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Surgico-therapeutic management of congenital disorder of gastro intestinal system in ruminants

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Abstract

The present study was conducted on 33 clinical cases of congenital disorder of gastro-intestinal system in ruminant species. The prevalence of congenital disorder of gastro-intestinal system in ruminants was highest in sheep 6.25% (1/16), followed by cattle 1.95% (26/1332), buffalo 1.66% (3/180), and least in goats 0.38% (3/800). The sex wise occurrence of congenital surgical affections was recorded higher in male ruminants (22/33, 66.67%) than in female (11/33, 33.33%). Out of 33 congenital disorder of gastro-intestinal system, highest occurrence was recorded in cattle, (26/33, 78.79%), equal incidence in goats (3/33, 9.09%) and buffalo (3/33, 9.09%) and least in sheep (01/33, 3.03%). The age wise occurrence of congenital disorder of gastro-intestinal system were recorded highest (29/33, 87.88%) in ruminants of 0-1 months age group followed by (3/33, 9.09%) 1-3 months age group and least (1/33, 3.03%) was recorded in > 3 months age group. In the present study 6 different type of congenital surgical disorder of gastrointestinal tract were recorded in ruminants of which highest occurrence of atresia ani (24/33, 72.73%), that was followed by atresia ani with recto vaginal fistula (4/33, 12.12%), atresia coli (2/33, 6.06%) and equal incidence of some of the rare cases encountered were unusual growth at tongue (1/33, 3.03%), atresia vulvi and cleft palate. The surgico-therapeutic treatment of the all cases of gastrointestinal system were attempted and the outcome of the treatment was satisfactory except in one case of atresia vulvi.

Keywords: ESF, cattle, fracture

Introduction

Congenital defects or diseases are abnormalities of structure or functions that are present at birth, may be caused by genetic or environmental factors, or a combination of both; in many cases, the causes are unknown. The most common environmental teratogens include toxic plants consumed by the dam and maternal-foetal viral infections during gestation (Bademkiran *et al.*, 2009) [3]. Developmental defects may be lethal, semi-lethal, or compatible with life, causing aesthetic defects or having no effect on the animal (Blowey and Weaver, 2011) [5]. Susceptibility to agents that affect development varies with foetal development, but in general decreases with gestational age. The majority of genetic defects in ruminants are inherited as recessives. The frequency of individual congenital defect will vary with such factors like breed, geographical area, year, sex, parental age, level of nutrition and environmental factors. Congenital abnormalities have a major impact on the economic viability of ruminants. It is therefore, important that they are reared economically and in a sound manner to ensure early maturity (Tanwar and Gahlot, 2012) [31].

Congenital anomalies of digestive system frequently occur due to genetic or environmental forces or a combination of both during the embryogenesis and may result from an inadequate blood supply to a segment of developing intestine leading to atrophy of the affected portion (McGeady *et al.*, 2006) [16].

Congenital abnormalities of gastro intestinal tract in animals are not uncommon with an incidence of about 4.3% (Leipold *et al.*, 1972) [13]. Atresia ani is one such developmental anomaly due to autosomal recessive gene (Bademkiran *et al.*, 2009) [3] characterized by absence of anus and may be associated with recto-vaginal fistula, rectocystic fistula, vagino urethral agenesis, taillessness, hypospadias (Singh *et al.*, 1993) [27].

Recto-vaginal fistula or anus vaginalis is an inherited lethal abnormality in which, there is an abnormal passage between rectum and vagina and faeces are voided through the latter due to imperforate anus (Oehme and Prier, 1974) [21]. Atresia ani associated with recto-vaginal fistula was reported in many species, viz. calves (Shakoor *et al.*, 2012, Mahesh *et al.*, 2014) [25, 15],

lambs (Kamalakar *et al.*, 2014) [11] etc. This condition needs early correction to avoid infections of urogenital system like pneumovagina, cystitis, vaginitis, cervicitis, endometritis, etc. (Farhoodi *et al.*, 1987) [7].

The objective of the study was to record the incidence and the outcome of congenital disorder of gastro-intestinal tract and their management in different animals.

Materials and Methods

The present study entitled surgico-therapeutic management of congenital disorder of gastro-intestinal tract in ruminants was carried out on 33 cases in ruminant species which included cattle, buffalo, sheep and goat. These cases were presented to the Teaching Veterinary Clinical Complex (TVCC) and Department of Veterinary Surgery and Radiology, College of Veterinary and Animal Science, RAJUVAS, Bikaner during the period from April 2016 to December 2016.

Diverse congenital disorder of gastro-intestinal tract in ruminants were identified and recorded based on the history and clinical examination. The data was collected based on species, sex, age and need for surgical correction.

The presentation of six different type of congenital disorder of gastro-intestinal system in ruminants was clinical presented as:

Atresia ani was clinically presented with the absence of anal opening and bulging of the anal area. The animals sometime showed mild abdominal distension and attempts of defecation. Atresia ani with recto-vaginal fistula is characterized by the communication between the dorsal wall of the vagina and the ventral portion of the rectum, so that the vulva functions as a common opening to the urogenital and gastrointestinal tracts. Manual pressure on the abdomen with simultaneous closing of the fistulous opening with the fingers resulted in bulging at anal area.

Unusual growth at tongue was clinically presented as the pedunculated mass attached to the dorsal surface of tongue having skin and hair present at its terminal end.

Atresia vulvi was diagnosed as a congenital atresia/hypoplasia of vulvar orifice (Fig.1).

Cleft palate was diagnosed as congenital disorder resulting from a failure of closure in facial processes such as the frontonasal, maxillary, and mandibular processes. The defects appear in the lateral or median site of the rostral face as cleft lips, jaws and palates (Fig.2).

Atresia-coli was diagnosed as congenital anomaly characterized by absence of faeces since birth, lack of development or closure of colon, abdominal distension and progressive depression should be suspected for atresia-coli.

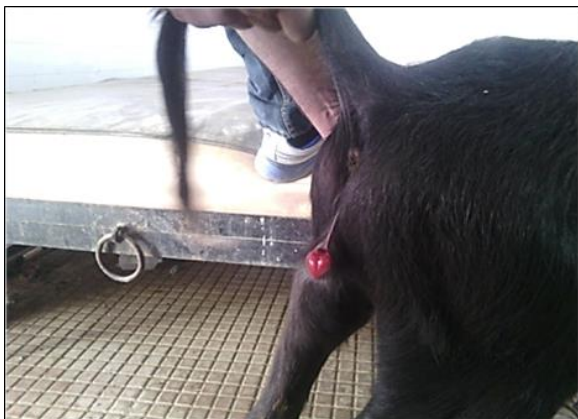


Fig 1: Atresia vulvi in a buffalo calf



Fig 2: Congenital cleft palate in a cattle calf

Surgico-therapeutic treatment was performed wherever feasible, for correction of the defect in conditions causing poor performance and structural unsoundness of neonate. The surgical procedures for various congenital affections were performed in a well-equipped operation theatre maintaining aseptic conditions and under local anaesthesia with 2% lignocaine HCl and light plane of sedation with xylazine HCl (0.05-0.1 mg/kg, IM). Prior to surgery the site was thoroughly prepared by clipping and shaving of hairs, washed and thoroughly scrubbed with soap and water for 2-3 times and painted with povidone Iodine.

Postoperatively, the animals were administered broad-spectrum antibiotics and nonsteroidal anti-inflammatory agents for 3-5 days and regular cleaning and dressing of the surgical wound. Intravenous fluid therapy was also administered in some cases. Sutures were removed on 10th post-operative day.

The outcome of surgico-therapeutic treatment of these congenital affections was evaluated and the mortality in the animals affected with congenital affections was recorded.

Result and Discussion

The congenital disorders of gastrointestinal system presented in ruminants were recorded as sporadic cases reported at TVCC RAJUVAS, Bikaner. Therefore, most congenital affections were recorded with variable frequencies, in different species. In present study, the prevalence of congenital disorder of gastro-intestinal system in ruminants was highest in sheep 6.25% (1/16), followed by cattle 1.95% (26/1332), buffalo 1.66% (3/180) and least in goats 0.38% (3/800) (Table 1). Sonfada *et al.*, (2010) [28] conducted a survey on the incidence of 11 congenital malformations of the ruminants, out of which 5 (45.5%) were of ovine species, 4 (36.4%) cases from caprine and 2 cases (18.2%) were from bovine species. In a similar study conducted by Hasan *et al.*, (2015), only 46 (0.64%) animals out of 7145 animals (cattle and goat) were congenitally defective. Further, it was observed that cattle (0.80%) were more prone to congenital defects than goat (0.21%) is in agreement with the findings of present study.

Out of 33 congenital disorder of gastro-intestinal system, highest occurrence was recorded in cattle, (26/33, 78.79%), equal incidence in goats (3/33, 9.09%) and buffalo (3/33, 9.09%) and least in sheep (01/33, 3.03%) (Table 2). Patil *et al.*, (2016) [22] observed the highest incidence of congenital affections in cattle followed by buffalo, goats and sheep. Most of the congenital abnormalities in ruminants can be characterized as lethal, sublethal or nonlethal (Nigam *et al.*, 1984) [18] but no such categorization was done in the present

study. In the present study, the sex wise occurrence of congenital surgical affections was recorded higher in male ruminants (22/33, 66.67%) than in female (11/33, 33.33%), which is in accordance with the findings of Patil *et al.*, (2016) [22] in ruminant species. Nath *et al.*, (2016) [17] also observed high incidence of umbilical hernia in male calves than female. The age wise occurrence of congenital disorder of gastro-intestinal system were recorded highest (29/33, 87.88%) in ruminants of 0-1 months age group followed by (3/33, 9.09%) 1-3 months age group and least (1/33, 3.03%) was recorded in > 3 months age group (Table 3), because of the fact that most of these affections caused visible structural or functional defect in the animal. However, Islam *et al.*, (2016) and Nath (2016) [17] found the highest incidence rate of surgical

affections and umbilical hernia in calves of 1-3 month age group of both sexes. Tanwar and Gahlot (2012) [31] also observed the occurrence of congenital affections in cattle and buffalo less than 1 year age.

Table 1: Incidence of congenital disorder of gastro-intestinal system in ruminant species (April-December 2016)

S. No.	Species	Total No. of cases	No. of congenital affections	Incidence
1.	Cattle	1332	26	1.95%
2.	Buffalo	180	3	1.66%
3.	Sheep	16	1	6.25%
4.	Goat	800	3	0.38%

Table 2: Species and sex wise occurrence of congenital disorder of gastro-intestinal system in ruminant species (April-December 2016)

S. No.	Species	Sex		Total	Occurrence
		Male	Female		
1	Cattle	16	10	26	78.79%
2	Buffalo	02	01	03	9.09%
3	Sheep	01	-	01	3.03%
4	Goat	03	-	03	9.09%
Total		22	11	33	100%

Table 3: Age wise occurrence of congenital disorder of gastro-intestinal in ruminant species (April-December 2016)

S. No.	Species	0-1month	1-3 months	> 3months	Total
1.	Cattle	22	3	1	26
2.	Buffalo	3	-	-	3
3.	Sheep	1	-	-	1
4.	Goat	3	-	-	3
Total		29	3	1	33
Incidence		87.88%	9.09%	3.38%	100%

In the present study 6 different type of congenital surgical disorder of gastrointestinal tract were recorded in ruminants of which highest occurrence of atresia ani (24/33, 72.73%), that was followed by atresia ani with recto vaginal fistula (4/33, 12.12%), atresia coli (2/33, 6.06%) and equal incidence

of some of the rare cases encountered was unusual growth at tongue (1/33, 3.03%), atresia vulvi and cleft palate (Table 4). Some authors (Belge *et al.*, 2000; Noh *et al.*, 2003; Johnson *et al.*, 1983; Leipold 1986) [4, 20, 10, 14] reported that the most anomalies of digestion system were observed as atresia-ani and et-recti in calves. The congenital abnormalities of anus and rectum are common in farm animals (Nixon, 1972) [19]. Congenital abnormalities of gastro intestinal tract in animals are not uncommon with an incidence of about 4.3% (Leipold *et al.*, 1972) [13]. Atresia ani is one such developmental anomaly due to autosomal recessive gene (Bademkiran *et al.*, 2009) [3]. Purohit *et al.*, (2015) [24] were also able to diagnose 19 different types of congenital affections in ruminants based on clinical signs.

Table 4: Various congenital disorder of gastro-intestinal system diagnosed in ruminant species (April-December 2016)

Congenital defect	Cattle		Buffalo		Sheep		Goat		Total
	Male	Female	Male	Female	Male	Female	Male	Female	
Atresia-ani	14	4	2	-	1	-	3	-	24
Atresia ani with rectovaginal fistula	-	4	-	-	-	-	-	-	4
Atresia coli	2	-	-	-	-	-	-	-	2
Unusal growth at tounge	-	1	-	-	-	-	-	-	1
Atresia vulvi	-	-	-	1	-	-	-	-	1
Cleft palate	-	1	-	-	-	-	-	-	1
Total	16	10	2	1	1	-	3	-	33

Atresia ani is the most frequently occurred congenital affection either alone in most instances or with other congenital defects (Nigam *et al.*, 1984) [18]. The incidence of atresia ani as the most frequent congenital affection in ruminants has been documented by Simon *et al.*, (2010) [26]. However, Patil *et al.*, (2016) [22] reported the highest incidence of umbilical hernia in cattle and buffaloes. In present study, atresia ani condition was recorded in 24 ruminants including cattle, buffalo, sheep and goat. The condition is hereditary and is regulated by a single autosomal recessive gene (Nigam *et al.*, 1984) [18]. In present study, the condition was diagnosed based on physical examination and the clinical signs, as also suggested by Shakoor *et al.*, (2012)

[25] and Purohit *et al.*, (2015) [24].

In present study, surgico-therapeutic treatment was attempted in various congenital surgical disorders of gastro-intestinal system. Fortunately, most of the congenital surgical disorders of gastro-intestinal system in ruminants were corrected by surgico-therapeutic treatment with satisfactory results. However, some affection either did not require surgical interferences or sometimes the treatment was not attempted due to non-co-operation/negligence of animal owners. Gangwar *et al.*, (2014) [8] successfully corrected 94/112 cases of congenital malformations surgically while the others were not subjected to surgical treatment. Purohit *et al.*, (2015) [24] also suggested and performed corrective surgical

interventions for congenital affections in ruminants. Patil *et al.*, (2016) [22] also categorized congenital affections in 3 categories based on the need of surgical intervention for these affections. Tanwar and Gahlot (2012) [31] treated congenital affections on general principle of management.

In present study, surgical treatment of atresia ani was attempted in all the cases reported in ruminants. Surgery was performed under local infiltration anaesthesia using lignocaine HCl 2% by excision of a circular piece of skin at the bulging of the perineal region. The blind end of the rectum was exteriorized and the mucosa is snipped off which immediately relieved the meconium from the rectum. The margins of rectal mucosa were anchored to the skin opening at 3, 6, 9 and 12 O'clock position followed by continuous sutures using silk No 0 (Fig. 3-4). Similar techniques were previously described (Spadari and Diqattro, 1997; Alam and Rahman, 2008; Purohit *et al.*, 2015) [29, 1, 24]. All cases showed uneventful recovery except for the recurrence observed in one case only. Thus, the economic losses caused by ano-rectal anomalies could be minimized (Alsan *et al.*, 2009) and good survival rate was observed in response to surgery (Mahesh *et al.*, 2014) [15].

Atresia ani with rectovaginal fistula was surgically treated in four cattle calves (Fig. 5). The animal was secured in lateral recumbency and after aseptic preparation of site the area below the tail, local infiltration anaesthesia was achieved by 2% lignocaine hydrochloride. The index finger was introduced through the rent in the vaginal roof to locate the blind rectal end. Anal opening was created by making circular skin incision of 1-1.5 cm diameter, below the base of tail. The rectal end was exteriorized and a piece of rectal mucosa was removed and sutured with the skin margins. The rectovaginal opening was closed using chromic catgut No. 0 taking care not to include rectal mucosa. The atresia ani with rectovaginal fistula was also successfully corrected as previously suggested (Bademkiran *et al.*, 2009; Kamalakar *et al.*, 2015 Purohit *et al.*, 2006 and Shakoore *et al.*, 2012) [3, 12, 23, 25].

In a case of unusual growth at the tongue in a cattle calf, the growth was excised from its base of attachment after ligation with Vicryl No. 1 sutures under xylazine sedation (0.1 mg/kg, IM). The growth was surgically excised by diode LASER at 680 nm wavelength and 13 Watt energy level. (Fig. 6-8). After excision no bleeding was observed. Surgical excision of skeletal growth in the oral cavity has been successfully attempted by Purohit *et al.*, (2015) [24].

Right midflank colostomy was performed in all cases of atresia coli calves. The calf was positioned in left lateral recumbency and an inverted L-block in the right flank performed with infiltration of 2% lidocaine. After aseptic preparation, a 10-12 cm skin incision was made in the right midflank and the external abdominal oblique muscle incised. This modified grid incision potentially creates a valve-like effect upon closure of the layers. After systematic abdominal exploration, the proximal blind end of the colon was exteriorized and anchored to peritoneum and abdominal muscles in the middle of the mid flank incision, equidistant from both ends of the laparotomy incision, in a circular fashion using simple non-penetrating interrupted 1 chromic catgut sutures. Then, the upper and lower parts of the abdominal wall incision were closed in layers. The blind end of the colon was incised and after evacuation of meconium and irrigation of the region with warm normal saline (0.9% NaCl) solution, the intestinal wall was anchored to the skin using simple interrupted (1 silk) which was accordance to the

similar surgical correction by Ducharme *et al.*, (1988) [6] Syed, M. (1992) [30], Tanwar, M. and Gahlot, T.K. (2012) [31]. The one cases of atresia coli died after 30 to 72 hours. Only 1 case recovered uneventfully.

In the present study, congenitally cleft soft palates (palatoschisis) in calves are rare and pose a serious challenge for surgical correction due to high complication rates. Atresia vulvi was not corrected by surgically because hypoplasia of vulvar orifice was occurs and owner was advised for culling of the animal.



Fig 3: Agenesis and Bulging at anal opening



Fig 4: Sutures applied to create anal opening

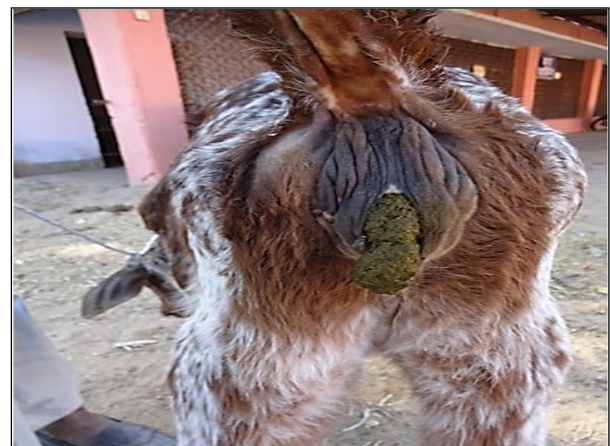


Fig 5: Atresia ani with rectovaginal fistula



Fig 6: Unusual growth attached to the tongue



Fig 7: Growth removed with diode LASER



Fig 8: Resected part of growth from the tongue

Conclusions

Highest incidence of congenital disorder of gatro-intestinal system were recorded in sheep (6.25%) and least in goats (0.38%). Sex wise occurrence of congenital affection were recorded more in male (66.67%) than females (33.33%). Congenital affections were reported more in ruminants of 0-1 month age group and least in animals >3 months age. Atresia ani is the most frequently occurred congenital affection of gastro-intestinal system either alone in most instances or with other congenital defects. Most of congenital disorder of gastro-intestinal system were successfully managed

surgically.

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