

Chronic Expanding Hematoma Secondary to Excision of Recurrent Myxomas in a Bitch

Carlos Arturo Rodríguez-Alarcón¹, Ramón Rivera-Barreno¹, Rene Alejandro Castro-Arellano², Marjorie Clark³, Cielo Ana Toledo-Valdez¹, Hugo Salvador Staines-Orozco⁴, Diana Marcela Beristain-Ruiz¹ & Inês Tenreiro Tavares⁵

ABSTRACT

Background: Expanding chronic hematoma is a relatively common postoperative complication in humans, not in dogs, nevertheless, is important understand this condition because it may affect the animal's health. A hematoma could be formed within hours and usually stabilizes spontaneously with the reabsorption of its content. However, occasionally the hematoma slowly expands, becomes encapsulated and forms a mass, causing a chronic expanding hematoma. Possibly skin and adipose tissue are displaced secondary to trauma, causing the formation of blood-filled cysts surrounded by a fibrous capsule. The aim of this document is to present the first report of a postsurgical chronic expanding hematoma in dog.

Case: A case of chronic expanding hematoma secondary to excision of recurrent myxoma in a bitch was described. Physical examination showed a hard, firm, non-mobile mass enclosed within the deep muscular layers. This mass was between the sternum and the cranial abdomen, similar to previous lesions excised by another veterinarian. Fine needle aspiration indicated the presence of blood. Radiology demonstrated that the bone-cartilage tissue was not involved. Due to the size of the mass, a skin stretching pre-suturing technique using self-adhesive tape was applied around the mass 48 h before surgery. The mass was removed with wide excision margins and portions of the affected muscles, but a large wound with great tension was created; consequently, a parallel to the wound incision and the thoraco-lumbar vertebrae was made. Six months after surgery, the animal presented recurrence of the same lesion, which was also removed. The bleeding times were within the normal range, but the animal was diagnosed with hyperadrenocorticism. After both surgeries histopathological exam revealed a hematoma, that had thrombosis and granulation tissue with fibrosis and severe panniculitis, in addition of multifocal, chronic, moderate lymphohistiocytic myositis; all these changes were compatible with a chronic expanding hematoma.

Discussion: Chronic expanding hematoma is a mass that grows slowly secondary to hemorrhage and does not exhibit elements of malignancy. However, it can occasionally be confused for a soft-tissue neoplasm. It has been reported frequently in humans but not in small animals. The first case was reported in 2002: 5 puppies with a cervical hematoma classified as a chronic expanding hematoma was described. In addition, 3 cases were reported: 1 cat with perirenal chronic expanding hematoma; 1 bitch with intra-abdominal presentation, and 1 cat with this pathology on the right pelvic limb after an intramuscular injection. The etiology of chronic expansive hematoma is unidentified in dogs, nevertheless, it is stipulated that is not an inflammatory process as previously assumed, but rather a neoplastic process. As in other cases, it was difficult to determine the origin of the chronic expanding hematoma. The coagulation times and platelets count were within ranges. Similarly, it is very complicated to relate hyperadrenocorticism with chronic expanding hematoma because dogs with Cushing's disease generally present hypercoagulopathies. Myxomas are associated with endocrinopathies in humans and dogs, therefore, hyperadrenocorticism is possibly related with this neoplasia. Myxomas have an expansive growth pattern, contrasting with myxosarcomas, which are infiltrating; Although in the present case the skin mass appeared to be invasive, both macroscopical and histopathological appearance of it corresponded to a well-shaped capsule compatible with chronic expanding hematoma. In summary, to the best of our knowledge, this is the first report of a post-surgical chronic expanding hematoma in a dog.

Keywords: dog, canine, surgery, expanding hematoma, postoperative complications, myxomas, small animal.

DOI: 10.22456/1679-9216.124428

Received: 19 May 2022

Accepted: 18 September 2022

Published: 22 October 2022

¹Departamento de Ciencias Veterinarias & ⁴Departamento de Ciencias Médicas, Universidad Autónoma de Ciudad Juárez, Juárez, Chihuahua, México. ²Private Veterinary Practitioner, Chihuahua. ³Private Veterinary Practitioner, Kansas City, MO, USA. ⁵Faculdade Medicina Veterinária, Universidade Lusófona de Humanidades e Tecnologias (ULHT), Lisboa, Portugal. CORRESPONDENCE: R Rivera-Barreno [rrivera@uacj.mx]. Veterinary Department, Universidad Autónoma de Ciudad Juárez. Anillo Envolvente del Pronaf y Estocolmo s/n. Zona Pronaf. C.P. 32310. Ciudad Juárez, Chihuahua, México.

INTRODUCTION

Chronic expanding hematoma is a postoperative complication uncommon in dogs, however, it's important to understand because it may impact the animal's health [9,12]. In humans, a hematoma is a frequent surgical complication with an incidence of 1-5% [6]. Hematoma is the accumulation of extravasated blood, that occurs in an organized mode, in an organ, space or tissue, occurring quickly within hours or days, stabilizing with the resorption of their contents [2]. If this does not happen, the hematoma slowly expands, becomes encapsulated and forms a mass, causing a chronic expanding hematoma, which is influenced by severe bleeding and chronicity [9]. The pathogenesis of the chronic expanding hematoma is unidentified; however, it is speculated that after trauma, skin and adipose tissue are displaced, causing the formation of blood-filled cysts surrounded by a fibrous capsule. Inflammation with degradation of leukocytes, erythrocytes and platelets occurs under this capsule causing damage and bleeding of the capillaries resulting in a sudden expansion that is perpetuated by the release of vasoactive substances which may cause additional bleeding [7,8]. Chronic expanding hematoma present appearance and growth like a malignant neoplasm; therefore, biopsies are definitive for diagnosis [9]. Consequently, this entity is classified as a pseudotumor that can delay wound healing, compress nerves, injure blood or lymphatic vessels, and generate infection and pain, which affects the postoperative recovery of the patient and potentially aggravates their health [1]. The objective of this manuscript is to present the first report of a postsurgical chronic expanding hematoma in a dog.

CASE

A 12-year-old sterilized Welsh Corgi Pembroke bitch, weighing 20 kg, was submitted for examination. The animal had a history of extirpation of cutaneous myxomas in the area between the sternum and cranial abdomen, as performed by another veterinarian up to 4 times. At the time of the clinical review, the animal presented a similar lesion in the same area that was causing pain and lameness of the left thoracic limb. On presentation, the physical examination revealed the patient to be obese with a body condition of 4/5 and with a pendulous abdomen, thin skin, and easily visible, slightly tortuous veins. The physiological variables

(body temperature, cardiac and respiratory frequency, auscultation and abdominal palpation) were within the normal ranges. However, in the physical examination a hard and firm dome-shaped alopecic mass with smooth and soft edges was observed. This mass was between the sternum and the cranial abdomen and extending to both axillary regions. The mass was not displaceable and apparently involving deep muscle areas. The dog appeared painful during deep palpation of the mass. The dimensions of this neo-formation tissue were 7 x 6 x 5 cm.

The presumptive diagnosis was of a recurrence of a cutaneous myxoma. However, due to the magnitude and depth of the lesions, a myxosarcoma was considered as a differential diagnosis. In addition, there was a presumptive diagnosis of obesity secondary to excessive consumption of food, without ruling out hypothyroidism or hyperadrenocorticism.

The bitch was referred to surgery for excisional biopsy. Pre-surgical blood tests were performed and to rule out metastases (in case of myxosarcoma), thoracic and abdominal radiographs were taken simultaneously with abdominal ultrasound. Fine needle aspiration and fine needle capillary aspiration were performed.

The laboratory results showed only a slight elevation of the ALP of 148.5 IU/L (20-60 IU/L), with the other analytes within normal ranges. In imaging studies, there were no changes suggestive of metastasis. Likewise, it was determined that the mass did not involve bone or cartilage of the sternum. The cytological description of the aspirates showed abundant erythrocytes and few neutrophils, as well as reactive fusiform cells and naked nuclei. In addition, no neoplastic cells were observed.

Day 1 to 2 - due to the size of the mass, a skin stretching pre-suturing technique using self-adhesive tape¹ (Velcro[®]) was applied around the mass 48 h before surgery.

Day 3- The bitch was prepared for surgery, preanesthetic medication protocol was an intravenous dose of the commercial combination of tiletamine / zolazepam² [Zelazol[®] - 3 mg/kg i.m], tramadol³ [Pisadol 50[®] - 4 mg/kg, i.v] and meloxicam⁴ [Metacam[®] - 0.2 mg/kg i.v]. For the induction of the anesthesia an intravenous dose of propofol⁵ [Neleprit[®] - 4 mg/kg, i.v] was used. The inhalant anesthesia was maintained with 2.5% isoflurane³ (Sofloran vet[®]). The mass was excised, the surgical margin included 3 cm of tissue

edge and the deep margins extended to level of the affected muscular fascia. As a result of the excision, a large wound with great tension was produced; thus, a release incision was made parallel to the wound and the thoraco-lumbar vertebrae (Figure 1).

The wound was closed using a sub-dermal approach pattern interrupted with absorbable monofilament sutures⁶ (monosyn[®]) of 2-0 caliber. This was followed by a combination of simple pattern and interlocking sutures caliber 2-0⁷ (polypropylene/Atramat[®]) on the skin. The far-near-near-far suture pattern was applied at the highest stress sites. The tissue was sent for histopathological analysis.

Day 5 to 7 - the patient remained hospitalized, wearing a compression bandage with an elastic tubular mesh⁸ (Le Roy[®]). Cephalexin⁹ [Ceporex[®] - 22 mg/kg/12 h v.o., BID] and buprenorphine³ [Brosipina[®] - 0.01 mg/kg/6 h i.v.] were administered.

Histopathological studies reported that in sections stained with Hematoxylin and Eosin¹⁰ (Hycel[®]), a pseudocyst was observed covering the hypodermis and dermis, elevating the epidermis. This pseudocyst contains abundant erythrocytes, fibrin, and inflammatory cells, as well as some blood vessels with the presence of thrombi. This cavity is surrounded by fibrous connective tissue, formed by reactive fibroblasts, hypertrophied endothelial cells, with the presence of granulation tissue, in addition to lymphocytes, plasma cells and few mast cells. Both the granulation tissue and the fibrous connective tissue encircled the area; however, infiltration is observed in some parts of the interior of the cavity, furthermore, areas with some remains of muscle fibers are observed, which show

dissociation and degenerative changes. There was also mature adipose tissue, invaded by fibrous connective tissue and inflammatory cells. The morphological diagnosis was a focal hematoma with thrombosis, as well as granulation tissue and severe fibrosis, with panniculitis and lymphohistiocytic, multifocal, chronic, moderate myositis, compatible with chronic expanding hematoma. No neoplastic cells were found in the tissue, including surgical borders.

Day 8 to 15 - the patient was discharged on the 4th day after surgery with analgesic carprofen² [Rimady[®] - 2.2 mg/kg v.o., BID]. The sutures were removed after 12 days without complications and a canine weight control diet was prescribed.

Day 30 - a thyroid profile and coagulation time test were performed. Both tests yielded results within the normal ranges. Due to surgical stress, the low dose dexamethasone test was postponed.

Day 180 - the bitch had nodule recurrence in the same area, with a volume of 3 cm³ (Figure 2). Fine needle aspiration and fine needle capillary aspiration were performed and again revealed blood. Wide edge excision was again performed including part of the muscle. The wound was sutured using a similar pattern to the previous surgery, but a cutaneous stretch technique was applied i.e., a rolled compress with sutures at each end of the wound. The tissue was sent for histopathological analysis.

Day 210 - as an initial screening test for hyperadrenocorticism, a low dose dexamethasone test³ [Vodexat[®] - 0.01 mg/kg i.v.] was performed, and cortisol values were as follows: Basal value 4.46 µg/dL, 4-h value 4.56 µg/dL, and 8-h value 3.83 µg/dL. Based on

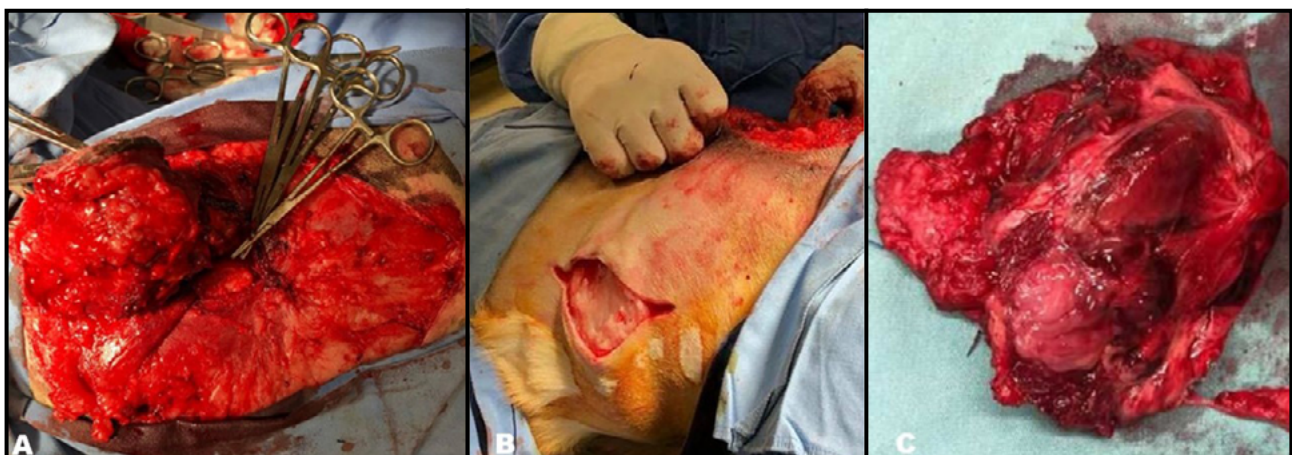


Figure 1. A- Mass resection with wide surgical margins including part of the musculature. B- Wound created to release tension before the surgical closure of the original wound. C- Macroscopic appearance of the first excised and opened mass, where the presence of the hematoma is observed.

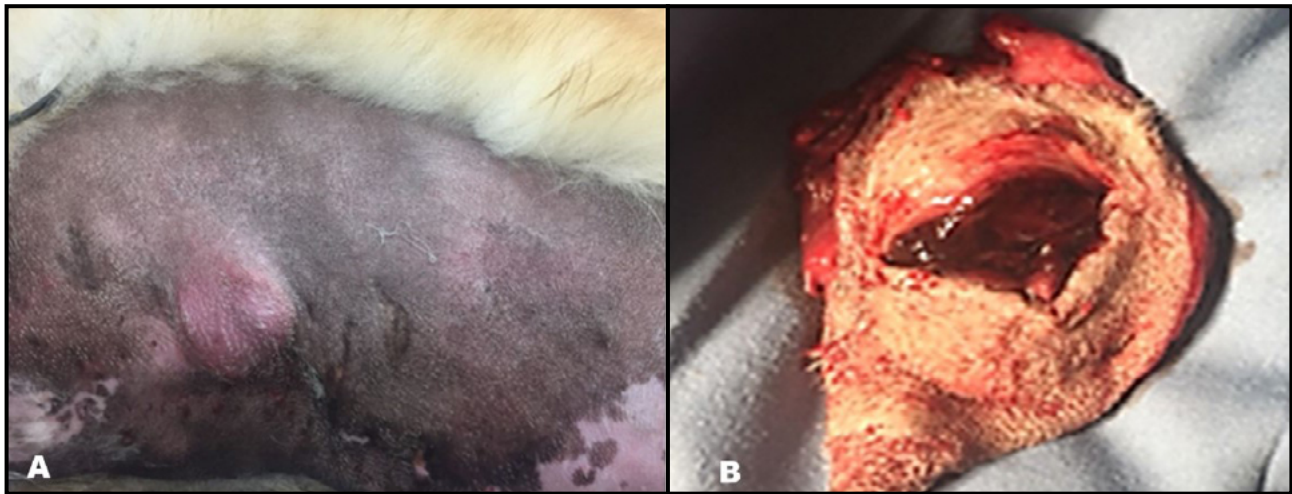


Figure 2. A- Image of recurrence of masses similar to those removed. B- Macroscopic appearance of the second excised and opened mass, where the presence of the hematoma is observed.

these results, a high dose dexamethasone (0.1 mg/kg) test was performed, with the following results: Basal value 4.46 µg/dL, 4-h value 4.56 µg/dL, and 8-h value 3.83 µg/dL. Therefore the bitch was diagnosed with a pituitary-dependent hyperadrenocorticism.

On both occasions histopathological examination revealed a focal hemorrhage (hematoma) with thrombosis and granulation tissue and severe fibrosis, with panniculitis and multifocal, chronic, moderate lymphohistiocytic myositis, which was compatible with a chronic expanding hematoma.

DISCUSSION

The term chronic expanding hematoma was established in 1980. It describes masses that grow slowly over time from an initial hemorrhage and do not present components of malignancy; nevertheless, they can affect patients directly depending on their location and size. Moreover, they can occasionally be mistaken for a soft-tissue neoplasm [1]. They have been reported with relatively frequency in humans but their description in small animals is rare. The 1st case was reported by Deneuche *et al.* [4], who described 5 cases in puppies with a cervical hematoma cataloged as a chronic expanding hematoma. A perirenal chronic expanding hematoma in 1 cat [3], a case of 1 bitch with intra-abdominal presentation of this entity [12], and 1 cat with this lesion on the right pelvic limb after an injection [13] have also been reported.

As well as in humans, the etiology of chronic expansive hematoma is unknown in dogs [4]. However, the theory about its formation has changed, since it has

been described that chronic expansive hematoma is a neoplastic process and not an inflammatory response as previously assumed [10].

In the present case, as in others, it was difficult to establish any cause of the chronic expanding hematoma. Coagulopathy is not a common cause of this pathology, because the coagulation profiles are usually normal. However, the evaluation of von Willebrand factors and the presence of thrombocytopenia are recommended to establish a possible relationship [12]. In the present clinical case, the platelets and the coagulation times were within normal ranges, and the von Willebrand test could not be run, because the owner did not sign off on it. Likewise, it is very difficult to relate hyperadrenocorticism with chronic expanding hematoma because dogs with Cushing's have hypercoagulopathies [11].

However, it is possible to relate hyperadrenocorticism to the presence of myxomas, since these tumors are associated with endocrinopathies in humans and dogs. Myxomas are tumors formed by fibroblast, which occur more often in adult dogs and affect several organs including the skin. Myxomas have an expansive growth pattern, unlike myxosarcomas, which are infiltrating; both have a gray or white color and are viscous in consistency [5]. Although in the present clinical case the skin mass appeared to be invasive, its macroscopic consistency corresponded to a hematoma. This was confirmed by needle aspiration, where only blood was obtained. Furthermore, both macroscopically and in the histopathological report, a well-shaped capsule was observed in the mass.

With this manuscript it is concluded that in humans, chronic expanding hematoma is a postoperative complication that, although it does not present malignancy, is aggravating and is increasingly being reported.

In veterinary medicine currently only 4 cases of chronic expanding hematoma have been described in small animal practice. Of these 4 cases, only 2 occurred in dogs. In conclusion, to the best of our knowledge, this is the 1st report of a post-surgical chronic expanding hematoma in a dog.

MANUFACTURERS

¹Velero de México S.A. Ciudad de México, México.

²Zoetis México. Ciudad de México, México.

³PiSA Agropecuaria. Guadalajara, México.

⁴Boehringer Ingelheim Vetmédica S.A. de C.V. Guadalajara, México.

⁵Zurich Pharma. Tepeji del Río, México.

⁶B. Braun VetCare Es. Barcelona, España.

⁷Internacional Farmacéutica S.A. de C.V. Ciudad de México, México.

⁸Laboratorios Le Roy S.A. de C.V. Ciudad de México, México.

⁹GSK -GlaxoSmithKline plc. Ciudad de México, México.

¹⁰Hycel de México. Zapopan, México.

Acknowledgements. I would like to thank the DVM Carlos Flores-Briones and the DVM Ana G. Tiburcio-Guzmán, residents of the HVU-UACJ for their help and assistance in the translation of this manuscript.

Declaration of interest. The authors report no conflicts of interest. The authors alone are responsible for the contents and writing of the paper.

REFERENCES

- 1 Ando W., Yamamoto K., Koyama T., Hashimoto Y., Yasui H., Tsujimoto T., Aihara M. & Ohzono K. 2017. Chronic expanding hematoma after metal-on-metal total hip arthroplasty. *Orthopedics*. 40(6): e1103-e1106.
- 2 Bazzle L.J. & Brainard B.M. 2015. Postoperative hemostasis monitoring and management. *Veterinary Clinics of North America. Small Animal Practice*. 45(5): 995-1011.
- 3 Beraud R. & Carozzo C. 2007. Perirenal expanding haematoma in a cat. *Journal of Small Animal Practice*. 48(1): 43-45.
- 4 Deneuche A.J., Viateau V.T. & Boulouha L. 2002. Cervical expanding hematomas in dogs: five cases. *Journal of the American Animal Hospital Association*. 38(6): 533-540.
- 5 Hendrick M.J. 2017. Tumors in domestic animals. In: Meuten D.J. (Ed). *Tumors in Domestic Animals*. 5th edn. Ames: Wiley Blackwell, pp.142-175.
- 6 Ito T., Nakahara T., Takeuchi S., Uchi H., Takahara M., Moroi Y. & Furue M. 2014. Four cases of successfully treated chronic expanding soft tissue hematoma. *Annals of Dermatology*. 26(1): 107-110.
- 7 Labadie E.L. & Glover D. 1976. Physiopathogenesis of subdural hematomas. Part 1: histological and biochemical comparisons of subcutaneous hematoma in rats with subdural hematoma in man. *Journal of Neurosurgery*. 45(4): 382-392.
- 8 Lenin Babu V., Rana M.M., Arumilli B.R., Dean T., Brown C. & Paul A. 2007. Chronic expanding haematomas with interesting presentations. *Iowa Orthopedic Journal*. 27: 108-111.
- 9 Manenti G., Cavallo A.U., Marsico S., Citraro D., Vasili E., Lacchè A., Forcina M., Ferlosio A., Rossi P. & Floris R. 2017. Chronic expanding hematoma of the left flank mimicking a soft-tissue neoplasm. *Radiology Case Report*. 12(4): 801-806.
- 10 Panagopoulos I., Gorunova L., Kostolomov I., Lobmaier I., Bjerkehagen B. & Heim S. 2020. Chronic expanding hematoma with a t(11;19)(q13;q13) chromosomal translocation. *Anticancer Research*. 40(1): 97-100.
- 11 Rose L., Dunn M.E. & Bédard C. 2013. Effect of canine hyperadrenocorticism on coagulation parameters. *Journal of Veterinary Internal Medicine*. 27(1): 207-211.
- 12 Sebbag L., Harkin K.R., Habekost A., Gumber S. & Lee T. 2014. Abdominal chronic expanding hematoma causing iron-deficiency anemia in a dog. *Journal of the American Animal Hospital Association*. 50(5): 350-355.
- 13 Togni A., Sievert C., Hurter K. & Knell S. 2015. Chronic expanding haematoma in a cat. *Journal of Feline Medicine and Surgery*. 17(8): 733-736.