

## **Tomographic findings in a domestic rabbit (*Oryctolagus cuniculus*) with nasal adenocarcinoma**

## **Hallazgos tomográficos en un conejo doméstico (*Oryctolagus cuniculus*) con adenocarcinoma nasal**

DOI: 10.53499/sfjeasv2n1-001

Received in: January 3rd, 2022

Accepted in: February 20th, 2022

### **Jessica Duemes**

Post-graduated in Veterinary Medicine by Universidade Estácio de Sá - RJ  
Institution: Instituto de Biologia Marinha e Meio Ambiente/IBIMM  
Address: Av. Tancredo Neves, 204, apto 103. Ilhéus – BA – CEP: 45655-120  
E-mail: jessicaduemes@gmail.com

### **Rodrigo Rabello de F. C. e F. Passos**

Master in Veterinary Sciences by Universidade Federal de Uberlândia - UFU  
Institution: Instituto de Biologia Marinha e Meio Ambiente/IBIMM  
Address: Av. Tancredo Neves, 204, apto 103. Ilhéus – BA – CEP: 45655-120  
E-mail: rodrigorabello77@gmail.com

### **Myla Cristina Bastos Barcellos**

Master of Science by Universidade Federal Rural – UFRJ  
Institution: Instituto de Biologia Marinha e Meio Ambiente/IBIMM  
Address: Rua Pontes Correia, 126, apto 104. Andaraí – RJ- CEP: 20541-142  
E-mail: mylabarcellos@gmail.com

### **Edris Queiroz Lopes**

PhD in Morphological Sciences pela FMVZ- Universidade de São Paulo-USP  
Institution: Instituto de Biologia Marinha e Meio Ambiente /IBIMM  
Address: Fazenda Palmares – Santa Cruz das Palmeiras- SP- Brasil - CEP: 13650-000  
E-mail: edris@ibimm.org.br

### **ABSTRACT**

A 6-year-old female rabbit (*Oryctolagus cuniculus*) showed signs of upper respiratory disease unresponsive to antibiotic therapy. Knowing the limitations of plain radiography for evaluating the upper tract in rabbits, a computed tomography scan was requested, which revealed the presence of an amorphous, expansive neof ormation with partially defined limits, high uptake to the vascular contrast medium, with areas of necrosis. Material was collected where the histopathological diagnosis of the mass was conclusive for nasal adenocarcinoma. Computadorized tomography revealed important information for the identification of the mass and the prognosis of the animal. This reported case study of adenocarcinoma of the nasal mucosa in a female rabbit is the first to use computed tomography and intravenous contrast media to assess the nasal lesion. Diseases of the upper respiratory tract must be very well evaluated in cases that do not respond to the

therapy established by the veterinarian, and it must be taken into account that nasal adenocarcinoma is a differential diagnosis that must be respected.

**Keywords:** Diagnostic imaging, nasal, lagomorphs, tumor.

## RESUMEN

Una coneja (*Oryctolagus cuniculus*) de 6 años de edad presentaba signos de enfermedad respiratoria superior que no respondían a la terapia antibiótica. Conociendo las limitaciones de la radiografía simple para evaluar el tracto superior en conejos, se solicitó una tomografía computarizada que reveló la presencia de una neoformación amorfa y expansiva con límites parcialmente definidos, alta captación al medio de contraste vascular, con áreas de necrosis. Se recogió material donde el diagnóstico histopatológico de la masa fue concluyente para adenocarcinoma nasal. La tomografía computarizada reveló información importante para la identificación de la masa y el pronóstico del animal. Este estudio de un caso de adenocarcinoma de la mucosa nasal en un conejo hembra es el primero que utiliza la tomografía computarizada y los medios de contraste intravenosos para evaluar la lesión nasal. Las enfermedades del tracto respiratorio superior deben ser muy bien evaluadas en los casos que no responden a la terapia establecida por el veterinario, y hay que tener en cuenta que el adenocarcinoma nasal es un diagnóstico diferencial que hay que respetar.

**Palabras clave:** Diagnóstico por imagen, nasal, lagomorfos, tumor.

## 1 INTRODUCTION

In recent years, the breeding of rabbits as pets has increased considerably, consequently the quality of veterinary care of these pets has also improved, increasing the life expectancy of rabbits. Problems related to geriatric diseases and neoplasms are frequently reported in routine veterinary care, although spontaneously occurring neoplasms are not widely reported, retrospective studies suggest that the prevalence of 0,5% e até 2,7% in the entire rabbit population, (Bell E, Henrinci AT, 1916) and Tinkey PT. et al., (2012).

Often animals with neoplasia go unnoticed by the caregiver and may only show changes in the natural behavior of the species, such as decreased appetite, activity level, body score, and also respiratory rate.

Respiratory diseases of the upper tract are also common in rabbits and are usually caused by common bacterial pathogens such as *Pasteurella multocida*, *Bordetella bronchiseptica* e *Pseudomonas spp*, (DiGiacomo RF. et al., 1991); (Lennox AM, Kelleher S.,2009). In rabbits any nasal changes can have important clinical consequences.

Some chronic diseases of the upper respiratory tract can be difficult to treat, and often prolonged use of antibiotic therapy is necessary (Rougier S. et al., 2006). In cases where the chronic infection produces granulomas, caseous pus or necrosis of the turbinates, debridement of the affected region, in some cases rhinotomy or rhinostomy can be

extremely beneficial, mainly due to the improvement in breathing by removing material that ends up leading to obstruction of the sinuses (Lennox AM., 2012; Lennox AM., 2014).

In rabbits are also reported other conditions that affect the nasal cavity, such as foreign bodies, rhinitis, fungal infections, traumatic infections and neoplasms (Lennox AM., 2021; Lennox, Kelleher S., 2009; Sjober JG., 2005).

The anatomy of the nasal cavity is well described in rabbits (Barone R.,1973; Popesko P., et al 1992) The nasal cavity is separated into 2 nasal fossae paired by a longitudinal septum. The nasal cavities contain the nasal conchae or conchae. The nasal meatus includes the common meatus lateral to the septum and the ventral meatus that continues into the rhinopharynx. The paranasal sinuses include the paired maxillary and conchal (dorsal) recesses. Disease of the nasal cavity is especially severe in rabbits, as this species is an obligate nasal breather, and spontaneous neoplasms of the upper respiratory system are rare in these animals. The epiglottis is usually involved over the caudal margin of the soft palate, consequently, breathing through the mouth in some severe upper respiratory disease process is extremely difficult (Lennox AM., 2012).

This case report aims to determine the CT findings of a rabbit with intranasal adenocarcinoma.

## **2 MATERIALS AND METHODS**

A female rabbit approximately 5 years old, was admitted to Advance veterinary advanced imaging, where the person in charge of the animal reported that the animal presented with respiratory distress, listlessness, serous discharge from both nostrils and increased stridor on inspiration, , the animal was referred for the accomplishment of the CT (computed tomography) exam of the skull, with objective of evaluating nasal sinuses, since the simple radiography was not enough to arrive at a diagnosis, the CT was done in a Philips device Brilliance model, of 6 channels, with the patient in ventral decubitus. The animal was anesthetized and intubated for the exam, with acquisitions without and with the use of intravenous contrast (non-ionic iodinated - Omnipaque - at a dose of 2ml/kg). The procedures were authorized according to the Bioceua/IBIMM guidelines - protocol no. 038/2021

The following anesthetic protocol was used: midazolam 5mg/ml at a dose of 1mg/kg and ketamine 10% 10 mg / kg intramuscularly. Intravenous (IV) access was main-

tained through a 24 gauge catheter placed in the lateral saphenous vein. Anesthetic induction was done using a mask, followed by endotracheal intubation with a 2.0 tracheotube without cuff and tracheal desensitization with 0.1 ml of lidocaine 2%. Anesthetic maintenance was done with isoflurane. Anesthetic monitoring was performed with a multiparameter monitor (Dixtal) with electrocardiogram and heart rate evaluation, pulse oximetry, capnography, rectal temperature, and noninvasive blood pressure. Flumazenil 0.05mg/kg was administered at the end of the diagnostic procedure for reversal of the benzodiazepine.

### 3 RESULTS

A CT (computed tomography) scan confirmed the presence of an amorphous, expansive, partially defined, hypercaptive neof ormation with vascular contrast medium, with areas of hypodensity inside (necrosis), located in the left nasal cavity, completely obstructing the air passage. The lesion promotes nasal bone osteolysis and extends to the facial subcutaneous tissue (left infraorbital region), causing latero caudal displacement of the left eyeball, and measures approximately 2.6 cm high x 3.3 cm wide x 6.0 cm long (Figures 1 and 2).

Figure 1. CT scan of the skull of a rabbit. Cross-sectional (A-C), dorsal (D) lateral (E); soft tissue window with intravenous contrast. (A-E) Presence of an amorphous, expansive, infiltrative neof ormation, partially defined, hypercaptive to venous contrast medium, with areas of hypodensity inside (liquefaction), located in the left nasal cavity, completely obstructing the nasal sinus (green arrows) (D-E). The neof ormation extrapolates the nasal cavity and affects the subcutaneous tissue of the left dorsolateral portion of the sinus and the left infraorbital region, causing latero caudal displacement of the left eyeball (green arrows). Photo: (author).

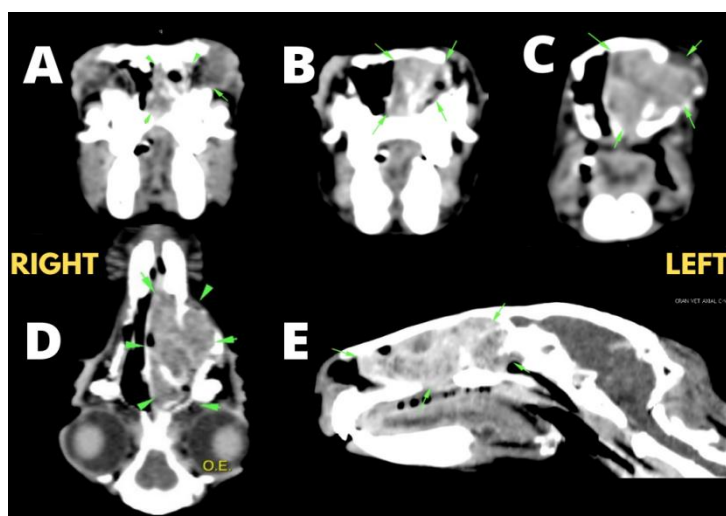
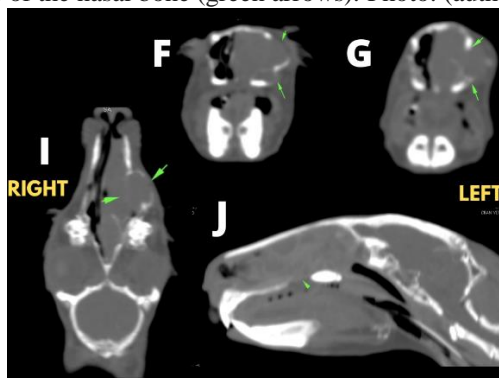
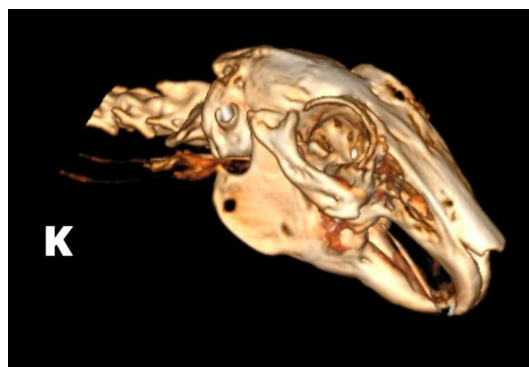


Figure 2. CT scan of skull of a rabbit. Cross section (G-H) lateral (I) Dorsal (J); bone windowing. (G-J) Evident remodeling and lysis of the nasal bone (green arrows). Photo: (author).



Three-dimensional reconstruction of the skull was performed to evaluate the nasal bone lesion and more skull structures showed no noteworthy changes. Figure 3.

Figure 3. Three-dimensional reconstruction of the skull of the rabbit with nasal bone lesion (green arrows) Photo: (author).



#### 4 DISCUSSION

Comparative studies of radiographic techniques and computed tomographic imaging have revealed a higher overall sensitivity and superior accuracy for diagnosis and prognosis using CT, especially in cases of periapical infections, West-myelitis, rhinitis, and also middle ear disorders, and it provides more information about treatment planning and surgery. This same study considered that plain radiography is a diagnostic imaging modality that complements CT scanning, and cannot be discarded in routine skull evaluation in rabbits, but rather used as a screening exam for CT request (Capello V. & Cauduro A., 2016).

CT is an excellent modality for the evaluation of the skull, in some cases resulting in the detection of changes before they become clinically or radiographically apparent. Capello V.et al, 2005; Verstraete FJ.,et al (2005), report the importance of CT in veterinary anatomy studies to aid in important elements missed on conventional x-ray

examinations. While radiographic interpretation by an experienced examiner usually reveals only about 85% of the pathologic changes present, CT provides more accurate information (Crossley DA., 2000). The sensitivity of CT makes it possible to diagnose large changes more quickly, accelerating treatment and improving the patient's prognosis.

In the present patient, the CT findings were suggestive of nasal neoplasia due to the characteristic of the lesions, but histopathology of the neoformation is necessary to differentiate between the different types. In this case, the upper respiratory tract change was a malignant neoplasm causing an expansive, space infiltrating mass in the left nasal fossa. After CT scanning, the mass was removed for histopathological evaluation, which was conclusive for adenocarcinoma. The location and extent of the neoplasm suggested a poor overall prognosis for the patient.

Only one case of nasal adenocarcinoma was previously reported, there was also one case that presented as chronic rhinitis unresponsive to antimicrobial therapy, neoplasia was suspected based on severe changes seen on CT and confirmed after rhinotomy, biopsy and histopathology. On CT head images were obtained without contrast, the main change was in the right nasal fossa, evidenced by a mass of soft tissue hyperattenuation throughout the right nasal fossa, significant loss of nasal conchae, loss of the pterygoid along the medial aspect of the orbit. The nasal septum was intact but deviated to the left due to the size of the mass (Lennox AM & Reavill D., 2014). This report demonstrates features in common with the clinical and CT findings with the case reported in this paper, being the second case reported in the literature of nasal adenocarcinoma in rabbits.

## **5 CONCLUSION**

This case report represents an unusual cause of clinical signs of severe upper respiratory disease in a pet rabbit. Neoplasia should be considered in the differential diagnosis in patients presenting with clinical signs of upper respiratory disease, especially for those not responding to medication therapy. CT is the exam of choice for evaluation of the sinuses in rabbits, it allows early stages of alteration, improves diagnosis and prognosis of alterations.

## **ACKNOWLEDGMENTS**

Special thanks to Advance Imagem Veterinária Diagnostic Center - RJ and Scan Diagnósticos – BSB

## REFERENCES

- Barone R(ed): Atlas Dánatomie Du Lapin. Issy-les-Moulineauz. France, Masson et Cie, 1973.
- Bell E, Henrinci AT. Renal tumors in the rabbit. *J Cancer Res* 1:157- 67, 1916.
- Capello V, Cauduro A: Comparison of Diagnostic Consistency and Diagnostic Accuracy Between Survey Radiography and Computed Tomography of the Skull in 30 Rabbits With Dental Disease. *Jornal of exotic Pet medicine*. Volume 25(2): 115-127, 2016.
- Capello V. Other Diagnostic. In: Capello V, Gracias M, Lennox A, eds. *Rabbit and rodent dentistry handbook*. Greenacres, Fla: Zoological Education Network, 109-112, 2005.
- Crossley DA. Rodent and rabbit radiology. In: Deforge D, Col-mery D III, eds. *An Atlas of veterinary dental radiology*. Ames, Iowa: Iowa State University Press, 247-259, 2005.
- DiGiacomo RF, Xu YM, Allen V, et al: Naturally acquired *Pasteurella multocida* infection in rabbits: clinicopathological aspects. *Can J Vet Res* 55(3): 234-238, 1991.
- Lennox AM, Kelleher S: Bacterial and parasitic diseases of rabbits. *Vet Clin North Am Exot Anim Pract* 12(3): 519-530, 2009.
- Lennox AM, Reavill D. Nasal mucosa adenocarcinoma in a pet rabbit. *J Exot Pet med*. 23(4): 397-342, 2014.
- Lennox AM: Respiratory disease and pasterurellosis, in Quesenberry KE, Carpenter JW (eds): *Ferrets, Rabbits and Rodent* (ed 3). St. Louis, MO, Elsevier/Saunders, pp 205-216, 2012
- Lennox AM: Rhinotomy rhinostomy for surgical treatment of chronic rhinitis in two rabbits. *J Exot Pet Med* 22(4): 383-392, 2014.
- Lennox AM: Rhinotomy in rabbits. *Proceeding of the Conference & Expo With the Association of Exotic Mammal Veterinarians, 11 th Annual Conference, Oakland, CA*, pp 101-103, 2012
- Popesko P, Rjtová V, Horák J (eds): *A Colour Atlas of Anatomy of Small Laboratory Animal* (vol I): Rabbit, Guinea Pig. London, UK, Wolfe Publishing Ltd, 1992.
- Rougier S, Galland D, Boucher S, et al: Epidemiology and susceptibility of pathogenic bacteria responsible ofr upper respiratory tract infections in pet rabbits. *Vet Microbiol*, 115 (1-3): 192-8, 2006.
- Sjober JG: Foreign body in the nose of a rabbit. *Exot DVM* 6:19, 2005
- Tinkey PT, Uthamanthil RK, Weisbroth SH. Rabbit neoplasias. In: Suckow MA, Stevens KA, Wilson RP, editors. *The laboratory rabbit, Guinea pig, hamnster, and other rodents*. San Diego (CA): Academic Press, p 447-501, 2012.
- Verstraete Fj, Croosley DA, Tell LA, et al. Diagnostic imagins of dental disease in rabbits, in *Proceeding. 14<sup>th</sup> Eur Cong Vet Dent*, p 57-60, 2005.