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Surgical Management of Atresia Ani and Associated Congenital Malformations in Three Calves

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ABSTRACT

Background: Congenital malformation leads to perinatal mortality, decreases maternal productivity and reduces the value of the neonates. Atresia is the most common anomaly of the anus and rectum of calves and pigs. It may occur either alone or associated with other congenital defects like atresia recti, rectovaginal fistula, vagino-urethral agenesis. The present study reports surgical management atresia ani and associated malformationsin three animals.

Methods: All three animals (1 female and 2 with undefined sex) were presented on first day of life with near normal physiological parameters. After clinical examination, all neonates were prepared for surgery and the resulting complications were managed accordingly.

Result: Essential surgical interventions were done to correct atresia ani and the associated anomalies. One calf succumbed to death due to postoperative complications and other two survived.

Key words: Anomalies, Atresia ani, Calves, Congenital.

INTRODUCTION

Congenital malformations are an important problem in livestock production. Congenital abnormality is defined as a defect in structure and function, which are present at birth (Badaway, 2011) andresults from defective genetics mainly because of autosomal recessively inherited genes (Bryan *et al*., 1993), environmental factors or agents (nutritional deficiencies, teratogenic drugs, chemical exposure, some viral infections, toxic plant ingestion), or a combination of both (Shukla *et al*., 2007), x-rays radiation exposure and per rectal examination during the early stage of organogenesis. Developmental defects may be lethal, semi-lethal or compatible with life-causing aesthetic defects and sometimes have no effect on the animal (Johnson *et al*, 1985). These anomalies can lead to animal death, reduce their productive ability and influence animal welfare. Defects of the rectum or anus are predominately recorded as congenital gastro-intestinal malformation in ruminants (Rahman *et al*., 2016; Niwas *et al*., 2020). Atresia ani may be a condition on its own or associated with atresia recti, rectovaginal fistula, vaginourethral agenesis, taillessness, hypospadias, cleft scrota, *etc* (Niwas *et al*., 2020). In the present case study, three cases with congenital anomalies and their surgical management were described.

MATERIALS AND METHODS

The study was conducted during the year 2020-21 in three calves with atresia ani and associated congenital malformations presented to the Department of Veterinary Surgery and Radiology, College of Veterinary Sciences, LUVAS, Hisar, Haryana. Out of three neonates with no history of dystocia, two animals with undefined sex had no opening for the anus as well as for the passage of urine. The correction of atresia ani followed by that of the associated malformation in all the newborns was undertaken after sedation with xylazine hydrochloride @0.1 mg/kg body weight intravenously along with epidural anaesthesia and local infiltration with 2% lignocaine hydrochloride at the surgical site.

Case no 1

A one-day-old Holstein Friesian female calf was presented with a distended abdomen, tenesmus and a pedunculated lump at the right side of the tentative anal opening (Fig 1a). After clinical examination, the case was diagnosed as atresia ani. The animal was prepared for the surgery with epidural anesthesia and local infiltration of lignocaine 2% at the site. Firstly, the mass was excised and sent for histopathological examination. A circular incision was made on the bulged portion after applying manual pressure on the abdomen. After blunt dissection, the rectal cul-de-sac was freed from its surrounding attachments and drawn to the level of anal opening and fixed to the skin by simple interrupted sutures

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using braided silk (Fig 1b). The opening was reinforced with a 5 ml disposable syringe barrel to prevent stenosis of the anal opening which is the major post-operative complication due to cicatrisation during healing (Niwas *et al*., 2020). The histopathological report showed hyperplastic growth of cells in epithelial lining along with congestion, haemorrhages and presence of a severe inflammatory reaction which involves infiltration of degenerated neutrophils.

After 20 days of surgery, the calf was presented with a stenosed anal opening and diarrhoea due to the owner's non-compliance. The surgical procedure was repeated and the stenotic anal opening was enlarged and reinforced with a barrel of 10 ml disposable syringe. Inj. Oxytetracycline (5 mg/Kg BW) along with infusions of Metronidazole (20 mg/kg BW), Ringer Lactate, Dextrose Normal Saline were administered for 5 days. Further, follow up for 3 months revealed no further complications.

Case No 2

The second, tailless Sahiwal calf with undefined sex, agenesis of coccygeal vertebrae, imperforate anus and with no passage for urine was presented just after birth with a fluid-filled perineal cylindrical swelling that is extended up to the umbilical region (Fig 2a). On ultrasonography, the bladder was found intact and compressed due to the pressure exerted by the swelling.

An exploratory laparotomy was performed. Rectal end was not found on exploration and the distal part of the intestine was sutured with skin using simple interrupted suture pattern with silk no 1. Next, the incision was made over the fluid-filled-sac covered by skin (Fig 2b) and around 500ml faeces mixed liquid was drained out. No part of the urethral tract was evident upon exploration (Fig 2c) and a tissue sample was sent for histopathological examination. To make the passage for urine tube cystostomy was done. The muscles, subcutaneous structures were sutured with Vicryl no 1 and skin was closed routinely. After 2 days of surgery, the calf developed a distended abdomen and was unable to defecate and urinate. The fluid therapy was started but before any intervention, the animal collapsed. Histopathology indicated urinary bladder with congestion and haemorrhages (Fig 2d).

Case No 3

A one-day-old non-descript calf with undefined sex was presented with no passage for faeces and urine (Fig 3a). The animal was prepared for the surgery and atresia ani was corrected. The mucosa of the blind end of the rectum was fixed with the skin with silk suture no 1 using interrupted pattern (Fig 3b). Further, an exploratory laparotomy was performed. Agenesis of urogenital tract was evident (Fig 3c). For maintaining the patency of the urinary tract Foley's catheter was tied to the skin from the urinary bladder (Fig 3d). The muscles and subcutaneous structures were closed with Vicryl no. 0 in a routine manner.

The animal was reported after a week with distended abdomen. On surgical intervention, a hernial ring was found (Fig 3e), suggestive of umbilical hernia. Herniorraphy was done using polypropylene mesh (Fig 3f). The muscles and skin were sutured in a routine manner. Thereafter, the calf was presented twice with postoperative complications which were managed with antibiotics and analgesics and local dressing of the wound. The calf was followed for six months and no complication was reported.

All the calves were administered with antibiotic Ceftriaxone (5-10 mg/Kg BW), anti-inflammatory Meloxicam (0.1 mg/Kg BW) and B complex injection intramuscularly for five consecutive days. Liquid paraffin was also advised for application in the circular fashion over anal opening to prevent stenosis. The application of glycerine was also advised after the removal of sutures to maintain the patency. Fly repellent (Topicure) was recommended.

RESULTS AND DISCUSSION

Atresia ani has been found associated with abnormal chromosomes and interruption of the foetal blood supply to the anus which leads to failure of the anal membrane to become perforated, thereby failure of the bowel to become canalized (Singh *et al*., 2020). Also, palpation of the amniotic vesicle between 36 and 42 days of gestation at the time of pregnancy examination during the period of principle organogenesis is the cause of intestinal atresia *i.e*. atresia of colon, rectum and anus (Durmus, 2009, Azizi *et al*., 2010). According to Hossain *et al*. (2014), the heritability of intestinal atresia is controversial and poorly understood.

Atresia ani is being reported with supernumerary limbs (Ali *et al*.,1986), rectovaginal fistula(Bademkiran *et al*., 2009), orthopedic abnormalities (Nooh *et al*., 2003), umbilical hernia (Niwas *et al*., 2020) and some with multiple congenital abnormalities were euthanized with life incompatibility (Newmann *et al*., 1999). Besides, the anomalies of the urinary system such as renal agenesis, polycystic kidney and skeleton system such as coccygeal or sacral vertebral agenesis were also observed at the same time in calves (Mallesh *et al*., 2017). Urogenital anomalies are commonly reported in association with atresia ani and have been suggested to occur as a result of congenital or genetic abnormalities (Petiot *et al*., 2005).

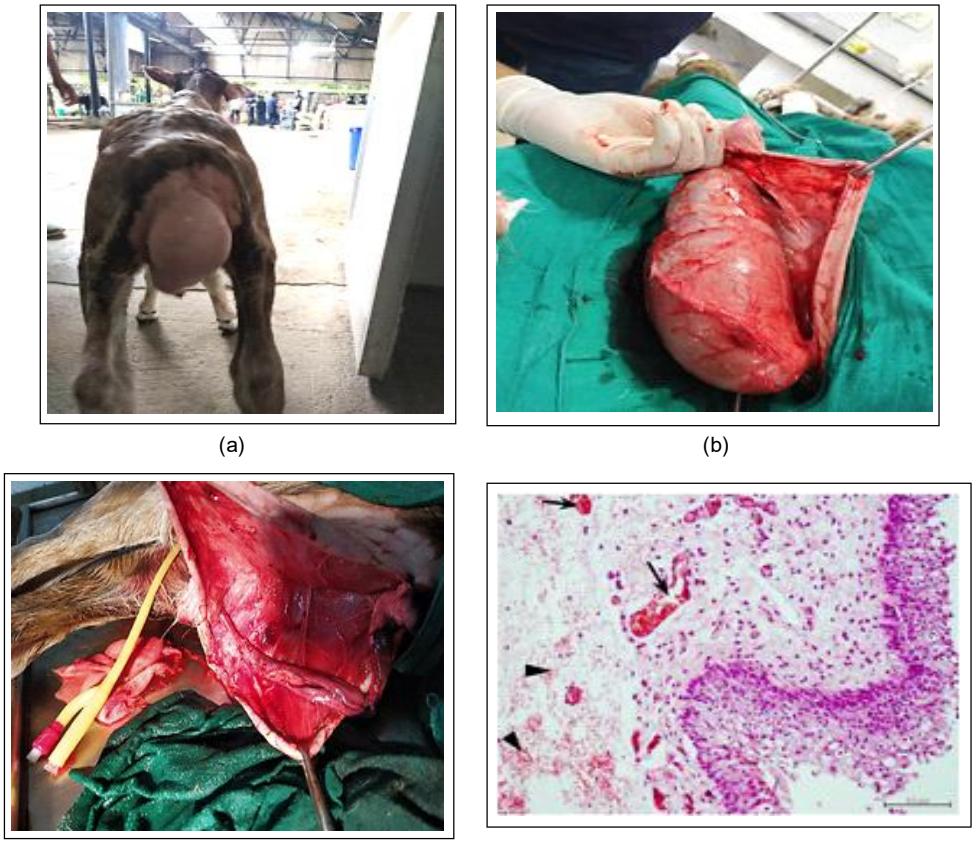
Some authors suggested that inept choice of male cattle for sperm collection, utilization of unsuitable ways in breeding and artificial insemination, not eliminating the cattle with abnormal genetic characteristics results in the propagation of congenital anomalies (Ayers *et al*.,1989; Schalles and Cundiff., 1999; Distl and Baher, 2005).

In the present study, all calves underwent anal construction for the management of atresia ani/atresia ani*et recti*. Anal stricture in one case necessitated a surgical revision. All three cases were presented at 0 to 1 day of birth had no previous birth history of congenital abnormality

in any of the three dams. For atresia ani/atresia *et recti* reconstructive surgery via a circular incision ventral to the base of the tail was performedto relieve the straining. Tube cystostomy was used as a salvage procedure to extend the life of an animal where there is complete agenesis of the urethral tract. One of the three calves that died might be due to the presence of other related agenesis of the intestinal tract or postoperative complications.

(a) (b)

Fig 1: (a) Atresia ani with pedunculated mass; (b) Corrected atresia ani and resected mass.



(a) (b) (c) (d)

Fig 2: (a) Atresia ani with perineal swelling; (b) Swelling covered with layer of skin; (c) Agenesis of urethral tract; (d) Urinary bladder tissue with marked congestion.

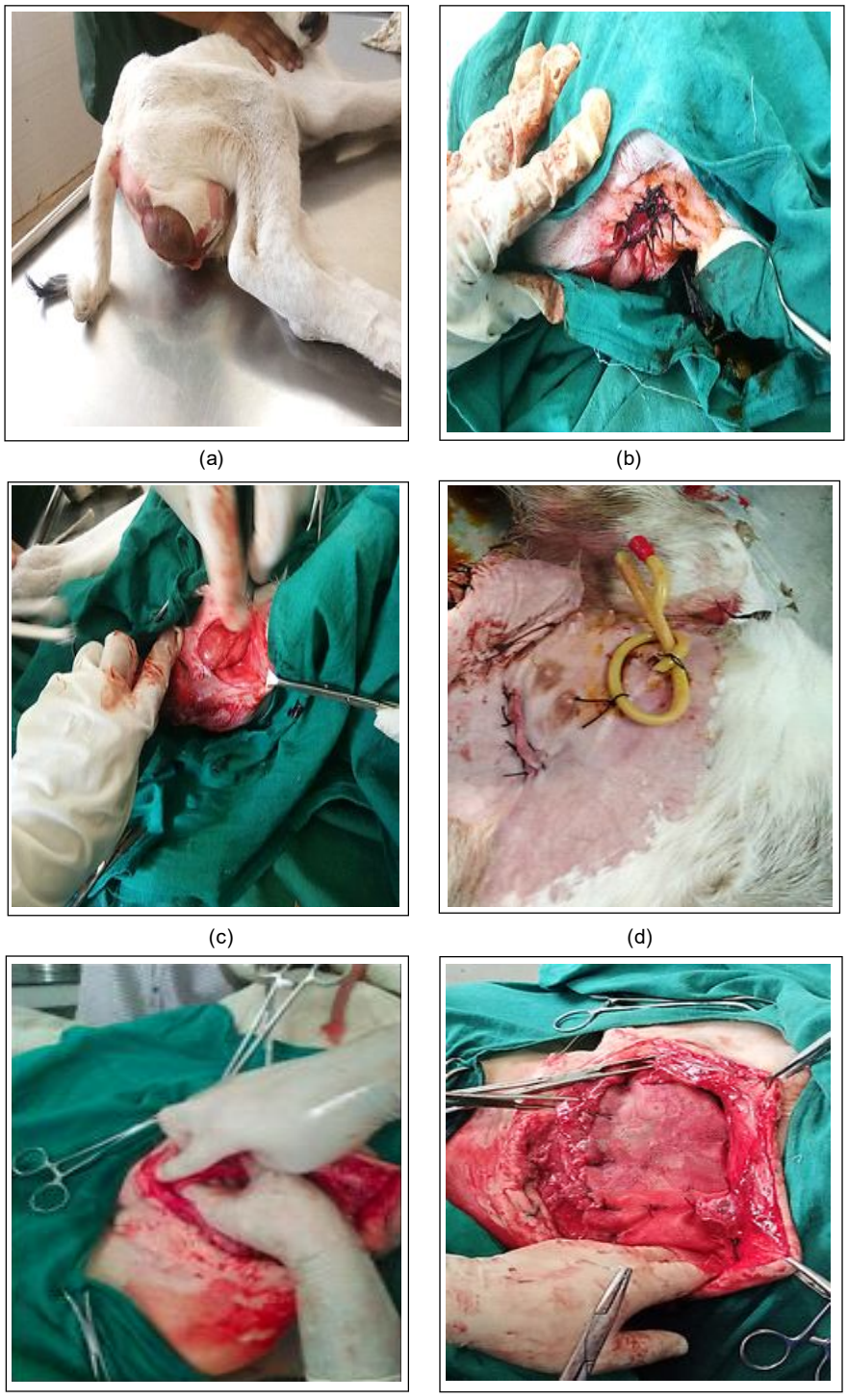


Fig 3: (a) Atresia ani with no passage of faeces and urine; (b) Corrected Atresia ani; (c)Agenesis of Uro-genital tract; (d) Tube Cystostomy; (e) Umbilical hernial ring; (f) Hernioplasty by polypropylene mesh.

CONCLUSION

Surgical correction of atresia ani in calves is the only successful treatment method. However, if it is associated with other associated anomalies that can't be surgically corrected, the prognosis depends upon the degree of anomaly and postoperative care by the owner. Measures like, recording of such cases, identification of the responsible gene, restricting the breeding of animals with a congenital conditions like umbilical hernia, previous urachus, *etc* can reduce incidence.

Conflict of interest: None.

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