

# Incidence of Congenital Abnormalities in Newborn Crossbred Calves

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## ABSTRACT

The present study was conducted to know the incidence of common congenital anomalies in calves presented to the Department of Veterinary Surgery and Radiology, RIVER, Puducherry during the period of 2021-2023. A total of 50 calves from day-old to 20 days old were reported with various conditions involving the gastrointestinal system 23 (46.0%), musculoskeletal system 20 (40.0%), urogenital system 4 (8.0%), nervous system 1 (2.0%) and congenital tumors 2 (4.0%). Gastrointestinal disorders included atresia ani, atresia ani et coli, lateral hernia, evisceration of intestine and umbilical hernia. Musculoskeletal disorders included arthrogyposis, contracted tendon, polymelia and prognathism. Nervous system disorders included hydrocephalus. Urogenital system included persistent urachus and atresia ani with ectopic bladder. Congenital tumors reported were vulval growth and congenital melanoma. In this study gastrointestinal system abnormalities were the most frequent among these congenital malformations in crossbred calves.

**Key words:** Congenital, Crossbred calves, Malformations, Prevalence.

*Ind J Vet Sci and Biotech* (2023): 10.48165/ijvsbt.19.6.14

## INTRODUCTION

Congenital anomalies are characterized as structural and functional defects that occur at birth (Badaway, 2011; Janmeda *et al.*, 2014). Congenital abnormalities in calf populations have been potentially rising along with the growing number of crossbred cattle (Salim *et al.*, 2015). Leipold and Dennis in 1986 estimated the occurrence of birth defects in cattle to be between 0.2% and 3.0% worldwide. The World Health Organization (WHO, 2016) defines congenital diseases as structural or functional abnormalities, including metabolic disorders that exist at birth and have several etiological origins, such as infections, genetic and environmental factors, or both. Congenital defects that are passed down from parents in livestock production hinder genetic advancement, result in financial loss for farmers due to death or impairment to their reproductive and productive ability (Albarella *et al.*, 2017). Around 300 congenital anomalies were detected in cattle by Huston (1993). The congenital defects in animal may involve musculoskeletal system, respiratory system, alimentary tracts, central nervous system, abdominal wall, urogenital system, cardiovascular system, skin etc. This communication reports the incidence of congenital abnormalities in 50 newborn crossbred calves reported at Puducherry Veterinary College Clinic in last 2 years.

## MATERIALS AND METHODS

The present study was conducted to record the incidence of clinical cases of congenital abnormalities in crossbred calf presented to the Department of Veterinary Surgery

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**How to cite this article:** Radjendran, A., Roshini, S. T., Gurunathan, N., Vigneswari, M., Arrivukkarasi, N., Chimithi, C., & Arul Jothi, N. (2023). Incidence of Congenital Abnormalities in Newborn Crossbred Calves. *Ind J Vet Sci and Biotech*. 19(6), 69-74.

**Source of support:** Nil

**Conflict of interest:** None

**Submitted:** 28/8/2023 **Accepted:** 12/09/2023 **Published:** 10/11/2023

and Radiology, RIVER, Puducherry (India) during the year 2021-2023. Details about the breeding history of dams, nutrition status, previous calving history, nature of conception, *i.e.*, AI/Natural service, and disease conditions during previous pregnancy etc were collected using an interview schedule. The congenital abnormalities were identified and classified according to the affected part of the body. The incidences of congenital anomalies were determined according to the organ/system affected.

## RESULTS AND DISCUSSION

During the study, most of congenital anomalies were reported by the farmers between 0-7 days after birth. Sex wise distribution of congenital anomalies among the

50 calves were 72.0% (n=36) in female and 28.0% (n=14) in male animals. The female calves were more affected compared to the male calves, which is in accordance with Simon *et al.* (2010).

Out of 50 calves, 94% was born by artificial insemination and 6% by natural service, which is in accordance with Polat (2022). In contrary to present study, Belge *et al.* (2000), Bahr *et al.* (2003), Firat *et al.* (2005) and Aksoy *et al.* (2006) reported that the incidence of congenital anomalies was lower in the offspring of animals conceived by AI.

Occurrence of congenital anomalies in calves were 46% in first calving, 51% in second and third calving, 3% in fourth or more calving of the dam. According to Polat (2022) the congenital anomalies in calves were more frequent in the first calving of their dams.

The congenital anomalies of the calves presented was broadly classified into gastrointestinal system defects, musculoskeletal system defects, urogenital system defects, nervous system defects and congenital tumours (Table 1).

The system-wise incidence of congenital abnormalities was found to be highest in the gastrointestinal system (46.0%) followed by musculoskeletal system (40.0%). Similarly, Aksoy *et al.* (2006), Dogan and Sindak (2013) and Polat (2022) reported that the prevalence of congenital anomalies in the abdominal wall and gastrointestinal system was higher than other types of anomalies. Kaya *et al.* (2011), Ogurtan

*et al.* (1997) and Ozaydin *et al.* (2006) have reported higher incidence of congenital anomalies in the musculoskeletal system.

The congenital anomalies reported in the study with their occurrence and prominent signs are presented in Table 2. The various congenital anomalies recorded in the present study were flexural deformities (22.0%), atresia ani et coli (22.0%), arthrogryposis (14.0%), evisceration of intestine (12.0%), hernia (12.0%), ectopic bladder (6.0%), and prognathism, polymelia, hydrocephalus, persistent urachus, congenital melanoma, vulval growth (each 2.0%). The details of the individual congenital anomalies are discussed below.

### Flexural Deformities (Contracted Tendon)

A total of 11 (22.0%) cases of flexural deformities were recorded in the forelimbs at the fetlock joints; bilateral affections in 6 calves and unilateral in 5 calves (Fig. 1). This condition is caused by autosomal recessive gene and *in utero* positioning may also affect the degree of disability (Russell *et al.*, 1982). In the present study, contracted flexor tendon was the most prevalent abnormality of the musculoskeletal system of new born calves.

### Atresia Ani

Atresia ani was reported in 7 calves, atresia ani et coli in 2 and atresia coli in 1 calf (Fig. 2). The presented animals were not

**Table 1:** Classification of congenital anomalies in crossbred calves

Systems involved	Congenital anomaly	Distribution of anomalies	
		No.	Frequency %
Abdominal Wall and Gastrointestinal Organs	Atresia ani	9	18.0
	Atresia ani et coli	2	4.0
	Evisceration of intestine	6	12.0
	Lateral hernia	2	4.0
	Umbilical hernia	4	8.0
	<b>TOTAL</b>	<b>23</b>	<b>46.0</b>
Musculoskeletal System	Prognathism	1	2.0
	Polymelia	1	2.0
	Contracted tendon	11	22.0
	Arthrogryposis	7	14.0
	<b>TOTAL</b>	<b>20</b>	<b>40.0</b>
Nervous System	Hydrocephalus	1	2.0
	<b>TOTAL</b>	<b>1</b>	<b>2.0</b>
Urogenital System	Persistent urachus	1	2.0
	Atresia ani with ectopic bladder	3	6.0
	<b>TOTAL</b>	<b>4</b>	<b>8.0</b>
Congenital Tumors	Congenital melanoma	1	2.0
	Vulval growth	1	2.0
	<b>TOTAL</b>	<b>2</b>	<b>4.0</b>
	<b>OVERALL TOTAL</b>	<b>50</b>	<b>100.0</b>



**Table 2:** Different congenital affections observed in the calves

Affection	Prominent clinical sign	%
Flexural deformities (contracted tendon)	Joint flexion noticed on one or both limbs	22.0
Atresia ani	Developmental defect of anal opening	22.0
Atresia ani et coli	Developmental defect of anal opening and colon	22.0
Arthrogyroposis	Stiffened flexion of one or more joints in different limbs, animal hardly to stand up and walk	14.0
Evisceration of intestine	Protrusion of intestinal contents	12.0
Umbilical hernia	Presence of hernial sac	12.0
Lateral hernia	Presence of hernial sac	12.0
Atresia ani with ectopic bladder	Fluctuating swelling on the anal region with urine on aspiration	6.0
Congenital tumors	Tumour like growth	4.0
Prognathism	Extension of lower jaw	2.0
Polymelia	Presence of one extra-limb or more anywhere on the body surface	2.0
Hydrocephalus	Enlargement of the head, and dome-shaped forehead	2.0
Persistent urachus	Dribbling of urine from umbilicus	2.0



**Fig. 1:** Contracted tendon



**Fig. 2:** Atresia ani

**Fig. 3:** Arthrogyroposis

voiding feces in spite of normal feeding habits. Atresia ani is the failure of the anal membrane to break down to make an anal orifice; any intestinal segment from the duodenum to the anus may be atretic causing these defects. According to reports, it is one of the most common surgical affections in calves. Crossbred calves are more susceptible to atresia ani, which could be caused by poor bull sperm or other issues (Hossain *et al.*, 2014). The incidence of atresia ani, atresia ani et coli in the present study was 22.0% of the total congenital anomalies.

**Arthrogyroposis**

Arthrogyroposis is a congenital malformation characterized by multiple articular rigidity, dysplasia of muscles and curvature of the limbs (Jubb *et al.*, 1993). It was recorded in 7 calves in the present study (Fig. 3). In 6 cases ankylosis of elbow joint was noticed and in 1 case ankylosis of the fetlock joint was noticed. The joints were ankylosed and fixed in a flexed position and difficult to be extended. It was differentiated from contacted tendon by radiographic examination. The incidence of arthrogyroposis in the

present study was 14.0% of the total congenital anomalies (Table 2).

### Congenital Eventration of Intestine

Congenital eventration is described as the protrusion of visceral organs with their serous sac as a result of improper abdominal wall closure during foetal development (Niwas *et al.*, 2020). It was reported in 6 (12. %) calves (Fig. 4). The affected calves were presented immediately after birth with eventration of intestinal loops. The eviscerated mass was intact with the parietal peritoneum in 3 calves and in the other 3 calves it was dry and necrosed.

### Hernia

A total number of 6 (12.0%) cases were presented with congenital hernia, umbilical hernia in 4 (Fig. 5a) and ventral hernia (Fig. 5b) in 2 calves. Umbilical hernia is displacement of part of organs or complete organs through a defect in the abdominal wall at the region of umbilicus with skin intact (Doijode, 2019). A ventral hernia occurs when the intestines project through the abdominal wall as a result of external forces or trauma weakening of the abdominal musculature. It is commonly seen along the costal arch (Singh *et al.*, 2014). A hernia through any area of the abdominal wall other than the umbilicus or inguinal canal is referred to as a “ventral hernia”. An autosomal recessive gene causes this condition. In comparison to indigenous calves, crossbred calves experience a higher incidence of umbilical hernia (Salim *et al.*, 2015).

### Ectopic Bladder with Atresia Ani

Ectopic bladder with atresia ani was reported in 3 (6.0%) female calves from the same region (Fig. 6). The mode of conception of these calves was by natural service by same bull. On presentation the calves had atresia ani and fluctuating swelling below the anal region and on aspiration urine was noticed. Advice was given to prevent the usage of the bull for breeding purpose.

### Tumours

Tumour on the vulva was reported in one calf and melanoma on the brisket region (Fig. 7) was reported in one male calf. Limited numbers of congenital tumours have been recognized in calves. The incidence of congenital tumours in the present study was 4.0% of the total congenital anomalies.

### Persistent Urachus

Persistent or patent urachus is a congenital disorder that develops when the embryonic attachment between the urinary bladder and the allantoic sac does not seal off after birth, and results in functional urine drainage from the umbilicus. It was reported in one female calf (2.0%, Fig. 8). Constant dribbling of urine from the umbilicus was noticed and the area around it was wet. Area around the umbilicus had inflammation and mild oedema.

### Prognathism

Prognathism was reported in one calf in the study (Fig. 9), which had a short face, bulging forehead. Prognathism is a



Fig. 4: Eventration of intestines



Fig. 5b: Ventral hernia



Fig. 5a: Umbilical hernia

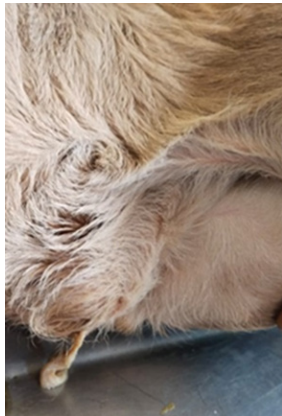




**Fig. 6:** Ectopic bladder



**Fig. 7:** Congenital melanoma



**Fig. 8:** Persistent urachus



**Fig. 9:** Prognathism



**Fig. 10:** Polymelia



**Fig. 11:** Hydrocephalus

congenital deformity, which is characterised by shortened nasal bones and occurs when the lower jaw overlaps the upper jaw (Niwas *et al.*, 2020). The primary cause of this disorder is due to an autosomal recessive gene causing chondrodysplasia (Roberts, 2004). The incidence of prognathism in the present study was 2.0% of the total congenital anomalies.

**Polymelia**

Polymelia is a congenital disorder of limbs with presence of one or more supernumerary limbs. Polymelia appears to be

a sex-linked recessive trait (Leipold *et al.*, 1983). One case of polymelia was recorded in this study (Fig 10). A female calf was presented with 2 extra legs from the thoracic cavity (thoracomelia) with eventration of intestinal contents. In the presented case the extra limbs did not have neurological reflexes and flexibility. The incidence of polymelia in the present study was 2.0% of the total congenital anomalies.

**Hydrocephalus**

In the study period a single case of hydrocephalus was reported in a one-day old female calf (Fig. 11). According to

reports, there are 1.5 occurrences of bovine hydrocephalus for every 1000 calvings (Priester *et al.*, 1970). Enlarged dome shaped cranium was observed in the presented calf indicating hydrocephalus and the other clinical signs observed included weak suckle reflex, droopy head and ears, seizures, recumbency, conscious proprioceptive deficits. The incidence of hydrocephalus in the present study was 2.0% of all the congenital anomalies.

## CONCLUSION

The present study recorded the incidence of congenital abnormalities in 50 calves affecting various systems with 94.0 % of the calves born through artificial insemination. Among these congenital anomalies, conditions like ectopic bladder with atresia ani in three calves were reported for the first time and congenital tumors were rarely reported. The occurrence of these congenital malformations can be due to increase in spreading of negative alleles responsible for genetic diseases. This can be best controlled by identifying and excluding the carriers from mating.

## ACKNOWLEDGEMENT

We thank the Dean of RIVER, Puducherry for providing all the necessary facilities to complete the work.

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