



NOTE

Surgery

Functional endoscopic sinus surgery in a cat with nasal tumor

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ABSTRACT. An 11-year-old, 5.8-kg, male European cat was presented with a 4-month history of sneezing, nasal discharge, respiratory distress and bilateral conjunctivitis. Physical examination showed bilateral hemorrhagic mucopurulent nasal discharge and stertorous respiratory sounds. An irregular shaped mass involving the aboral portion of the right nasal cavity and sphenoidal sinus was identified by computed tomography. The mass was localized endoscopically in the medium meatus and an endoscopic-guided biopsy was performed. B-cell lymphoma was diagnosed by histopathological and immunochemistry exams. Functional endoscopic sinus surgery allowed to completely remove the tumor and restore a normal nasal flow. The cat showed no recurrence of the neoplasia for 15 months after the functional endoscopic sinus surgery.

KEY WORDS: feline, functional endoscopic sinus surgery, mini-invasive surgery, nasal neoplasia

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Functional endoscopic sinus surgery (FESS) is a minimally invasive technique used to treat refractory chronic rhinosinusitis, nasal polyps and tumors in humans [10]. FESS is useful to remove relevant foci of disease (polyps, tumors) and to restore the drainage, aeration and natural muco-ciliary clearance of endonasal sinuses [10]. FESS is performed incising the anterior margin of the uncinate process and removing the medial infundibular wall (infundibulotomy); proceeds then posteriorly, exposing the osteomeatal complex, the anterior and the middle ethmoid. The contents of the endonasal sinuses are examined and anatomical obstructions that prevent proper mucosal drainage/aeration can be removed [8]. Endoscopy and computed tomography (CT) are mandatory to identify the diseased area and to plan the therapeutic approach.

Most tumors of nasal cavities are locally invasive and malignant in dogs and cats. Nasal neoplasia is commonly treated by pharmacological therapy, chemotherapy, radiation therapy and surgical invasive approach. The use of one or combination of these treatments depends on the histologically nature of the tumor [3, 11]. To the authors' knowledge, this is the first case report on the use of FESS in a cat with nasal tumor.

An 11-year-old, 5.8-kg, neutered European male cat was referred to the Veterinary Teaching Hospital of Perugia University with a 4 months history of sneezing, nasal discharge, respiratory distress and bilateral conjunctivitis unresponsive to symptomatic therapy with cefadroxil monohydrate (20 mg/kg q24 hr, orally) and betamethasone sodium phosphate (0.1 mg/kg q24 hr, aerosol). Appetite loss was present in the last 5–6 days. Physical examination showed lethargy, bilateral hemorrhagic mucopurulent nasal discharge with air flow reduction and stertorous respiratory sounds. Complete blood count and biochemical analysis findings, performed by the referring veterinarian, were unremarkable. Feline leukemia virus (FeLV) and feline immunodeficiency virus (FIV) testing were negative. Latero-lateral, oblique and ventro-dorsal open mouth X-rays of the skull showed a regular hyperdense area corresponding to the middle part of right nasal cavity (Fig. 1A). No evidence of bone involvement was observed. The right frontal sinus appeared filled with hyperdense material (Fig. 1B). CT scan showed an irregular shaped mass that involved the aboral part of the right nasal cavity and the sphenoidal sinus. A mild peripheral contrast enhancement of the mass was observed. Osteolysis was present in small area of the ventral and right lateral sphenoidal wall close to the mass. A mild atrophy of the right turbinate was also observed. The right frontal sinus was filled with semi-fluid hyperdense material (Fig. 1C). An endoscopic-guided biopsy was planned in order to obtain a tissue sample for histopathologic examination. The samples obtained were analyzed, and the histopathological and immunochemistry exams revealed a B-cell lymphoma (Fig. 2). After the results of the histopathological exam, radiotherapy and chemotherapy were proposed at the owner but he refused this type of approach. The owner refused also radiation therapy or chemotherapy alone and he accepted only a palliative mini-invasive surgical approach to remove the tumor. Under general anesthesia, the cat was positioned in dorsal recumbency with the head flexed in order to place the palatine bone perpendicularly to the table. A 0°-degree 3 mm endoscope (Karl Storz, Tuttlingen, Germany) was used for the endoscopy. Nasal

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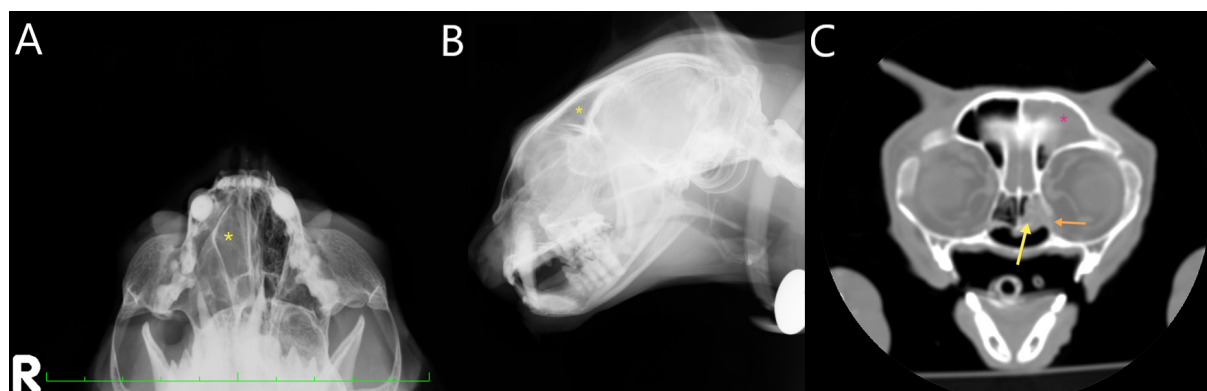


Fig. 1. Radiographs and computed tomography at the presentation. (A) Ventro-dorsal open mouth X ray of the skull shows a diffuse radio-opacity of the right nasal cavity (asterisk). (B) Latero-lateral X ray shows the involvement of the frontal sinus (asterisk) that appears totally radio-opaque. (C) Computed tomography scan at the level of the orbits shows a hyperdense irregular mass in the cranial part of the right sphenoidal sinus (yellow arrow) and a principle of bone lysis of the orbit (orange arrow). The right frontal sinus is filled by hyperdense substance (red asterisk).

mucosa was decongested with local application of a swab soaked with nafazolin nitrate (1 mg for about 5 min). The optic was introduced through the nostril and nasal vestibule, and middle and inferior turbinate, dividing the nasal cavity in three meatus, were identified [2]. Medially to the middle turbinate, angulating the optic of about 30°, the medium meatus was explored, and it appeared to be as the widest. A lardaceous with evident vascular texture mass was localized endoscopically in the medium meatus and it seems to origin from the middle turbinate, near the rostral part of the ethmoidal bone (Fig. 3A). Using miniaturized cutting tool RHINOFORCE® (Karl Storz, Tuttlingen, Germany) and a gripper, the mass was removed by the excision of the middle turbinate near the lamina papiracea of the anterior ethmoid (Fig. 3B). During the procedure, a muco-purulent-hemorrhagic discharge, coming probably from the frontal sinus, was observed (Fig. 3C). All procedures were made under endoscopic guidance. A nasal hemostatic tampon was applied after FESS and removed by the owner at home the day after the procedure. Histopathologic and immunochemistry exams were performed from the excised tissue and the diagnosis of B-cell lymphoma was confirmed. The cat was able to eat again in few days and therapy with clavulanic and amoxicillin (12.5 mg/kg BID, orally) and beclometasone dipropionato (0.1 mg/kg q24 hr, aerosol) was administered for 1 week. Follow-up at 6, 12 and 15 months after the FESS revealed no evidence of any clinical signs. CT scan and endoscopy were repeated 12 months after the FESS. On CT, no recurrence of the tumor was visualized, and the residual part of the turbinate appeared normal without fluid or mucosal thickening. A wide clear airway was observed (Fig. 4A). Similar findings were also observed during the endoscopy (Fig. 4B).

Obstructive lesions in the area of the choanae and the nasopharynx include infiltrative tumors, nasopharyngeal polyps, inflammatory polyps of the nasal turbinates [5], foreign bodies and nasopharyngeal strictures in companion animals [7, 13]. Most tumors of the nasal cavity are locally invasive and malignant in dogs and cats. Lymphosarcoma, adenocarcinoma and squamous cell carcinoma are the most common tumor affecting the nasal cavities in cats [9].

Radiographs have significant limitations in the assessment of the nasal cavity and paranasal sinuses, because of the superimposition of the anatomical structures. In cats, unilateral opacification of the nasal cavity associated with turbinate erosion and paranasal bone lysis has been reported to be indicative of neoplasia [12]. Endoscopy and CT of the nasal cavity can provide useful information for the diagnostic and therapeutic plan, even if the definitive diagnosis requires histopathological exams [3]. Only small biopsy specimens can be performed by endoscopy with the risk to obtained non-diagnostic samples [13]. CT can be useful to assess bone integrity and metastatic spread of the tumor to regional lymph nodes and/or lung [3, 12]. Although radiographic findings showed a hyperdense area in the middle part of right nasal cavity in the cat of this case report, only CT and endoscopy allowed to accurately evaluate the extent and nature of the mass.

Surgical removal or debulking of nasal tumors and adjunctive radiation therapy were the treatment of choice in humans.

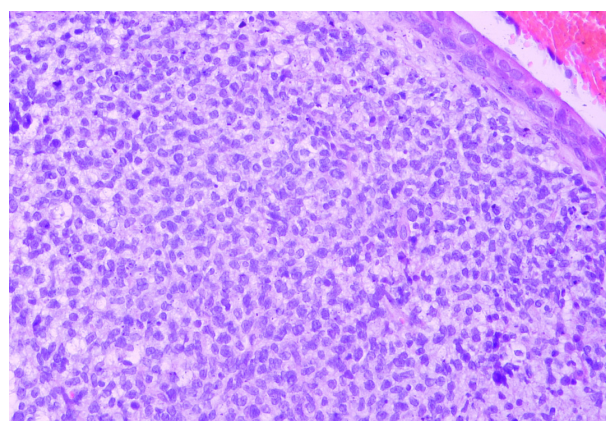


Fig. 2. Histopathological features from the endonasal mass. Solid sheets of large round cells diffusely obscure the lamina propria underlying respiratory epithelium (upper right). Hematoxylin and Eosin, 200 × magnification.

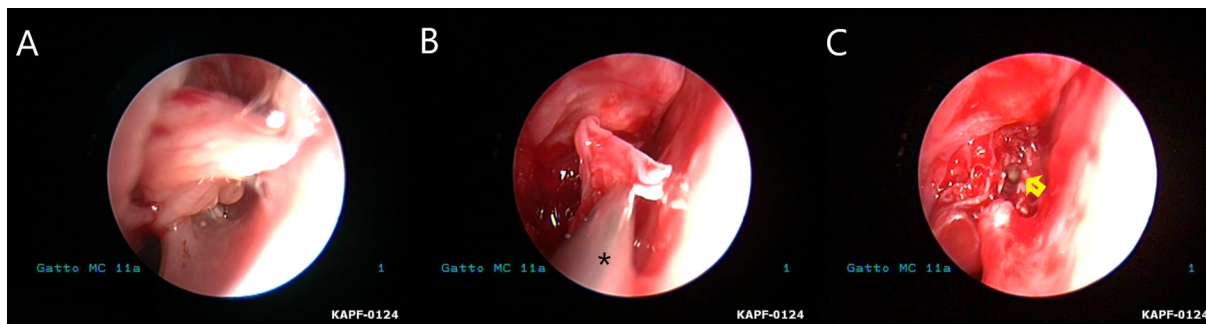


Fig. 3. Endoscopic examination during the procedure. (A) Endoscopic view of the nasal cavity. The presence of a lardaceous and heterogeneous mass originating by the middle turbinate, occupying the middle meatus is visualized. (B) The removal of a part of the mass using a grasper (asterisk) under endoscopic guidance can be observed. (C) The removal of the middle turbinate and the partial ethmoidectomy can be seen at the end of the procedure. The opening of the frontal sinus with mucous material flowing out can also be seen (yellow arrow).

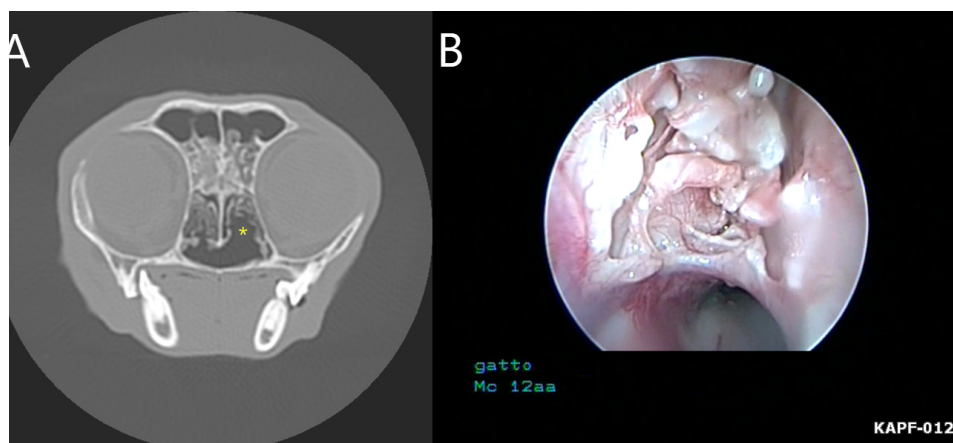


Fig. 4. Computed tomographic and endoscopic examinations 12 months after the procedure. (A) Computed tomography shows the partial nasal chonchectomy without presence of abnormal tissue (asterisk). The lamina papiracea of the anterior ethmoid bone and the rhinopharinx below can be viewed. No recurrence of neoplasia is noticed. (B) The lamina papiracea of the anterior ethmoid bone can be visualized during the endoscopy. No recurrence of neoplasia is observed.

Recently, radiation therapy followed up by surgical excision of the contents of the nasal cavity has been shown to increase the disease-free interval in certain nasal tumors [13]. Surgical approaches to expose the nasal cavity and sinuses are based on osteotomy or osteotomy of the nasal/oral bones, and required the use of rongeurs to grasp and tear modified turbinates. These techniques are invasive, so they implicated high post-operative risks as hemorrhage, anemia, long-term care, extensive subcutaneous emphysema and use of a feeding tube. Recently, a minimally invasive approach using a small rigid endoscope to visualize the nasal cavity has been reported, in association with a diode laser to remove the nasal turbinates and modified tissue [13]. In the present case report, a mini-invasive technique was performed to remove the neoplasia. Using a miniaturized cutting tool and a grip under endoscopic guidance, the neoplastic tissue was completely removed by performing a partial ethmoidectomy and the excision of the middle turbinate. This minimally invasive technique is also called “functional” because it allowed to restore a normal nasal flow and a correct sinus drainage, in according to human literature [8].

Radiation therapy could be considered the mainstay of treatment of feline nasal lymphoma. Most cats have a localized lymphoma at the time of presentation and this tumor is very sensitive to radiation with a median survival times of 456 days [6]. However, chemotherapy for at least six months is recommended due to possible target residual local tumor cells as well as undetected systemic disease. A combination of local radiation and systemic chemotherapy leads to median survival times from 174 to 955 days [1, 6, 11], although several reactions to these treatments have been reported [4]. In the current case, radiotherapy and/or chemotherapy were proposed after the diagnosis of nasal B-cell lymphoma, but the owner of the cat refused this approach.

Recurrence of nasal lymphoma can be expected. Some authors [11] have reported a local recurrence (23.5%) and a recurrence at distant sites (17.6%) in cats treated with a combination of local radiation and systemic chemotherapy. Recurrence of the tumor was observed within 134 to 945 days from the date of diagnosis [11]. Recurrence of clinical signs in cats with malignant tumors of the nasal cavity treated by surgical approach alone can occur within 6 to 12 months [13]. In our case report, the cat showed no

evidence of any clinical signs after 15 months from the FESS, and CT recheck (12 months after the procedure) showed no local recurrence of the tumor.

In summary, this report describes the first case of nasal neoplasia treated by FESS in a cat. FESS was useful to remove the mass without major perioperative/postoperative complications. In addition, FESS allowed to restore the nasal flow and drainage/aeration of the sinuses. Further studies are needed to assess the benefit of FESS in companion animals affected by nasal neoplasia.

CONFLICT OF INTEREST. The authors declare no conflicts of interest related to this report.

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