



## CASE REPORT

### Surgical Treatment of Squamous Cell Carcinoma (SCC) of the Third Eyelid in a Cat

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### Bir Kedide Üçüncü Göz Kapağında Bulunan Skuamöz Hücreli Karsinomun (SCC) Cerrahi Rezeksiyonu ile Sağaltımı

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#### Öz

Skuamöz hücreli karsinom (SCC) kedilerde en sık karşılaşılan göz kapağının malign tümörüdür. Genellikle 10 yaş ve üzeri beyaz tüylü kedilerde görülmektedir. Çeşitli bölgesel ve sistemik kemoterapi tedaviler önerilse de genellikle kitlenin cerrahi olarak total rezeksiyonu en çok kabul edilen tedavi yöntemi olarak bilinmektedir. Bu çalışmanın amacı, bir kedide göz kapağı SCC'sinin cerrahi total rezeksiyon yöntemi ile tedavi etmek ve değerlendirmektir. Çalışma materyalini Selçuk Üniversitesi Veteriner Fakültesi Hayvan Hastanesi Cerrahi Kliniğine 4 Ocak 2024 tarihinde sağ gözünde ülseratif tümör şikayeti ile getirilen kısa tüylü, gri-beyaz dişi bir sokak kedisi oluşturdu. Hastanın klinik ve hematolojik muayeneleri yapıldıktan sonra kitle rezeksiyonu için operasyona alındı. Operasyon bölgesine 0,25 ml dozunda bupivakain T şeklinde kıkırdağın bulbar konjunktivasına subkonjunktival olarak enjekte edildi ve ardından diseksiyon makasıyla üçüncü göz kapağının orijin aldığı konjunktiva dokusu bütün sınırları boyunca diseke edildi ve dokunun total rezeksiyonu sağlandı. SCC'nin kesin tanısı yapılan histopatolojik inceleme sonucu konuldu. Operasyon sonrası hastanın göz segmentlerinin detaylı muayenesinde ve oküler MR görüntülenmesinde herhangi bir patoloji tespit edilmedi. Ayrıca hastanın klinik ve hematolojik bulgularına ve toraksın radyografik bulgularına göre hastada metastaz bulgularına rastlanmadı. Hastanın post operatif 1 aylık takip sürecinde bölgede nüks veya genel durum bozukluğu saptanmadı. Sonuç olarak üçüncü göz kapağının cerrahi olarak total rezeksiyonu kedilerin üçüncü göz kapağı kaynaklı SCC'nin tedavisi için uygulanabilir bir yöntem olduğu düşüncesindeyiz.

**Anahtar kelimeler:** Kedi, Rezeksiyon, Skuamoz hücreli karsinom

#### Abstract

Squamous cell carcinoma (SCC) is the most common malignant tumor of the eyelid in cats. It is usually seen in white-haired cats aged 10 years and older. Although various regional and systemic chemotherapy treatments have been proposed, surgical total resection of the mass is generally recognized as the most accepted treatment method. The aim of this study was to evaluate the treatment of eyelid SCC by surgical total resection in a cat. The study material consisted of a short-haired female grey-white stray cat that was brought to Selçuk University, Faculty of Veterinary Medicine, Animal Hospital, Department of Surgery on January 4, 2024 with the complaint of ulcerative tumor in the right eye. After clinical and hematologic examinations, the cat was operated for mass resection. A dose of 0.25 ml bupivacaine was injected subconjunctivally into the bulbar conjunctiva of the T-shaped cartilage, and then the conjunctival tissue from which the third eyelid originated was dissected along all its borders with dissecting scissors and total resection of the tissue was achieved. The final diagnosis of SCC was made after histopathologic examination. Postoperative detailed examination of the eye segments and ocular MR imaging revealed no pathology. In addition, according to the patient's clinical and hematologic findings and radiographic findings of the thorax, no evidence of metastasis was found. During the 1-month postoperative follow-up period, no recurrence or general condition deterioration was detected. In conclusion, we believe that surgical total resection of the third eyelid is a feasible method for the treatment of SCC originating from the third eyelid in cats.

**Keywords:** Cat, Resection, Squamous cell carcinoma



## Introduction

Squamous cell carcinoma (SCC) is the most common malignant tumour of the eyelid in cats and affects the epidermal layer of the skin. It accounts for 28% of all cases of eyelid tumours in cats. Feline eyelid tumours are most common in cats over 10 years of age (Bostock 1986). The development of tumours has been linked to exposure to ultraviolet light, in particular ultraviolet B (UVB) radiation. SCC is most common in light-haired, unpigmented areas of the skull, particularly in white-haired and unpigmented coloured cats (Murphy 2013). SCC lesions are characterised by erythematous, slightly raised and non-healing ulcerative wounds on the eyelids, the auricle and the nasal planum. Lesions can develop simultaneously in different parts of the body and metastases occur in about 40% of cases. Metastatic lesions are usually detected in the regional lymph nodes or in the lung tissue (Théon et al. 1995, Murphy 2013).

Treatment of eyelid SCC is primarily surgical. Reconstructive surgical techniques are used to preserve the functional eyelid after excision of large lesions. Enucleation of the eye is recommended if the lesion is very large or if other segments of the eye are also affected (Murphy 2013, Glaze et al 2022). In the early stages of the disease, medical and conservative treatments should be considered. For example, strontium-90 (ST-90) plesiotherapy is a radiotherapy method used to treat superficial tumours by applying the radioactive device directly to the tumour surface. ST-90 delivers beta particles to superficial tissues only, without damaging the tissue with its limited penetration (2-3 mm) into the irradiated tissue (Russak et al 2022). Another treatment for superficial tumours is cryosurgery. Intralesional chemotherapy is rarely used in cats. However, in addition to systemic chemotherapy, electrochemotherapy is also recommended for the treatment of SCC (Glaze et al 2022).

The aim of this case report was to provide information on the clinical, MRI and surgical technique of resection of SCC in the third eyelid of a cat.

## Case presentation

### Case History

The case material was a short-haired female grey-white stray cat brought to the Small Animal Clinic of Selcuk University Faculty of Veterinary Medicine on 4 January 2024 by a citizen complaining of ulcerated and crusted swelling of the right eye.

### Clinical Examination

Clinic examination revealed that the mass was large enough to completely cover the globe, covered with firm crusts and producing mucoid discharge in the region. On examination, the lesion was found to originate from the third eyelid. The

cornea and upper and lower eyelids were not involved (Figure 1. A and B). Due to the large size of the lesion, detailed examination of the other layers of the affected eye was not possible. No evidence of disease was found in the patient's left eye. A detailed examination of the affected eye was carried out after the total resection of the mass. Biochemical and haematological evaluations were performed prior to the procedure. Chest radiographs and orbital MR images were obtained to exclude systemic disease and possible metastasis.

### Surgical technique

After routine anesthetic protocol, the right eye was shaved circumferentially and desinfection was performed. The mass and cornea were rinsed with a 1:50 dilution of iodine. The area was then covered with a sterile surgical drape. For local anaesthesia, a 0.25 ml dose of bupivacaine (Marcaine® 0.5% Astrazeneca İlaç San. Ve Tic. Ltd. Şti.) was injected subconjunctivally into the bulbar conjunctiva of the T-shaped cartilage (Grubb and Lobprise 2020). The third eyelid was excised outwards using haemostatic forceps. Subsequently, the bulbar conjunctival tissue from which the third eyelid is derived was dissected along all edges with dissecting scissors, achieving complete resection of the tissue (Payne et al 2009). The conjunctiva was sutured with 5/0 atraumatic absorbable sutures (Alcasorb®, Katsan, Türkiye). Atipamezole hydrochloride (Antisedan®, Zoetis, Finland), an  $\alpha_2$ -adrenergic receptor antagonist, was injected intramuscularly at a dose of 0.025 mg/kg to emerge the patient from anaesthesia (Simon and Steagall 2020). In the postoperative period, eye drops containing neomycin and dexamethasone sodium phosphate (Neo-Kort®, Vetaş, Türkiye) were instilled twice a day for 7 days. For post-operative pain management, a single subcutaneous dose of 0.3ml/5kg of meloxicam (Maxicam®, Sanover, Türkiye) was administered at the end of surgery. For the histopathological evaluation, the tissue sample was fixed in a 10% buffered formol-saline solution (pH 7.4). After removal of the mass, a direct ophthalmoscopic examination of both eyes, an examination of the pupillary and palpebral reflexes and a fluorescein staining test for the integrity of the corneal tissue were carried out. The Schirmer tear test was performed, intraocular pressure measured, and the retinal vasculature and optic nerve examined. In addition, T1- and T2- MR imaging of the eye and the retrobulbar tissues were carried out.

### Histopathologic examination

For histopathological examination, tissue samples were fixed in 10% formol for 24 to 48 hours. After routine tissue tracking, tissues were passed through graded alcohol, xylol, xylol-paraffin and paraffin series. Tissue tracking was performed using a tissue tracking device (Leica TP 1020, Germany). Then, tissues were embedded in paraffin. Tissue sections of 5  $\mu$ m thickness were cut from paraffin

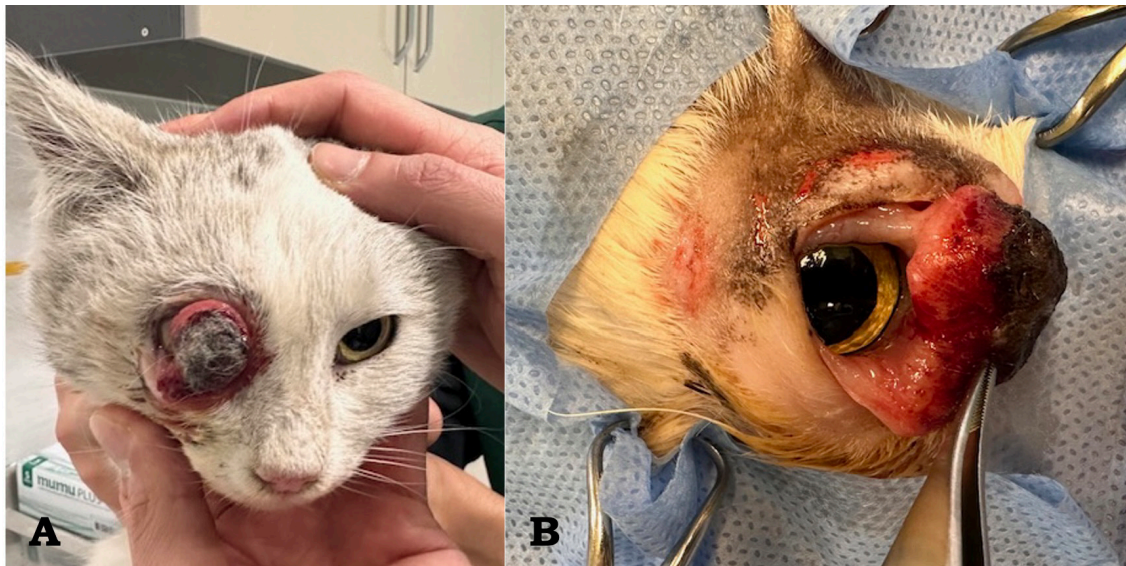


Figure 1. A: The lesion is covered with a hard crust. B: The mass appears to be ulcerated.

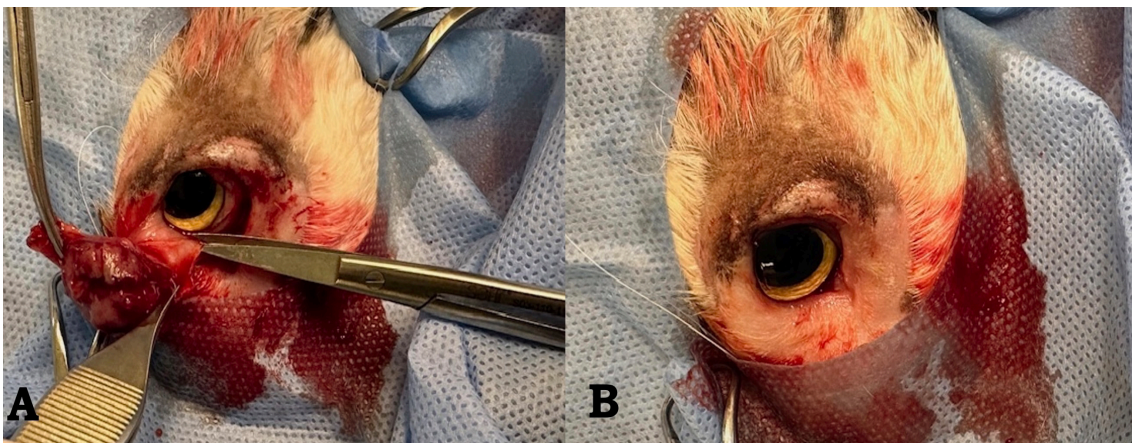


Figure 2. A: Surgical resection of the mass. B: Postoperative image of the affected eye.

blocks using a microtome (Leica RM2125 RTS, Germany) and the tissue sections were stained with Hematoxylin-eosin (H&E). After staining, slides were examined under a light microscope (Olympus BX51, Japan) and photographed (Olympus DP12, Tokyo, Japan).

### Discussion

Patient's corneal fluorescein staining was negative, Schirmer tear test values were 12 mm/min in right eye and 14 mm/min in left eye, intraocular pressure was 22 mm/Hg in right eye and 20 mm/Hg in left eye. In the images obtained with the fundus camera, the anatomical structure of the tapetal and non-tapetal fundus, optic nerve and retinal arteries and vessels were assessed as normal (Figure 3) (Parlak et al 2021). MR T1- and T2-imaging showed a normal and bilaterally symmetric globe with no pathology in the eye

segments, retrobulbar muscle, retrobulbar fat or optic nerve (Figure 4 A-B and Figure 5 A-B).

Histopathological tissue sections showed epidermal hyperplasia due to hyperkeratosis, parakeratosis and acanthomatosis. In addition, karyomegaly, mitotic figures in keratinocytes and keratin pearls (globe corne) were detected in the neoplastic cells of the tissue (Figure 6 A-D) (Poinsard et al 2017). Neoplastic cells in tissue were multinucleated tumour cells with a single central prominent nucleolus, large oval, often vesicular nuclei, abundant pale to bright eosinophilic cytoplasm and clear cell borders. Anisocytosis, anisonucleosis and pleomorphism were also found in tumour cells.

Eye and periocular tumours account for only 2% of all tumours in dogs and cats (Poinsard et al 2017). Periocular





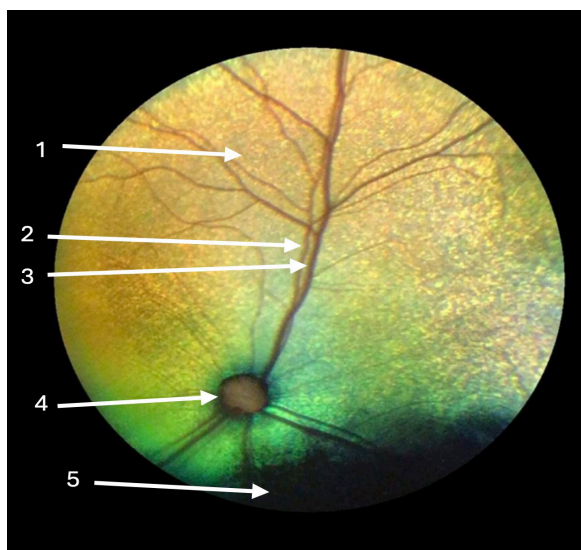


Figure 3. 1-Tapetal fundus, 2-Retinal artery, 3-Retinal vein, 4-Optic disc, 5-Non-tapetal fundus.

tumours are usually benign, but in cats, horses and cattle, periocular tumours tend to be malignant, and squamous cell carcinoma (SCC) is the most common type of malignant tumour found in the eye and its surrounding structures (Maggs 2012). It can originate from the bulbar conjunctiva or from the nictitating membrane, and it is also commonly found in the limbus and on the eyelids. SCC is known to be a locally highly invasive tumour with relatively low metastatic potential (Stiles 2013). The SCC lesions are usually raised, ulcerated and pink in colour (Maggs 2012). In this case, the tumour was in the third eyelid, with no involvement of the cornea or the upper or lower eyelids. In the present case, the lesion was found to be large enough to completely cover the globe, covered with a hard crust and causing a mucopurulent discharge in the area. SCC is most common in cats between 10 and 12 years of age, and white cats have a predisposition to the disease. Furthermore, direct sunlight exposure, melanin deficiency and chronic inflammatory

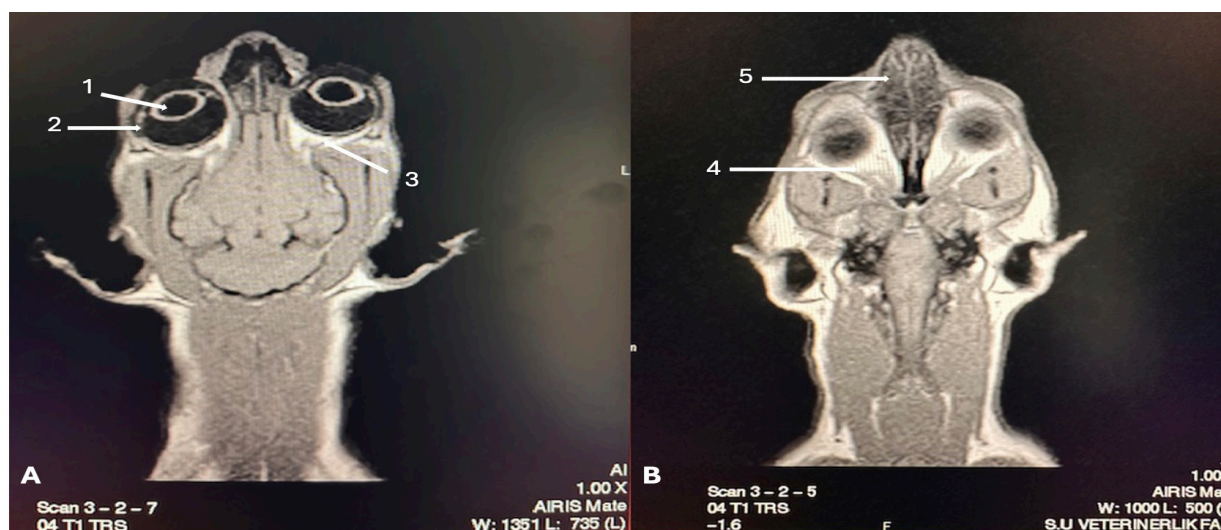


Figure 4. A and B T1 coronal images. 1-Lens, 2-Vitreous, 3 and 4-Optic nerve, venous plexus and extraocular muscle tissue, 5-ethmoid turbinates

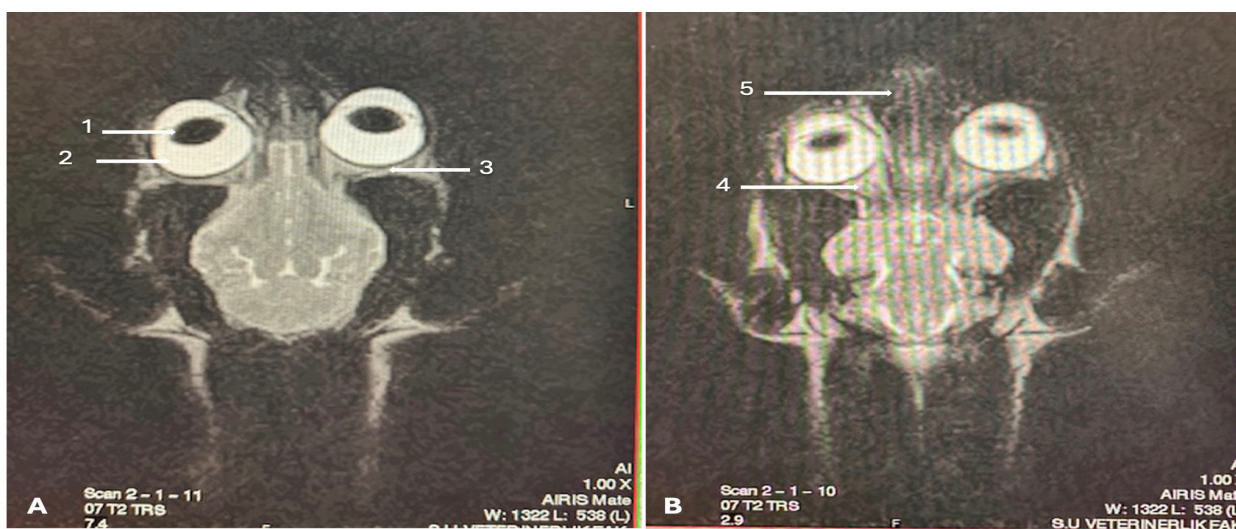


Figure 5. A and B T2 coronal images. 1-Lens, 2-Vitreous, 3 and 4-Optic nerve, venous plexus and extraocular muscle tissue, 5-ethmoid turbinates.





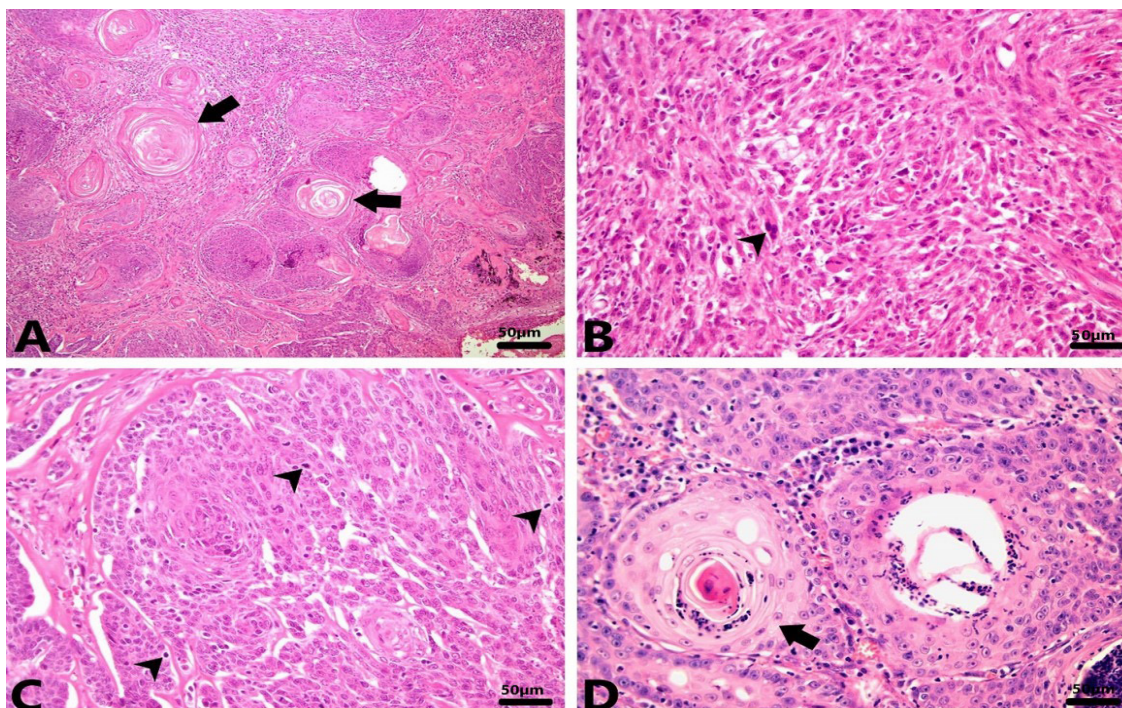


Figure 6. Histopathological findings of the tumour; A: Keratin pearl formation (globe corne) (arrows) x 10, HE, B: Multinucleated tumour cells (arrowhead) x40, HE, C: Mitotic figures in tumour cells (arrowhead) x40, HE, D: Keratin bead formation (arrow) x40, HE, turbinates.

diseases are reported to predispose to the SCC (Dubielzig et al 2010). Since the presented case was a stray cat, healthy anamnesis information could not be obtained. The fact that the mass originated from the membrana nictitans and that the cat was grey and white was consistent with the literature (Russak et al 2022).

Treatment options for ocular SCC include total resection of the mass, cryotherapy, interstitial radiotherapy, immunotherapy, intralesional chemotherapy and local electrochemotherapy. The choice of treatment may vary depending on the size and location of the tumour (and/or the rate of metastases) and economic factors, as well as the preference of the doctor. According to previous studies, surgical resection is the recommended treatment for SCC in the third eyelid, with a reported success rate of 90% (Scheck 2005, Payne et al 2009). In the case presented in this study, the SCC that originated from the nictitating membrane was treated with a total surgical resection. In the following period, no metastases or recurrences in the region were observed. Clinical examination of the lymph nodes, chest x-ray and MR imaging of the periocular and retrobulbar tissues showed no evidence of metastasis. Therefore, no systemic or regional chemotherapy was administered. However, a variety of reconstructive transposition flap applications, such as the frontal transposition flap and the lip commissure to eyelid transposition flap technique, may be recommended in cases of more complicated SCC (Whittaker et al 2010, Stiles 2013). Procedures other than total resection of the mass may be

recommended for tumours originating from the cornea, limbus, or upper and lower lid, rather than from the third lid, or when surgical margins are not well defined (Poinsard et al 2017).

### Conclusion

In conclusion, this case report evaluates the clinical, radiographic and MR findings of SCC in the third eyelid of a stray cat with incomplete history and the results of surgical resection. The fact that there were no clinical complications during the post-operative follow-up period in this case may provide encouragement to general practitioners who are involved in the treatment of feline eye disease, as well as contributing to the literature. In addition, in order to determine prognosis and treatment options, detailed clinical investigations may be useful in patients presenting to clinics with SCC.

### Conflict of Interest

The authors declares that there are no conflicts of interest related to the publication of this article.

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## Author Contributions

Motivation/Concept: NZ/FA; Design: NZ/FA; Control/Supervision: NZ/IS/SP; Data Collection and Processing: IS/SP/MK; Analysis and Interpretation: NZ/IS/SP/ATC/MK/RG; Literature Review: NZ/SP; Writing the Article: NZ; Critical Review: NZ/FA

## Ethical Approval

The study was approved by the Selçuk University Faculty of Veterinary Medicine Animal Experiments Local Ethics Committee (SÜVDAMEK) on 07.06.2024, with the decision numbered E.771056.

