



ISSN: 2230-9926

Available online at <http://www.journalijdr.com>

IJDR

International Journal of Development Research

Vol. 11, Issue, 11, pp. 51446-51450, November, 2021

<https://doi.org/10.37118/ijdr.23117.11.2021>



RESEARCH ARTICLE

OPEN ACCESS

SUPERFICIAL CERVICAL AXIAL PATTERN PEDICLED FLAP FOR RECONSTRUCTION OF SURGICAL DEFECT IN SQUAMOUS CELL CARCINOMA EXERESIS IN A CAT'S PINNA

Daniel Cardoso Garcia^{1*}, Nathalia Ferreira Lisboa², Amanda Martins dos Santos², Stephanie Caroline Bezerra Souza² and Marcelo Jorge Cavalcanti de Sá³

¹PhD Student in Small Animal Surgery Post Graduation Program (Stritu Sensu) at the Federal University of Campina Grande (UFCG), Patos - PB - Brazil; ²Post Graduation Program (Lato Sensu), Veterinary Medicine Residency in Professional Health Area/ Federal University of Campina Grande (UFCG), Patos - PB - Brazil; ³Small Animal Surgery Professor at the Academic Unit of Veterinary Medicine, Federal University of Campina Grande (UFCG), Patos - PB - Brazil

ARTICLE INFO

Article History:

Received 17th August, 2021
Received in revised form
28th September, 2021
Accepted 09th October, 2021
Published online 23rd November, 2021

Key Words:

Axial flap, squamous cell carcinoma, SCC, cat, Superficial cervical flap, Reconstructive surgery.

*Corresponding author:

Daniel Cardoso Garcia

ABSTRACT

Squamous Cell Carcinoma (SCC) is a neoplasm that most frequently affects animals with light skin and fur, with access to the street and that are exposed to chronic UV radiation, which leads to chronic inflammatory lesions. It is characterized as a locally aggressive neoplasm, but there are few reports of distant metastasis. Reconstructive surgeries are extremely important, as they allow a significant injured area of skin to be removed, and at the same time, this site is covered by skin from other regions, obtaining primary and faster healing compared to secondary healing. The objective of this study is to report the effectiveness of the superficial cervical artery flap to cover a skin defect after removal of SCC in a cat's pinna. The patient was seen at the Veterinary Hospital of the Federal University of Campina Grande (UFCG), Patos, Paraíba, Brazil, and had a history of a bloody wound in the left pinna region. According to the cat's owner, the patient had previously been treated with Terracortril, Ivermectin and Meloxicam, but the case was not resolved. Clinical examination revealed an ulcerative, bloody lesion with crust formation on the left ear. After cytology, the patient was diagnosed with SCC in the pinna. Before surgery, the patient was treated with Amoxicillin + Potassium Clavulanate in a dose of 20 mg/kg, every 12 hours, for 10 days, orally; Meloxicam 0.03 mg/kg, every 24 hours, for 3 days, orally; and Dipyrone drops 1 drop/kg, every 24 hours, for 4 days, orally. Cleaning of the wound with saline solution, every 12 hours, associated with collagenase ointment every 12 hours until the infected tissue was eliminated and use of Elizabethan collar were indicated. During surgery, the affected pinna was removed, plus 3 cm of skin to ensure surgical margins. The wound was closed with the aid of a flap from the superficial cervical artery and the stitches removed after 10 days. The technique proved to be extremely useful to repair the tissue defect, without causing tension to the defect, generating a good esthetic result and helping in the healing process of lesions in the temporal region.

Copyright © 2021, Daniel Cardoso Garcia et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Daniel Cardoso Garcia, Nathalia Ferreira Lisboa, Amanda Martins dos Santos, Stephanie Caroline Bezerra Souza and Marcelo Jorge Cavalcanti de Sá. "Superficial cervical axial pattern pedicled flap for reconstruction of surgical defect in squamous cell carcinoma exeresis in a cat's pinna", *International Journal of Development Research*, 11, (11), 51446-51450.

INTRODUCTION

Neoplasms are pathologies characterized by a set of biological phenomena originating from the nucleus of cells (MARIA *et al.*, 1998). In one study, skin neoplasms accounted for 41.1% (93/226) of the total number of neoplasms, with mast cell tumors (11.8%) and SCC (100%) being the most frequent skin tumors in dogs and cats, respectively (PRIEBE *et al.*, 2011).

Vail and Withrow (2007) reported that SCC was the only neoplasm diagnosed in felines during the study period, representing 15% of tumors in felines and 5% in canines. The etiology of SCC is still unknown, however about 50% of patients with SCC have mutations in the p53 tumor suppressor gene caused by UV radiation (FRAYOT *et al.*, 2009; SABATTINI *et al.*, 2010). Other factors that predispose the development of SCC are chronic exposure to UV radiation in body areas with intense sun exposure (SABATTINI *et al.*, 2010; MURPHY, 2013), animals that have light skin and fur, chronic inflammatory lesions and oncogenic papillomavirus infection

(MURPHY, 2013). The diagnosis of SCC is based on history, anamnesis and complete physical examination, showing clinical signs and predisposing factors for neoplasia (MURPHY, 2013). The cytological exam can be used as a screening exam, as it is a less invasive diagnostic method, which is used to discern neoplastic from inflammatory lesions, and determine if the tumors have some degree of malignancy as well as their origin (BLACKWOOD, 2013). Surgical removal is the most indicated treatment method for SCC (MURPHY, 2013). However, it may be limited due to some issues, such as location of the lesion, size of the neoplasm and patient size (BLACKWOOD, 2013). For the removal of the neoplasm with safety margins, it is necessary in some cases to use reconstructive surgery techniques to repair the defect (MANKIN, 2017). Other therapeutic modalities can also be considered (LINO *et al.*, 2019), such as radiotherapy, cryosurgery, photodynamic therapy (SABATTINI *et al.*, 2010). These other modalities are used to treat SCC with variable success, depending on the animal's prognosis (MURPHY, 2013). The superficial cervical or omocervical axial pattern flap incorporates the branch of the omocervical artery and its associated vein. These vessels originate adjacent to the pre-scapular lymph node and arborize dorsally just cranially to the scapula. The superficial cervical axial pattern flap has potential use for large skin defects because its rotation arc, including wounds involving the face, head, ear, shoulder, neck and axilla (PAVLETIC, 1990). This paper reports a case of SCC in the pinna region of a domestic cat, in which its surgical excision was performed and associated to a surgical reconstruction of the defect. As shown above, they are very frequent neoplasms in veterinary medicine and for the treatment to be successful, it needs to be removed with adequate margins. The objective is to report the effectiveness of the omocervical artery flap to cover the skin defect after removal of SCC in a cat's pinna.

CASE REPORT

A female, mixed breed cat, white coat, 7 years old, weighing 3.4 kg was seen at the Small Animal Medical Clinic of the Veterinary Hospital Prof. Dr. Ivon Macêdo Tabosa - UFCG/PATOS (HV/UFCG - Patos), Paraíba, Brazil. Three months before the patient was seen at the hospital, the owner observed a small lesion in the ear and that this lesion was increasing with time. Also, she noticed a nodule in the neck region. And by her own, she initiated treatment twenty days before her pet was attended, using bleach + Terracortril spray (Hydrocortisone + Oxytetracycline Hydrochloride), and later, Vetagloss and physiological solution to clean the wound, daily. The patient was eating and drinking normally, and used to be fed with meat and chicken. Also, she was defecating and urinating normally. The patient had street access and had contact with another cat. Fifteen days before her attendance, the owner also used Ivermective and Meloxicam for 4 days on her own, but she could not to inform their dosages. During physical examination, was noticed that the animal had a lot of itching at the injury site. She was neutered and vaccinated against rabies. Rectal temperature was 38.4°C, heart rate 144 bpm, respiratory rate 52 mpm. She acted active in station, had normal colored ocular and oral mucosas, lymph nodes without alteration on palpation, skin turgor of 2s, capillary filling time 2 seconds, cardiac and pulmonary auscultation without alterations, body score 3 (1 to 5), normohydrated, and no changes in the oral cavity.

In the left ear an ulcerative lesion was seen, with crusts, reddish secretion, erythema and alopecia. The patient felt uncomfortable when the ear was handled. Blood count, biochemistry and cytology of the ulcerated lesion were requested. The patient's blood count showed a red series without alterations, reactive lymphocytes and neutrophils with toxic granulations. Serum biochemistry was within reference values for the specie and cytology confirmed the diagnosis of squamous cell carcinoma (SCC). After the cytology result, chest radiographies and abdominal ultrasound were requested, and possible metastases < 5 mm in diameter in internal organs were ruled out. The ear lesion was infected, so the patient needed previous stabilization before being referred to the surgery sector. The medications that were taken home with the aim of controlling the infection were

Amoxicillin + Potassium Clavulanate 20 mg/kg, every 12 hours, for 10 days, orally; Meloxicam 0.03 mg/kg, every 24 hours, for 3 days, orally; Dipyrone drops 1 drop/kg, every 24 hours, for 4 days, orally; and was indicated the cleaning of the wound with saline solution, every 12 hours, associated with collagenase ointment every 12 hours until the infected tissue was eliminated, and the use of Elizabethan collar. After 15 days, the patient was referred for surgery. Total pinnectomy and reconstruction of the surgical defect with an omocervical axial pattern flap was planned. To perform the surgery, the owner was asked to comply a 4-hour fasting period, and new blood count and biochemical tests were requested, which results indicated normality according to the reference values. The pre-anesthetic medication used were Acepromazine (0.03 mg/kg) and Morphine (0.3 mg/kg), via intramuscular. Anesthetic induction was done with Lidocaine without vasoconstrictor (1 mg/kg), Ketamine (1 mg/kg) and Propofol (4 mg/kg), intravenously. The patient was intubated with a 3.5 tracheal tube and an anesthetic plan was reached through inhalation anesthesia with Isoflurane diluted in 100 % oxygen in an open circuit. As local anesthesia, blockade of the auriculotemporal, greater auricular and infiltrative nerve were performed in the incision line of the flap, with 2 mg/kg Bupivacaine plus Lidocaine with 2% vasoconstrictor at a dose of 9 mg/kg. Sodium Ampicillin at a dose of 10 mg/kg was administered intravenously 30 minutes before the surgery started. This procedure required wide trichotomy of the entire frontal, temporal and left maxillary region up to the thoracic region, caudal to the scapula. The surgery was started with a pinnectomy, and for this, a skin incision was made around the pinna with a safety margin of 3 cm from the nodule (Figure 1), subcutaneous dissection and incision with an electric scalpel of the auricular cartilage (Figure 2).



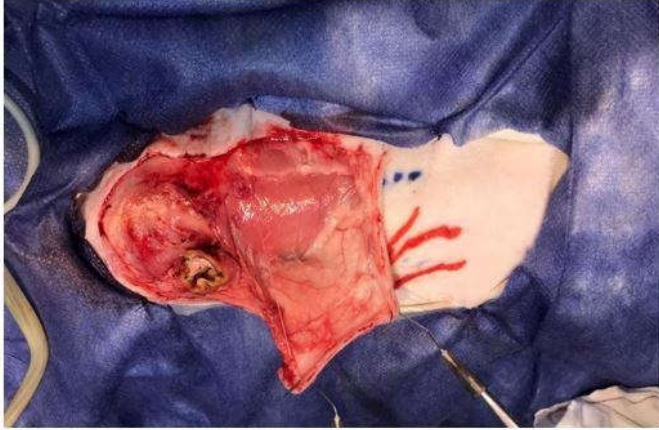
Figure 1. Photographic image showing the start of the surgical procedure. The neoplasm was being removed with skin incision respecting the 3 cm margin of healthy tissue



Source: HV-UFCG, 2021

Figure 2. Photographic image showing the removal of the neoplastic mass, after dissection of the subcutaneous tissue and incision of the auricular cartilage with electric scalpel

Later, the release of the omocervical flap, through a horizontal skin incision towards the omocervical artery was done, being careful with dissection of the subcutaneous tissue so as not to damage the irrigation of the flap as well as its size to later advancement to the region of the surgical defect (Figure 3). An anchor suture was made to facilitate the reduction of dead space with a 3-0 absorbable suture (Figure 4). Demorrhaphy was done with 3-0 nylon thread, in a simple and separated pattern and an open drain was introduced in the subcutaneous space (Figure 5).



Source: HV-UFCG, 2021

Figure 3. Photographic image showing flap preparation through dissection from its origin and the flap being folded distally



Source: HV-UFCG, 2021

Figure 4. Photographic image showing fixation of the flap in the host area through sutures in the subcutaneous space, in a simple and separated pattern with polyglactin 910 3-0



Source: HV-UFCG, 2021

Figure 5. Photographic image showing complete demorrhaphy and introduction of an open drain in the subcutaneous space

Meloxicam was administered at the end of surgery at a dose of 0.03 mg/kg, via intramuscular. For the postoperative period, oral Amoxicillin + Potassium Clavulanate 20 mg/kg were prescribed every 12 hours for 10 days; Meloxicam 0.03 mg/kg, every 24 hours for 4 days, orally; Dipyron drops 1 drop/kg, every 24 hours, for 3 days, orally; Tramadol 2 mg/kg, every 12 hours, for 5 days, orally; and the use of an Elizabethan collar. For topical use, Furanil ointment was indicated, every 12 hours, for 10 days, and Hirudoid in regions with hematoma, every 12 hours, for 7 days. The use of a cold compress was indicated for the first 72 hours, every 8 hours, for 5-10 minutes, and then a warm compress for another 72 hours every 8 hours, for 5-10 minutes. After 10 days, the patient returned for stitches removal, showing complete healing and only with a small area of necrosis close to the ear canal region (Figures 6 and 7).



Source: HV-UFCG, 2021

Figure 6. Photographic image showing the patient presenting complete healing after 10 days of surgery. There is a small necrosis tissue in the upper part of the ear canal region



Source: HV-UFCG, 2021

Figure 7. Photographic image showing the patient after stitches removal, without evidence of any necrotic tissue at the grafted area

CASE DISCUSSION

Neoplasms are the fourth most common cause of death in cats seen in veterinary clinics in England (O'NEIL *et al.*, 2015) and, according to Vail and Withrow (2007), SCC represents 15% of neoplasms that affect felines. In a study carried out in Belém by Priebe *et al.* (2011),

they analyzed 33 cat biopsies from veterinary clinics and 100% of these samples were diagnosed as SCC. It was observed in many studies that the skin and subcutaneous tissue are the most common sites for the development of tumors in cats (GRAF *et al.*, 2015). This author reported that 76.1% of the neoplasms studied through histological exams were of malignant character. Likewise, Ho (2018) also showed a high rate of malignant neoplasms in cats in his report. It is known that skin pigmentation, climate in the living region, and feline habits influence the prevalence of SCC due to the relationship between the development of the disease and exposure to solar radiation (MURPHY, 2013), as well as light coat and exposure to UV radiation are also predisposing factors (DALEK, 2016). These same factors were identified in the patient reported here, such as having a light fur, free access to the street, and living in a tropical climate region. The patient in the report was 7 years old, being considered an elderly animal. Murphy (2013) found that SCC is a neoplasm that is more prevalent in elderly animals, with a mean age of 10 to 12 years. More than 80% of the lesions are found in the face region (FRIBERG, 2006). The places of greatest incidence are associated in areas with little pigmentation, such as ears, eyelids, nasal plane and temples (LINO *et al.*, 2019). The most common clinical findings of these lesions are erythema, ulcers, regions of alopecia and crusts, which can be explained by the invasive and local activity of the SCC (HOGGARD *et al.*, 2018).

In the present study, the patient had these same lesions in the pinna region. Complementary tests are extremely important to be able to define the patient's prognosis. Hematological and biochemical analyzes, in addition to defining the patient's clinical condition (MELO *et al.*, 2018), allow the relative assessment of the healing activity, keeping in mind that patients with hypoproteinemia, liver disease, immunosuppression, uremia and infection present a delay in the healing process (AMSELLEM, 2011; THOMPSON, 2017). Serum changes may compromise the success of the surgery. In this case, the patient had an infection of the neoplastic area in the pinna, with the presence of toxic neutrophils, requiring antibiotic treatment (Amoxicillin + Potassium Clavulanate 20mg/kg) before surgery to stop the infectious process and favor flap adhesion over the surgical defect. The implantation of flaps or grafts over infected areas can be disastrous, as it cannot adhere to the new implanted area if there is no healthy tissue and infection is present (PAVLETIC, 1990; FOSSUM, 2013). The investigation of metastasis with the aid of ultrasonography, chest radiographies and regional lymph node cytology in any neoplasm are essential. Although SCC is an aggressive neoplasm, local in character and with low metastatic power, Tilley and Junior (2008) point out that although metastases are not frequent, there are cases in which patients have metastases to regional lymph nodes, surrounding tissue areas and lungs. These tests also contribute to the staging of the neoplasm and choice of the ideal treatment for the patient when ruling out or verifying the presence of a metastasis (MURPHY, 2013). Surgical excision with free margins of 3 cm in circumference is the treatment of choice for this type of neoplasm (MURPHY, 2013). Other treatments, such as cryosurgery, can be used for SCC found in areas that cannot be operated with the removal of free margins (LINO *et al.*, 2019). Thus, the reported SCC was present in the pinna and could be removed with wide margins as long as reconstructive surgery techniques were used to promote complete closure of the defect, without causing wound tension.

Therefore, the planning was for the use of the omocervical axial pattern flap, as it incorporates a cutaneous artery and a direct vein at its base, allowing the flap to be vascularized through its own vascular branches, thus avoiding complications, such as necrosis related to the extension of the flap (MANKIM, 2017). In addition, this flap pattern can be used extensively to cover head and neck defects (DEGNER, 2007). These flaps have a survival rate greater than 50% when compared to subdermal plexus flaps in cats (REMEDIES *et al.*, 1991), reducing the chances of vascular complications (AMSELLEM, 2011). Prior planning and demarcation of anatomical points and adequate patient positioning decrease the chances of complications, corroborating with Pavletic (1990). The simple and separate suture pattern using monofilament thread is recommended in flap techniques

(FOSSUM, 2013) because it provides direct apposition of the skin edges, promoting cutaneous healing in an aesthetic way, with less vascular compromise (FAHIE, 2013). To reduce the incidence of seroma, a drain can be implanted (HUNT, 2013) associated with the use of compression bandage, with the aim to protect the flap and the donor region, and avoid excessive movement, maintaining at the same time a smooth compression. It also helps to reduce the dead space, and serves as a physical barrier to bacterial contamination (DEGNER, 2007). In this report, the use of simple and separate sutures with monofilament thread proved to be effective for the proper apposition of edges without causing ischemic injuries. Compressive bandaging and open drain were effective in controlling dead space and seroma formation. Although in this report there was no complications, some problems can be expected in this specie due to its morphological characteristics, such as having a lower density of cutaneous angiosomes, particularly in the trunk region of cats (TAYLOR and MINABE, 1992; BOHLING and HENDERSON, 2006). This feature predisposes to lesser flap grip; and lower collagen production (BOHLING *et al.*, 2004). Thus, the epithelial healing in the cat becomes later, and this fact reflects in the intensification of postoperative care. To have a good healing process, pain needs to be controlled. Steagall and Monteiro-Steagall (2013) showed that the main support for the treatment of acute pain is the combination of opioids with NSAIDs. Thus, the use of multimodal therapy for the treatment of pain in cats is extremely important in the postoperative period (STEAGALL and MONTEIRO STEAGALL, 2013), strategy that minimizes patient's stress and ensures a good recovery (KEHLET, 1993; DHALI WAL and KUFUOR-MENSAH, 2007), as noted for the patient in this report.

CONCLUSION

The use of reconstructive surgery has been increasingly needed to correct surgical wound defects after tumor removal, or even to promote faster healing of accidental wounds. As seen in this case, the removal of adequate surgical margins and the use of reconstructive techniques are ideal, respectively, to prevent local metastasis of some neoplasms and to avoid wound tension, thus favoring healing. The use of a superficial cervical axial pattern flap was ideal, as it is an accessible technique for repairing the defect in the temporal region, without short or long-term complications. The technique proved to be extremely useful to repair the tissue defect, without causing tension to the defect, generating a good aesthetic result and helping in the healing process. However, the main factor to successfully employ any reconstructive surgical technique is good surgical planning, which takes into account the extent of the wound defect after removal of the neoplasm. It is also necessary to correctly follow the description of the technique, taking good care in the trans and postoperative periods. Care with planning, asepsis for the patient and surgeons, delicate dissection and apposition of wound edges was essential for the surgical success of this case.

REFERENCES

- AMSELLEM, P. Complications of Reconstructive Surgery in Companion Animals. *Veterinary Clinics of North America*, 41:995-1006, 2011.
- BLACKWOOD, L. Cats with cancer: Where to start. *Journal of Feline Medicine and Surgery*, 15:366-377, 2013.
- BOHLING, M.W.; HENDERSON, R.A. Differences in Cutaneous Wound Healing Between Dogs and Cats. *Veterinary Clinics of North America*, 36:687-692, 2006.
- BOHLING, M.W.; HENDERSON, R.A.; SWAIM, F.S.; KINCAID, S.A.; WRIGHT, J.C. Cutaneous wound healing in the dog: a macroscopic description and comparison with cutaneous wound healing in the dog. *Veterinary Surgery*, 33:579-87, 2004.
- DALECK, C.R.; DE NARDI, A.B.; RODASKI, S. *Oncology in dogs and cats*. São Paulo: Roca, p. 612, 2008. In: TOMIO, J.; SANTOS, A.R.I.; FILHO, P.R. *Squamous cell carcinoma in cats*,

- Technical-scientific report, XXIV Scientific Initiation Seminar, 2016.
- DEGNER, D.A. Facial reconstructive surgery. *Clinical Techniques in Small Animal Practice*, 22:82-88, 2007.
- DHALIWAL, R.S.; KUFUOR-MENSAH, E. Metastatic squamous cell carcinoma in a cat. *Journal of Feline Medicine and Surgery*, 9:61-66, 2007.
- FAHIE, M.A. Primary wound closure. In: Tobias, K.M.; Johnston, S.A., editors. *Veterinary Surgery: Small Animal*. St Louis (MO): Elsevier Saunders, 1197-209, 2013.
- FAVROT, C.; WELLE, M.; HEIMANN, M.; GODSON, D.L.; GUSCETTI, F. Clinical, Histologic, and Immunohistochemical Analyses of Feline Squamous Cell Carcinoma In Situ. *Veterinary Pathology*, 46(1):25-33, 2009.
- FOSSUM, T.W. *Small Animal Surgery*. 4th ed. Elsevier, Rio de Janeiro, pp. 192-228, 2013.
- FRIBERG, C. Feline Facial Dermatitis. *Veterinary Clinics of North America*, 36:115-140, 2006.
- GRAF, R.; GRÜNTZIG, K.; HÄSSIG, M.; AXHAUSEN, K.W.; FABRIKANTX, S.; WELLE, M.; MEIER, D.; GUSCETTI, F.; FOLKERS, G.; OTTO, V.; POSPISCHIL, A. Swiss Feline Cancer Registry: a retrospective study of the occurrence of tumors in cats in Switzerland from 1965 to 2008. *Journal of Comparative Pathology*, 153:266-277, 2015.
- HO, N.T.; SMITH, K.C.; DOBROMYL, M.J. Retrospective study of more than 9000 feline cutaneous tumors in the UK: 2006-2013. *Journal of Feline Medicine and Surgery*, 20:128-134, 2018.
- HOGGARD, N.; MUNDA, J.S.; LUFF, J. Localization of *Felis catus* Papillomavirus Type 2 E6 and E7 RNA in Feline Cutaneous Squamous Cell Carcinoma. *Veterinary Pathology*, 55:409-416, 2018.
- HUNT, G.B. Local or subdermal plexus flaps. In: Tobias KM, Johnston SA, editors. *Veterinary Surgery: Small Animal*. St Louis (MO): Elsevier Saunders, pp. 1243-55, 2013.
- KEHLET, H.; DAHL, J.B. The value of 'multimodal' or 'balanced analgesia' in postoperative pain treatment. *Anesthesia Analgesia*, 77:1048-1056, 1993.
- LINO, M.; LANORE, D.; LAJOINIE, M.; JIMENEZ, A.; CROUZET, F.; QUEIROGA, F. L. Prognostic factors for cats with squamous cell carcinoma of the nasal planum following high-dose rate brachytherapy. *Journal of Feline Medicine and Surgery*, 21(12):1157-1164, 2019.
- MANKIN, K.T. Axial Pattern Flaps. *Veterinary Clinics of North America*, 47:1237-1247, 2017.
- MARIA, P.P.; SOBRAL, R.A.; DALECK, C.R. Casuistry of dogs with cancer treated at the Veterinary Hospital of Unesp/Jaboticabal from 01/01/95 to 05/01/97, In: Congresso Brasileiro de Cirurgia e Anestesiologia Veterinária, Belo Horizonte. UFMG, 1998. p.61.
- MELO, A.M.C.; CARDOSO, T.M.S.; CRUZ, M.V.R.A.; OLIVEIRA, C.A.A.; VITAL, K.C.; CARVALHO, K.S. Squamous cell carcinoma - case report; *Pubvet*, 12:1-6, 2018.
- MILLER, M.A.; NELSON, S.L.; TURK, J.R.; PACE, L.W. BROWN, T.P.; SHAW, D.P.; FISCHER, J.R.; GOSSER, H.S. Cutaneous neoplasm in 240 cats. *Veterinary Pathology*, 28:389-95, 1991.
- MURPHY, S. Cutaneous squamous cell carcinoma in the cat. Current understanding and treatment approaches. *Journal of Feline Medicine and Surgery*, 15:401-407, 2013.
- O'NEILL, D.G.; CHURCH, D.B.; MCGREEVY, P.D., *et al.* Longevity and mortality of cats attending primary care veterinary practices in England. *Journal of Feline Medicine and Surgery*, 17:125-133, 2015.
- PAVLETIC, M.M. Skin Flaps in Reconstructive Surgery. *Veterinary Clinics of North America: Small Animal Practice*, 20(1):81-103, 1990.
- PRIEBE, P.S.; RIET-CORREA G., WALLS, L.J.A.; COSTA, M.S.F.; SILVA, C.D.C.; ALMEIDA. Occurrence of neoplasms in dogs and cats in the metropolitan mesoregion of Belém, PA, between 2005 and 2010. *Arquivo Brasileiro de Medicina Veterinária e Zootecnia* [online]. 2011, 63(6) [Accessed 9 October 2021], pp. 1583-1586. Available in: <<https://doi.org/10.1590/S0102-09352011000600042>>. Epub 19 Dez 2011. ISSN 1678-4162. <https://doi.org/10.1590/S0102-09352011000600042>.
- REMEDIES, A.M.; BAUER, M.S.; BOWEN, C.V.A, FOWLER, J.D. Axial pattern skin flaps in cats. *Microsurgery*, 12:125-129, 1991.
- SABATTINI, S.; MARCONATO, L.; ZOFF, A.; MORINI, M.; SCARPA, F.; CAPITANI, O.; BETTINI, G. Epidermal growth factor receptor expression is predictive of poor prognosis in feline cutaneous squamous cell carcinoma. *Journal of Feline Medicine and Surgery*, 12:760-768, 2010.
- STEAGALL, P.V.M.; MONTEIRO-STEAGALL, B.P. Multimodal analgesia for perioperative pain in three cats. *Journal of Feline Medicine and Surgery*, 15:737-743, 2013.
- TAYLOR, G.I.; MINABE, T. The angiosomes of the mammals and the vertebrates. *Plastic and Reconstructive Surgery*, 89:181-215, 1992.
- THOMPSON, E. Debridement Techniques and Non-Negative Pressure Wound Therapy Wound Management. *Veterinary Clinics of North America*, 47:1181-1202, 2017.
- TILLEY, L.P.; JUNIOR, F.W.K.S. *Veterinary Consultation in 5 Minutes: Canine and Feline Species*. 3. ed. Translation: Cid Figueiredo *et al.* Barueri: Manole, 2008, pp. 189-197.
- VAIL, D.M.; WITHROW, S.J. Tumors of the skin and subcutaneous tissues. In: WITHROW, S.J.; VAIL, D.M. *Small Animal Clinical Oncology*. 4th ed. Canada: Saunders, 2007, p.382.
