

Subcutaneous angiomyolipoma in a bichon frise dog. Clinical case

Angiomiolipoma subcutáneo en una perra bichon frise. Caso clínico

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ABSTRACT

Angiomyolipoma located on the caudal part of the abdominal wall was reported in a 15-year-old femal bichon frise dog weighing 17 kg. A radiographic examination was performed followed by a histological examination of the mass, which revealed a benign encapsulated mesenchymal proliferation composed of three compartments: vascular, smooth muscle and adipose. The predominant adipose component is made of large lobules of mature adipocytes. A blood chemistry profile was performed revealing an increase in the activity of liver enzymes: Gammaglutamyl transferase (12.90 IU·l⁻¹), Aspartate aminotransferase (70.1 IU·l⁻¹), Alkaline phosphatase (403 IU·l⁻¹); total, direct and indirect hyperbilirubinemia were also noted (6.71 mg·l⁻¹, 1.54 mg·l⁻¹, 5.17 mg·l⁻¹ respectively). The management of angiomyolipoma requires surgery which consists of the removal of the neoplasia mass to prevent local progression. This clinical case is considered as the first case of angiomyolipoma reported in canine veterinary medicine in Algeria.

Key words: Angiomyolipoma; radiographic examination; histological examination; neoplasia; surgery

RESUMEN

Se notificó un caso de angiomiolipoma localizado en la parte caudal de la pared abdominal en una perra Bichón Frisé de 15 años y 17 kg de peso. Se realizó un examen radiográfico seguido de un examen histológico de la masa reveló una proliferación mesenquimatoso encapsulada benigna compuesta por tres compartimentos: vascular, músculo liso y adiposo. El componente adiposo predominante está formado por grandes lóbulos de adipocitos maduros. Se realizó un perfil químico sanguíneo que reveló un aumento en la actividad de las enzimas hepáticas: gammaglutamil transferasa (12,90 UI·l⁻¹), aspartato aminotransferasa (70,1 UI·l⁻¹), fosfatasa alcalina (403 UI·l⁻¹); También se observaron hiperbilirrubinemia total, directa e indirecta (6,71 mg·l⁻¹, 1,54 mg·l⁻¹, 5,17 mg·l⁻¹ respectivamente). El manejo del angiomiolipoma requiere cirugía que consiste en la extirpación de la masa neoplásica para evitar la progresión local. Este caso clínico se considera el primer caso de angiomiolipoma notificado en medicina veterinaria canina en Argelia.

Palabras clave: Angiomiolipoma; examen radiográfico; examen histológico; neoplasia; cirugía

INTRODUCTION

Angiomyolipoma (AML; angiolipoleiomyoma) is an extremely rare mesenchymal neoplasm in veterinary medicine [1]. These tumors are composed of varying proportions of adipose tissue, smooth muscle and thick-walled blood vessels [1, 2]. In humans, renal angiomyolipomas, which usually develop without symptoms, are found in approximately 80% of patients with tuberous sclerosis complex (TSC). The fatty tissue in these neoplasms is generally easily visualized by ultrasound and computed tomography, which allows good monitoring of the tumor masses [3]. However, malignant subtypes have been described in humans, particularly renal epithelioid angiomyolipoma, which represents a very aggressive subtype with metastatic potential and poor prognosis [1, 4]. The criteria of histological aggressiveness of epithelioid angiomyolipoma are nuclear anaplasia, mitotic activity, vascular invasion, presence of necrosis and perinephric fat infiltration [2, 5, 6]. The aim of this work is to describe the stages of the clinical and paraclinical evaluation of a case of a female bichon frise (*Canis Lupus familiaris*) who presented with an angiomyolipoma in the subcutaneous tissue of the caudal abdominal region, confirmed by histology. Surgical removal of the tumor was successfully performed; the regular follow-ups carried out after the surgery on the animal allowed us to confirm the absence of recurrence or metastasis.

MATERIAL AND METHODS

Case history

A 15-year-old multiparous bichon frise dog weighing 17 kg and living only indoors was presented to the ELOS veterinary clinic in Djebel Ouahch, Constantine (Algeria) with a large mass in the caudal region of the abdomen evolving for 6 weeks (FIG. 1). The animal appeared to be in good overall health, with plenty of physical activity and a healthy appetite. A general physical examination revealed no abnormalities: normal rectal temperature (38.5°C; 101.3°F), normal cardiovascular and respiratory parameters, non-reactive peripheral lymph nodes, ocular and oral mucous membranes showed a normal color (pink) with a good state of hydration, and capillary refill time was less than two seconds. Palpation revealed a single large subcutaneous mass in the caudo-ventral median abdominal region, painless, of firm consistency, motionless and adhered to the abdominal wall.

In order to establish a definitive diagnosis, we carried out the following paraclinical exams: a blood chemistry profile (BCP; including blood glucose level, ionogram, bilirubinemia, liver enzyme activities) was performed by Mindray BS-200 clinical analyzer (CHINA), an abdominopelvic X-ray (face: ventro-dorsal incidence and profile), was performed by FDR Smart f Fujifilm X-ray system USA and a histopathological examination of biopsies collected from the mass was performed using microscope Optika B-290TB Italy. Tissue biopsies were fixed in 10% neutral buffered formalin and embedded in paraffin. Tissue sections were mounted on glass slides and stained with hematoxylin and eosin (H-E) according to routine protocols.



FIGURE 1. Macroscopic view of the large mass on the caudal abdominal region

RESULTS AND DISCUSSIONS

The results of blood biochemistry analysis showed some abnormalities (TABLE I): mild hyperalbuminemia (48.9 g·l⁻¹), mild hyperbilirubinemia (6.71 mg·l⁻¹), with a slight increase in direct and indirect bilirubin, slight increases in liver enzyme activities (Aspartate aminotransferase (AST)=70.1 IU·l⁻¹, Alkaline phosphatase (ALP)=403 IU·l⁻¹, Gammaglutamyl transferase (GGT)=12.9 IU·l⁻¹).

The two radiographic images (ventro-dorsal and latero-lateral) revealed an oval structure with soft tissue-like radiopacity, located in the caudoventral region of the abdomen. X-ray examination confirmed subcutaneous location of the mass and the presence of no other abdominal and thoracic abnormalities (FIGS. 2, 3). In addition, the ventro-dorsal radiographic image showed severe osteoarthritis on both coxofemoral joints characterized by acetabular osteophytes and femoral head deformity (Figure 2).

The histopathological appearance of the mass was compatible with a tumor called angiomyolipoma, composed of three tissue groups: vascular, smooth muscle and adipose (FIG. 4). The vascular component included abnormal blood vessels with thick walls and

lumens of varying sizes and shapes (FIG. 4B). The wall of dysmorphic blood vessels is also characterized by the absence of the internal elastic lamina. Smooth muscle cells appeared to arise from the walls of blood vessels with a radial pattern (around the vessels). The lipomatous component comprised mature adipose tissue containing vacuolated mature adipocytes (stored lipids) (FIG. 4A).

Table 1
Blood chemistry profile in bichon frise bitch with subcutaneous angiomyolipoma

Test	Results	Reference range	Units
Sodium	148	143-154	mmol·l ⁻¹
Potassium	3.83	3.9-5.6	mmol·l ⁻¹
Chloride	114.4	106-116	mmol·l ⁻¹
Glucose	0.64	0.67-1.35	mg·l ⁻¹
Urea	0.15	0.08-0.3	g·l ⁻¹
Creatinine	5.62	5-20	mg·l ⁻¹
Total protein	72.24	55-78	g·l ⁻¹
Albumin	↑ 48.9	28-42	g·l ⁻¹
Creatine kinase (CK)	362	48-400	IU·l ⁻¹
Bilirubin, total	↑ 6.71	1-6	mg·l ⁻¹
Bilirubin, direct	↑ 1.54	<1.4	mg·l ⁻¹
Bilirubin, indirect	↑ 5.17	<3	mg·l ⁻¹
Aspartate aminotransferase (AST)	↑ 70.1	16-54	IU·l ⁻¹
Alanine aminotransferase (ALT)	82.1	18-86	IU·l ⁻¹
Alkaline phosphatase (ALP)	↑ 403	20-320	IU·l ⁻¹
Gammaglutamyl transferase (GGT)	↑ 12.9	2-10	IU·l ⁻¹

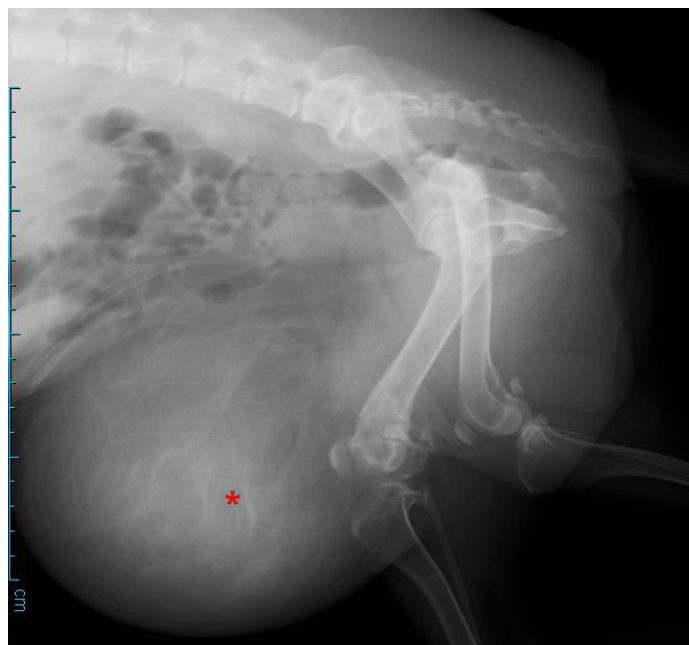


FIGURE 3. Lateral abdomino-pelvic X-ray images of the female dog showing the oval structure with radiopacity similar to soft tissues (*)

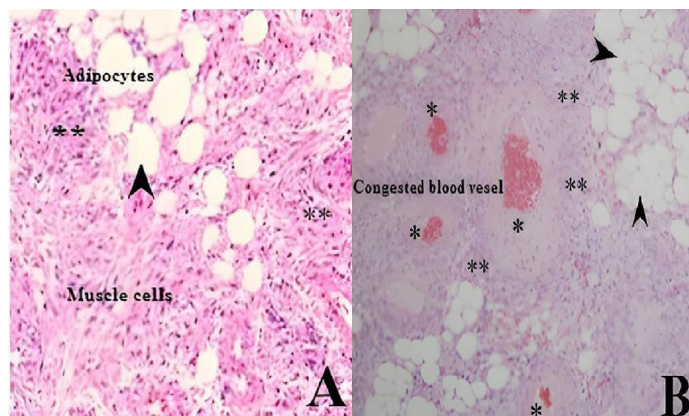


FIGURE 4. Histological aspect of the cutaneous angiomyolipoma with these three compartments: vascular (*), muscular (**) and adipose (arrow)



FIGURE 2. Frontal abdomino-pelvic X-ray images of the female dog showing the oval structure with radiopacity similar to soft tissues (*) and coxofemoral osteoarthritis (**)

We opted for the surgical treatment which consists in carrying out the ablation of the examined mass and this, after having confirmed, by histology, the benign nature of the tumor (angiomyolipoma).

Surgical removal of tumor was performed under general anesthesia. After cephalic vein catheterization, premedication was performed with acepromazine (0.05 mg·kg⁻¹ IV, CALMIVET®, VETOQUINOL, France), followed by ZOLETIL®100 (IV, 7.5 mg·kg⁻¹ of tiletamine and 7.5 mg·kg⁻¹ of zolazepam, VIRBAC France) to provide general anesthesia.

The animal was placed in dorsal recumbency on a surgical table. The skin at the incision site was carefully shaved, cleansed and disinfected, after which a sterile surgical field was placed. Surgical removal of the tumor was performed by incising the skin surrounding the mass and dissecting the subcutaneous tissue, after which we resected the tumor parenchyma using a pair of sterile curved Mayo

scissors, allowing complete excision of the tumor. Electrocoagulation of the resected tissues was performed at the same time as the resection, in order to stop the capillary hemorrhage.

The large blood vessels were isolated, clamped using haemostatic forceps and then ligated with transfixed surgical knots using absorbable suture threads (USP size 3-0, polyglactin 910, Vicryl® Ethicon). After removal of the tumor (FIG. 5), closure surgical wound was performed according to standard surgical techniques, by performing a simple continuous suture and a simple interrupted suture in order to reconstitute the subcutaneous tissues and the skin, respectively.

Postoperative pain management was provided by two subcutaneous injections of meloxicam at a dose of 0.2 mg·kg⁻¹ per day (METACAM®, 5 mg·ml⁻¹, Boehringer Ingelheim Animal Health). The surgical wound was regularly cleaned and disinfected until the lesion was fully healed; systemic antibiotic therapy is provided by the administration of Cefazolin Sodium at a dose of 25 mg·kg⁻¹ q12h IM (CEFAZOL® 1 g) during 10 days. Regular medical check-ups (including imaging) were performed throughout a year to detect any return of the tumor.

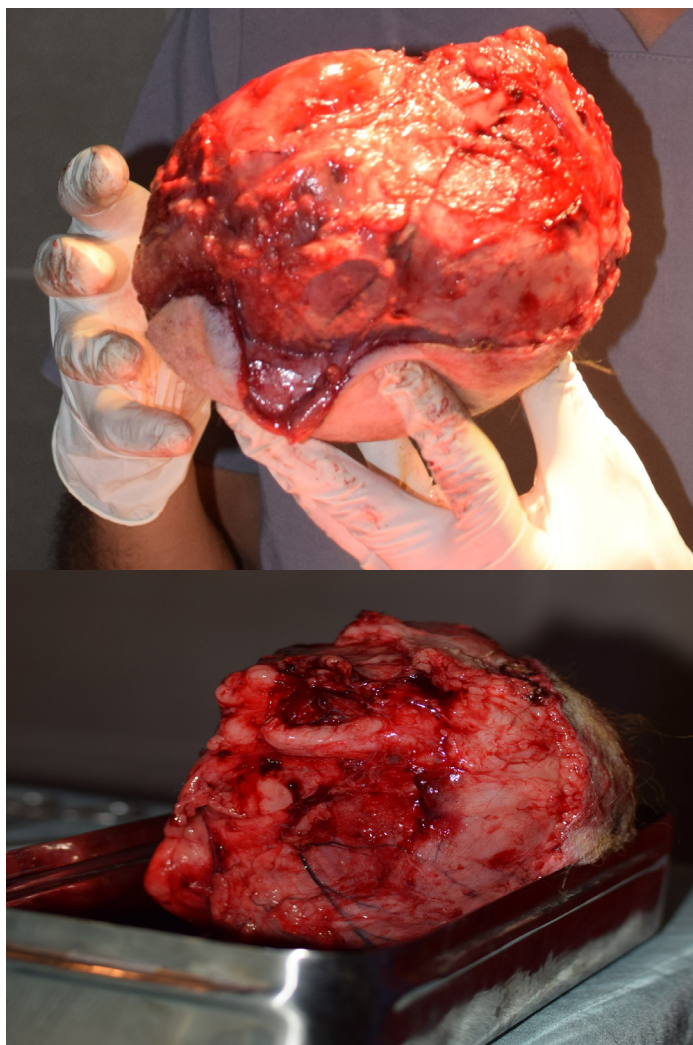


FIGURE 5. Macroscopic appearance of the excised tumor mass having a large size (length × width × height= 16×15×12cm) and weighing 1,410 g (3.1 lb) (A). The section of the tumor, revealed a significant flow of blood and clotted blood (B)

Angiomyolipomas were relatively rare in dogs and their diagnosis usually involved a combination of imaging techniques such as ultrasound, CT scan (CT: computed tomography) or MRI (Magnetic Resonance Imaging), as well as a biopsy. Extra-hepatic problems could cause elevation of AST or ALP; increase in AST could indicate, for example, muscle damage. Mild increase in ALP was difficult to interpret in the dogs. In the absence of endocrinopathies or his drugs use history inducing the production of ALP (corticosteroids for example), hepatic hypoxia, mild cholestasis secondary to hepatocellular damage seemed to be the most probable causes of this elevation. However, the combination of elevation (in the female dog examined) in AST (1.3-fold increase), ALP (1.2-fold increase), GGT (1.3-fold increase) and bilirubinemia (1.18-fold increase) could indicate cholestasis, although our animal did not show clinical signs indicating liver damage [7].

Hemolysis and liver disease were the main differential diagnosis of hyperbilirubinemia. The increase in unconjugated bilirubin (1.72 × increase in our case) in the blood indicated, in the first instance, hemolytic anemia which could be the result of an autoimmune disease (immune mediated destruction) or a neoplasm [8]. The suspicion in our case of moderate hemolysis explaining the unconjugated hyperbilirubinemia cannot be excluded because the hematocrit was not evaluated [7].

The histological appearance of the large mass observed in the dog confirmed a cutaneous angiomyolipoma composed of three compartments: smooth muscle tissue, mature adipose tissue and abnormal blood vessels. Although smooth muscle cells were predominantly spindle cells, they occasionally resembled rounded epithelioid cells; occasionally, high levels of nuclear atypia (multinucleation and mitotic activity) can be seen in these cells, suggesting a possibility of malignancy [3].

The proportions of each of the three compartments (adipose, muscular, and vascular) determined the typical radiographic image of angiomyolipomas; mature adipose tissue was generally the predominant component, allowing CT (computed tomography) differentiation between renal angiomyolipoma and renal cell carcinoma, two tumors affecting the human kidneys [9].

Angiomyolipoma was rarely found in veterinary medicine and only four cases belonging to different animal species have been reported and published: a uterine angiomyolipoma in a female dog [10], a renal angiomyolipoma in a cat [11], a cutaneous angiomyolipoma described in a female budgerigar (*Melopsittacus undulates*) [12] and a fourth case of soft tissue angiomyolipoma in a Labrador female dog [2].

A retrospective study conducted in Switzerland between 2008 and 2013 using data from the Swiss Canine Cancer Registry revealed that the most common canine cutaneous tumors (out of 11,740 cases of canine skin tumors) were mast cell tumors (16.35%), lipomas (12.47%), hair follicle tumors (12.34%), histiocytomas (12.10%), soft tissue sarcomas (10.86%), and melanocytic tumors (8.63%) [13, 14].

Soft tissue sarcomas (18.40%), mast cell tumor (16.24%), lipoma (9.69%), hair follicle tumors (9.34%), and benign sebaceous tumors (8.50%) were the most frequently detected tumors out of 1,435 confirmed cases of cutaneous tumors in dogs in a retrospective study conducted in Japan from 2008 to 2017 [15].

In Egypt, the five most prevalent types of cutaneous tumors identified in a study conducted by [16] on 118 skin samples from 112 dogs were: basal cell carcinoma (8.47%), papilloma (7.63%),

infundibular keratinizing acanthoma (6.78%), liposarcoma (6.78%), and fibrosarcoma (5.93%).

Angiomyolipomas were mostly benign tumors; renal angiomyolipoma tumors were the most prevalent benign kidney tumors in humans [17].

CONCLUSIONS

Angiomyolipomas were rare in veterinary medicine and can be identified by three distinct tissues: muscle, vascular, and fatty. The physical examination of the female dog, the blood biochemistry profile and the radiographic and anatomopathological examinations allowed us: to diagnose a cutaneous angiomyolipoma, to establish the benign prognosis of the tumor and to opt for the surgical solution allowing ablation of the large examined mass. Regular medical follow-ups including imaging carried out over several months (up to twelve months) revealed no recurrences.

Conflict of interest statement

The authors declare that they have no conflict of interest

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