, reduces the risk of significant bleeding and neurological dysfunction post-surgery. The complexity of this procedure is further heightened by the need to maintain thoracic stability and ensure adequate respiratory function postoperatively. Smeak (1993) highlights the significant risk of damaging these structures during tumour removal, which can lead to life-threatening complications such as haemorrhage or pneumothorax. Similarly, Hunt & Tisdall (2005) emphasise the importance of maintaining thoracic wall stability to preserve normal respiratory function after surgery.

Compared to other neoplasms, where wider margins may be more easily achieved, FL excision in the ventral thoracic region requires a delicate balance between adequate tumour removal and minimising invasiveness. The goal is to excise the mass while preserving as much surrounding normal tissue as possible, reducing the need for extensive reconstructive surgery (Withrow & Vail, 2007). The potential for recurrence and infection is higher in surgeries involving the thoracic wall, given the complexity of achieving complete tumour resection while avoiding contamination of the surgical site (Fossum, 2018), particularly in cases with mixed bacterial and parasitic infections. Appropriate surgical management combined with chemotherapy may be necessary to prevent future recurrence.

Although FL is a benign tumour, its surgical removal requires detailed planning and precise execution to ensure complete removal of the tumour mass and minimise the risk of recurrence. Despite the lack of extensive literature on the surgical removal of FL, especially in the cranial sternum of dogs (Ganakalyan & Kumar, 2015), the successful excision in this case demonstrates the effectiveness of a careful surgical approach. Adequate postoperative management, including chemotherapy and antibiotic therapy, is

also crucial to promote healing and prevent further infections.

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