



## Bilateral Uncomplicated Anophthalmia in a Holstein Calf

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### Abstract

Anophthalmia is defined as a total absence of ocular tissues. Anophthalmia in calves have been reported occasionally and concurrent anomalies of skeletal and central nervous systems are present. The material of this case report was an eight day old male Holstein calf. In the clinical examination, it was found that the calf did not have eyeballs bilaterally and the eyelids were closed. While the upper eyelids had long cilia, the lower eyelids had some short cilia. The palpebral fissure was so small. The size of the right palpebral fissure was 2×0.5 cm and that of left was 1×0.2 cm. The calf showed no other abnormalities. The calf lived without any health problem until 15 month of age and was sent to slaughterhouse.

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### Bir Siyah Alaca Buzağında Komplikasyonsuz Bilateral Anoftalmi

#### Özet

Anoftalmi oküler dokuların tamamen yokluğu olarak tanımlanmaktadır. Buzağılarda görülen anoftalmi nadiren bildirilmiştir ve aynı zamanda iskelet ve merkezi sinir sistemi anomalileri ile birlikte bulunur. Bu olgu sunumunun materyali sekiz günlük, erkek bir Siyah Alaca buzağıdır. Klinik muayenede göz kürelerinin bilateral olarak bulunmadığı ve göz kapaklarının kapalı olduğu tespit edilmiştir. Üst göz kapaklarında uzun kirpikler varken alt göz kapaklarında kısa birkaç kirpik vardı. Palpebral yarık çok küçüktü. Sağ palpebral yarık 2×0,5 cm, sol palpebral yarık 1×0,2 cm idi. Buzağıda başka anomali görülmedi. Buzağı 15 aylığa kadar herhangi bir sağlık problemi olmaksızın yaşadı ve kesime gönderildi.

**Anahtar sözcükler:** Anoftalmi, göz, siyah alaca buzağı.

### Introduction

Anophthalmia in calves have been reported occasionally (Leipold & Huston 1968; Ofri, 2008) and is defined as a total absence of ocular tissues (Morimoto et al. 1995; Wilcock, 2007; Ofri, 2008). Macroscopic examination of orbital content usually reveals a normal lacrimal gland and vestigial extraocular muscles (Wilcock, 2007). Anophthalmic or severely microphthalmic animals have abnormally small orbits because of the normally enlarging globe regulating the development of the surrounding bony structures (Williams, 2010). Diagnosis of true anophthalmos is made after histologic examination of the orbital contents has not shown the presence of any ocular structure. Most instances of presumed clinical anophthalmos are cases of severe microphthalmos, because some histologic evidence of a rudimentary eye can usually be found (Ofri, 2008). Concurrent anomalies of skeletal and central nervous systems are common in anophthalmic animals (Leipold & Huston 1968; Wilcock, 2007; Korkmaz & Saritaş 2012).

### Case Report

The material of this case report was an eight day old male Holstein calf on a dairy farm. The calf had normal body size, appetite and vigor. In the clinical examination, it was found that the calf did not have eyeballs bilaterally and showed no other abnormalities clinically (Figure 1). The eyelids were undersized and closed and palpebral fissures were markedly narrowed. Right palpebral fissure was 2x0,5 cm and left one was 1x0,2 cm (Figure 2). Upper eyelid had long cilia and the lower eyelid had some short cilia. The orbit was small. Lacrimal gland tissue was detected in left eyelid. The clinical diagnosis was bilateral uncomplicated anophthalmia. Venous blood was harvested via jugular venipuncture and bovine viral diarrhea (BVD) virus antibody was investigated by ELISA. The calf was lived without any health problem until 15 month of age and was go to slaughterhouse.

### Discussion and Conclusion

To date, reported anophthalmia cases in calves are concurred skeletal and central nervous systems



**Figure 1.** The calf (eight days old in these pictures) in normal body size (A) and there were no other spinal column and tail defect (B)



**Figure 2.** Right (A) and left (B) palpebral fissures

abnormalities (Williams, 2010). Morimoto et al., (1995), reported that seen vertebral defects such as hemivertebra, wedge vertebra, and sagittal cleft vertebra in the coccygeal, sacral, and lumbar regions. Korkmaz and Saritaş (2012), stated that doming of the skull were observed in the skull radiography of the calf. The calf was also slightly small in body size and died one month later. German Holstein calves diagnosed bilateral anophthalmia showed deformation of jaws such

as brachygnathia superior (Bähr et al. 2003). Korean researchers reported that there was only wry tail in a Holstein calf with severe bilateral anophthalmia (Hur et al. 2008). Schulze et al. (2006) reported that there was ventricular septum defect and anuria/brachyuria in the calves with anophthalmia/microphthalmia. Despite that Supriya and Rao (2016), reported uncomplicated bilateral anophthalmia in a buffalo calf. In the presented case,

other body abnormalities were not observed in contrast to previous reports in calf.

Infectious agents cause formation of congenital globe abnormalities (Williams, 2010). BVD virus is the most common infection causing congenital brain and eye lesions in cattle (Liebler-Tenorio, 2005). Ocular lesions associated BVD virus include optic neuritis, reduced pigmentation of the retina, retinal atrophy, retinal dysplasia, cataract and microphthalmia. Central nervous system malformations associated BVD virus include microencephaly, cerebellar hypoplasia, hydranencephaly, hydrocephalus and dysmyelogenesis. Another frequently seen congenital defect are arthrogryposis (Liebler-Tenorio, 2005; Pearce & Moore, 2014). In this case, BVD antibody was not detected in sera of the calf. The calf also did not exhibit other clinically congenital nervous and skeletal system abnormalities.

Congenital globe abnormalities are often linked genetically (Pearce & Moore, 2014). A monogenic autosomal recessive inheritance could have caused bilateral anophthalmia (Bähr et al. 2003; Schulze et al. 2006). Anophthalmosis in sheep occurs as an autosomal recessive trait and has been linked to a region on chromosome 23 (Tetens et al. 2007), involving a missense mutation in the homeobox gene PITX3 (Becker et al. 2010). Shorthorn cattle have an inherited syndrome of microphthalmos (Leipold et al. 1971). A possible dominant trait has been reported, resulting in microphthalmos in half of the offspring of a Hereford bull (Kaswan et al. 1987). Abbasi et al (2009), revealed that a mutation in the WFDC1 gene causes multiple ocular defects in cattle. The cause of anophthalmia in presented case may be inheritance.

In conclusion, although bilateral complicated anophthalmia cases in calves were encountered, in our knowledge there was not reported bilateral uncomplicated anophthalmia and this is the first. The calf in this case lived until 15 month of age without any health problem and was sent to slaughterhouse.

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