
A RARE CASE OF CYCLOPIA AND ARHINIA IN A GOAT KID

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ABSTRACT

A rare form of cyclopia and arhinia was described in a kid born to a one and half year old primiparous Malabari eutocic doe. The most significant craniofacial malformation was the presence of a single median orbit that contained a single, large exophthalmic eyeball lacking vision. The congenital changes were confined to the head of the kid. The kid showed multiple birth defects like eyelid agenesis, arhinia and prognathism. The possible cause of this congenital defect could not be ascertained.

Keywords: Craniofacial anomaly, Eutocia, Goat, Malabari, Kerala

INTRODUCTION

Congenital malformations usually occursporadicallyinanimalsandmayrequire veterinarian's intervention and guidance (Agerholm *et al.*, 2015). Holoprosencephaly (HPE) is the failure of forebrain to separate normally into two discrete cerebral

hemispheres. Cyclopia or circle eye is a rare form of holoprosencephaly which is characterized by the failure of the embryonic prosencephalon to properly divide the orbits of the eye into two cavities (Sutaria *et al.*, 2012). Cyclops or cyclopia or cebocephalus also refers to gross malformations of the central nervous system, characterized by a single median orbital fossa in which global tissue is absent or rudimentary. Eyeball may be absent or ranging from a single, almost perfect eyeball through all degrees of doubling to two complete and closely adjacent globes of reduced size (Sivasudharsan *et al.*, 2010). Cyclopia has been previously reported in cattle (Nourani *et al.*, 2014), buffalo (Singh *et al.*, 2013), pigs (Autade *et al.*, 2012) and goats (Sivasudharsan *et al.*, 2010). Congenital arhinia is another rare anomaly consisting of an absence of external nasal structures and nasal passages. Inherited genetic abnormalities, viral infections, hypovitaminosis, and teratogens such as

radiation and plant toxins were attributed to be the problems in the embryonic forebrain dividing process, leading to development of such foetal monsters (Ozcan *et al.*, 2006). HPE and other related craniofacial deformities in lamb foetuses, 'monkey face lamb disease', were produced when pregnant ewes in early gestation grazed on *Veratrum californicum*, which contain a highly teratogenic alkaloid toxin called cyclopamine or 2deoxyjervine (Welch *et al.*, 2009; Sutaria *et al.*, 2012). The present case study puts on record a rare occurrence of cyclopia with arhinia in a kid delivered normally.

CASE HISTORY AND OBSERVATION

A one and half year old apparently healthy primiparous Malabari goat delivered a single normal sized, male live kid in normal anterior longitudinal presentation without any external assistance. The most striking feature of the kid was the presence of a single median orbit that contained a large exophthalmic eyeball lacking vision (Fig. 1). The craniofacial area was normal sized but severely deformed. Absence of eyelids, eyelashes, muzzle, external nasal structures and nasal passages or the skeletal structures of nose were also noted. The upper and lower lips were deformed with a narrow oral opening. The short upper jaw with deformed maxilla without os incisivum and large prominent protruded

lower jaw was also observed. Dental pad or upper incisors were also noted to be absent. A well-formed normal sized tongue was present which was mostly protruding from the oral cavity. The kid did not show any abnormalities of neck, vertebrae, thorax, abdomen or limbs. The kid was unable to find the udder due to blindness and failed to suckle the dam. When colostrum was hand fed, inability to swallow was also detected. Later the kid developed respiratory distress and could survive only for three days.

TREATMENT AND DISCUSSION

Sivasudharsan *et al.* (2010) stated that teratological features had long been identified as a cause of dystocia in animals and human, however in the present case the kid delivered without any assistance. The physical characteristics of the eye were suggestive of the condition known as



Fig. 1. Cyclopic kid's head showing a single median orbit-like opening with a single eyeball.

cyclopia. Other prominent morphological defects of the kid include eyelid agenesis, arhinia and prognathism. All the physical characteristics of the deformed fetus in the present study could be classified under teratological defects of embryonic development (Noakes *et al.* 2018). As the congenital disorders are incompatible with life, no medical or surgical treatment was done in the present case. Similar to the present study, cyclopia with other cephalic congenital abnormalities like arrhinocephaly, anostomia, aglossia and anencephaly has been reported by Mahabady and Barati (2012). An atypical cyclopic monster with arhinic condition in a buffalo was reported by Patel *et al.* (2019). A report of multiple birth defects like synophthalmia, arhinia, hypoplastic maxilla, curved mandibles and dental pad agenesis in a female Holstein calf was published by Nourani *et al.* (2014) similar to the present study. A rare teratological case of schistosomus reflexus and cyclopia syndromes causing dystocia were reported in a Tellicherry doe (Sivasudharsan *et al.*, 2010).

In the present case, there was no previous history of dam's disease conditions, treatment history and type of plants fed, as the dam was purchased from market during its late pregnancy. Hence, the

causative agent for this congenital defect could not be ascertained. This warrants a detailed investigation for procuring further information about the etiology of this malformation. This could be achieved by genetic analysis of the dam and sire of the affected fetus and detailed investigation of exposure of the dam to various teratological insults during the early gestation which could have caused cyclopia in the kid (Singh *et al.*, 2013; Patel *et al.*, 2019). The identification of the specific causative agent of the congenital disorder may ensure the preventive measures of such incidents in future.

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Ethics statement: This study does not involve animal experimentation and was conducted on cases reported in the hospitals, following standard operating protocols of animal handling and sample examination, upon informed consent of owners.

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