

Bilateral Anophthalmia in Feline

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ABSTRACT

Background: Anophthalmia is a rare, congenital condition, defined as the complete absence of the eye bulb due to inadequate growth of the vesicle or optic dome. The malformation can be primary (in the absence of complete), secondary (in the presence of only residual tissue), or degenerative (in which the eye begins to form, but for some reason, it begins to degenerate). This condition is rare in dogs, cats, cattle, and sheep. Microscopic evaluation of orbital tissue for identification is always recommended. The aim of this study was to report a case of bilateral anophthalmia in a domestic cat.

Case: A feline male, healthy, Maine Coon breed with 60 days of life was attended at the one veterinary private clinic. The cat, negative for FIV and FeLV, was born in a commercial cattery, belonging to his mother's third litter, healthy litter with the exception of this feline. He arrived with a complaint of not opening his eyelids, like the rest of the litter. In the clinical examination, it was found the normality of vital signs, absence of other visible anatomical abnormalities, only the ocular region was observed with closed eyelids. The initial suspicions were anophthalmia and microphthalmia. The patient was referred for an ocular ultrasound, which showed the complete absence of the right and left eye bulbs. The right and left orbital cavities had only a volume of soft, amorphous, and predominantly homogeneous tissue. After the ultrasound report, the patient underwent a surgical procedure to remove a fragment of tissue from the eye socket, which was sent for histopathological examination to confirm anophthalmia and discard the differential diagnosis of microphthalmia. Microscopy revealed immature, epithelial, and glandular tissue in the middle of discrete and moderate connective tissue, loosely arranged. In some fragments, cartilaginous tissue was also revealed. Thus, the histological findings are compatible with immature, pseudoformed tissues and without neoplastic characteristics. The diagnosis of secondary anophthalmia was reached with use of ultrasound and histological reports.

Discussion: Congenital malformations in domestic cats are less frequent than in dogs, some of which are rare, and little reported. Secondary anophthalmia in the reported patient was confirmed by histological and ultrasound examination. Bilateral secondary anophthalmia is characterized by the absence of the eyeball, but with the presence of adjacent tissue. The animal was submitted to an ocular ultrasound examination and the complete absence of ocular bulbs was found. The differential diagnosis of microphthalmia was ruled out because there was no evidence of the eyeball. Microphthalmia is a common congenital ophthalmic disorder in veterinary medicine. Representative fragments were submitted to histopathological examination, where immature, epithelial tissue was found. In some fragments sent for analysis, cartilaginous tissue was observed. The histological findings are compatible with immature, pseudoformed tissues, thus verifying bilateral congenital anophthalmia in the reported animal. The clinical examination in these cases serves to ensure that the animal does not have any other congenital changes, allowing a favorable prognosis in puppies. Based on the information presented, the animal in this study has bilateral secondary congenital anophthalmia, with a favorable prognosis for the patient to live with certain normality, with quality and well-being.

Keywords: anophthalmia, congenital, feline, microphthalmia.

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INTRODUCTION

Anophthalmia is a rare and congenital condition, defined as the complete absence of the eye bulb due to inadequate growth of the vesicle or optic dome at an early stage of pregnancy or due to subsequent failure of the expansion of the optical element. Thus, the animal is born without one or both eyes and without eye tissue in its orbit [2,12].

In different animal species, the failure in optical development is related to hereditary genetic factors, so the occurrence of other congenital changes, such as hydrocephalus, are described associated with the occurrence of anophthalmia [3]. The malformation can be primary (complete absence), secondary (presence of residual tissue only), or degenerative anophthalmia, in which the eye begins to form, however, for some reason, it begins to degenerate [12]. This condition is rare in dogs, cats, cattle, and sheep [7,8].

One of the main differential diagnoses is microphthalmia, which is a common congenital disease in veterinary ophthalmology. This condition is characterized by a failure in growth, by the invagination of the optic cup, or even by defective development of the primary vitreous. Clinically, the individual has an underdeveloped eye, being so small and imperceptible to the naked eye, that it can be confused with anophthalmia and, for this reason, the microscopic evaluation of the orbital tissue for identification must be performed [4]. The aim of this study was to report a case of bilateral anophthalmia in a domestic cat.

CASE

A feline male, healthy, Maine Coon breed with 60 days of life was attended at the one veterinary private clinic. The cat, negative for FIV and FeLV, was born in a commercial cattery, belonging to his mother's third litter, healthy litter with the exception of this feline. He arrived with a complaint of not opening his eyelids, like the rest of the litter.

On clinical examination, the vital signs were normal, with weight, size, and racial pattern homogeneous to the other animals in the litter, absence of other visible congenital abnormalities, observing only the ocular region with closed eyelids. Thus, the initial suspicions were anophthalmia and microphthalmia (Figure 1).

The patient underwent an ocular ultrasound procedure, which showed the complete absence of



Figure 1. Feline, male, healthy, Maine Coon breed, showing closed eyelids at 60 days.

the right and left eye bulbs, the right and left orbital cavities presented only a volume of soft, amorphous, and predominantly homogeneous tissue (Figure 2).

After the ultrasound report, the patient underwent the surgical procedure to remove fragments of tissue, with a total of 6 fragments of a firm, whitish consistency being removed, respectively: 1 x 0.5 cm; 0.5 x 0.3 cm; 0.8 x 0.8 cm; 1x 0.6 cm; 0.7 x 0.3 cm; 0.8 x 0.5 cm. of tissue from the eye socket, tissue fixed in 10% formalin and sent to histopathological examination to confirm anophthalmia and discard the differential diagnosis of microphthalmia (Figure 3).

Histological examination revealed immature, epithelial, and glandular tissue amidst mild and moderate connective tissue, loosely arranged. In some fragments, cartilaginous tissue was also revealed. Histological findings were compatible with immature, pseudoformed tissues and without neoplastic characteristics.

From the results presented in the ultrasound report and histological diagnosis, the diagnosis of secondary anophthalmia was reached.

DISCUSSION

Congenital malformations in domestic cats are less frequent than in dogs, some of which are rare, and little reported in Brazil. Some racial groups of cats show a greater predisposition to develop some types of congenital and hereditary defects, but little is discussed and reported [13]. In a survey of histopathological exams (33,075 exams), only 540 were ocular pathologies and felines showed a frequency of 11.1% in this study [10].

Bilateral secondary anophthalmia is characterized by the absence of the eyeball, but with the presence of adjacent tissue [3,12]. Through histology and ultrasound exams, secondary anophthalmia in the



Figure 2. Right orbit (RO) and left orbit (LO). There was a complete absence of eye bulbs. In the right and left orbital cavities, there is only a small volume of soft, amorphous, and predominantly homogeneous tissue.



Figure 3. Surgical procedure to remove a fragment of tissue from the eye socket for subsequent histopathological examination. Fragments of tissue fixed in formalin at 10% firm and whitish consistency, respectively: 1 x 0.5 cm; 0.5 x 0.3 cm; 0.8 x 0.8 cm; 1 x 0.6 cm; 0.7 x 0.3 cm; 0.8 x 0.5 cm.

reported patient was confirmed. Several reports had a clinical examination, ultrasound, and histopathology as a means of diagnosis [3,7,11,12].

The causes for this congenital and hereditary abnormality may be associated with the high degree of inbreeding in the cattery. The crossing between individuals of the same family tree (inbreeding) is reported in several species in the appearance of undesirable genes, in which they remain being passed on and this increases the possibility of inherited diseases in the litters by autosomal recessive genes [1,6,9]. In addition to the genetic factor, there is also the possibility of environmental interferences (viral, nutritional, and chemical agents), nutritional (lack of vitamins, proteins, lipids, and carbohydrates), infectious, physical (aggressions), toxic plants, or even interactions of both. Little is known about the pathogenesis that involves congenital malformations due to the difficult study of the etiology [1,9].

The differential diagnosis of microphthalmia was ruled out, as ultrasound and histopathological exams demonstrated that there was no evidence of the ocular bulb, and the alteration of microphthalmia is characterized by defective development of the primary

vitreous, that is, clinically the patient has an underdeveloped and small eye. Because it is so small, reaching the point of being imperceptible to the naked eye, it can be confused with anophthalmia [4,14]. This condition differs from anophthalmia, which is characterized by the absence of all ocular tissues [5,10].

No other congenital abnormalities were found other than anophthalmia. Clinical examination is of paramount importance in these cases of congenital changes to ensure that the animal does not have any other changes, thus favoring the prognosis of puppies with anophthalmia as favorable [3,12].

Based on the information presented, the animal in this study has bilateral secondary congenital anophthalmia, with a favorable prognosis for the patient to live with certain normality, with quality and well-being.

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