Treatment of an atresia ani et recti and urogenital agenesis in a calf

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SUMMARY

The purpose of this study was to describe the surgical correction of anorectal and urogenital agenesis in a Holstein calf. Clinical examination revealed the absence of anal and urinary openings, testicles or vulvar openings, and suggested the possibility of atresia ani et recti. The complete blood count, blood gas analysis, and biochemistry were evaluated and revealed the presence of a mild respiratory acidosis with a pH of 7.29 and pCO2 level of 62.7 mmHg. The surgery was performed under general anesthesia. During the intraoperative exploration, it was noted that the internal genital organs were not developed and there was a band-like structure between the urinary bladder and the blind pouch colon. Defecation was achieved by performing a ventral colostomy. The band between the urinary bladder and the colon was separated from the colon, a Foley catheter was passed through it by blunt dissection, and it was made to act as the urethra. By using the band-like structure and the Foley catheter, a urethral opening was fashioned and placed caudal to the colostomy opening, which resulted in successful urination. A follow-up check-up after one week showed the calf had no urination or defecation problems and was in good condition. Four weeks later, the owner reported that the calf was doing well and gaining weight. Early surgical treatment can lead to successful outcomes in cases of intestinal atresia and urethral agenesis. The condition known as the imperforate anus, or atresia ani occurs when the anal membrane and perineal skin fail to break down during development, either alone or in combination with other defects. The aim of this study was to present a case of extraordinary atresia ani et recti and urogenital agenesis and its surgical treatment. In small farms, even one calf is important. It should also be considered that the breeder's emotional attachment to the calves may lead to a preference for treatment.

KEY WORDS

Anorectal anomaly, bovine, colostomy, intestinal atresia, urethral agenesis.

INTRODUCTION

According to the World Health Organization, congenital defects can be defined as abnormalities that occur during intrauterine life. Congenital anomalies can be detected prenatally, at birth, or after birth [1]. Intestinal atresia, a congenital defect, has been reported in humans and various domestic animals such as pigs, sheep, and calves. In calves, this abnormality results from abnormal development of the intestinal wall and can affect the rectum/anus, colon, ileum, or jejunum. Intestinal atresia results in a complete blockage of the intestinal lumen, preventing the normal movement of intestinal contents and the passage of fecal material [2,3]. Obstruction can occur in different parts of the intestine, such as the duodenum, jejunum, ileum, colon, or anus.

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ntestinal atresia is a common congenital defect in calves [4,5]. Atresia ani et recti is a congenital abnormality with a lack of anal opening and rectum. Vulvar and urethral anomalies are rare. The urorectal septum divides the cloaca into a ventral and a dorsal part. With the differentiation of the cloacal folds, the ventral part forms the urogenital system and the dorsal part forms the digestive system. Urethral agenesis occurs as a result of malformation of this region [6-8]. This paper reports an extraordinary case of atresia ani et recti associated with urethral and genital agenesis.

MATERIALS AND METHODS

A 1-day-old Holstein calf (42 kg) was brought to the faculty hospital with a history of not passing meconium or urine since birth. The calf was quite active. Clinical examination confirmed the absence of anal and urinary openings, and testicles or vulvar openings (Figure 1A, B). There was no perineal swelling on

abdominal compression. The absence of swelling in the anal region strengthened the possibility of it being a case of atresia ani et recti. The body temperature of calf was 38.5°C measured from the mouth. Heart rate was 128/min and respiratory rate was 37/min. The abdomen was slightly distended, but there were no signs of colic. Complete blood count, blood gas, and biochemical analysis and results are detailed in Table 1. Mild respiratory acidosis was observed (pH:7.29, pCO2: 62.7 mmHg).

Meloxicam was administered 0,5 mg/kg (Maxicam, Sanovel, Türkiye). The surgical treatment was performed under general anesthesia. Propofol was administered at 5-6 mg/kg (Propofol-PF 2%, 20ml, Polifarma, Türkiye) by intravenous infusion. Then, endotracheal intubation was performed and 2-3% isoflurane (Isoflurane Usp 100%, 100ml, ABD) was used for inhalation anesthesia. For surgery, the calf was positioned in dorsal recumbency and abdomen was prepared for ventral midline laparotomy. The incision was started caudal to umbilicus to reach vesica urinaria. Intraoperative exploration revealed that the internal genital organs were not developed and there was a band-like structure between the urinary bladder and the end of the colon (Figure 2). The colon was ending as blind pouch. An enterotomy was performed approximately 4-5 cm in front of the blind end of the colon. The band-like structure extending from the vesica urinaria and a 4-5 cm colon section were used for the urethral opening. The enterotomy side was irrigated with a warm saline. A Foley catheter was passed through the colon section to the urinary bladder with blunt dissection and the cuff of the Foley catheter was inflated (Figure 3A, B). The wall of the colon section was sutured to the skin with simple interrupted sutures (USP:0, Monosorb, Sutures) to act as a urethra. The Foley catheter was removed from the abdominal wall caudal to the colostomy opening and urination was achieved. Ventral colostomy was performed. The colon was sutured to the abdominal wall and skin with simple interrupted sutures (USP:0, Monosorb, Sutures) to avoid peritonitis (Figure 4). In the first postoperative week control, it was determined that the calf did not have urination and defecation problems and was in good general condition (Figure 5). When the owner of the patient was contacted by phone 4 weeks later, it was learned that the calf was in good condition and had gained weight.

Table 1 - Laboratory data of calf.

Laboratory	Findings	Referance
Glucose (mg/dL)	213	70-110
ALT (U/L)	44	0-89
AST (U/L)	99	0-42
ALP (U/L)	234	0-70
GGT (U/L)	505	0-8
Albumin (g/dL)	2.30	2.3-3.1
Total protein (g/dL)	5.68	5.4-7.5
Urea (mg/dL)	14	8-28
Creatin (mg/dL)	0.58	0.5-1.7
Phosphorous (mg/dL)	9.4	2.9-5.3
pH	**7.29**	**7.35-7.50**
pCO2 (mmHg)	**62.7**	**34-45**
pO2 (mmHg)	33	30-40
K^+ mmol/L	5.37	3.90-5.80
Na^+ mmol/L	139	132-152
Cl^- mmol/L	100	100-110
WBC $x10^9$/l	9.72	4-12
LYM $x10^9$/l	4.22	2.5-7.5
MON $x10^9$/l	0.12	0-0.84
NEU	5.37	0.6-6.7
LYM%	43.5 %	45-75
MON%	1.3 %	2-7
NEU%	55.2 %	15-65
RBC $x10^{12}$/l	10.89	5-10
HGB	11.1	8-15
HCT%	40.05	24-46
MCV	37	40-60
MCHC	27.8	30-36
PLT $x10^9$/l	289	100-800

ALT: Alanine aminotransferase, AST: Aspartate aminotransferase, ALP: Alkaline Phosphatase, GGT: Gamma glutamyl transferase, pH: Actual blood pH, pCO_2: Partial pressure of carbon dioxide, pO_2, Partial pressure of oxygen, K^+: Potassium, Na^+: Sodium, Cl^-: Clor, WBC: White blood cells; LYM: Lymphocytes, MON: Monocytes, NEU: Neutrophils, RBC: Red blood cells, HGB: Haemoglobin, HCT: Hematocrit, MCV: Mean corpuscular volume, MCHC: Mean corpuscular haemoglobin concentration, PLT: Platelet.

Figure 1 - Caudal (Left) and ventral (Right) view of calf, absence of anal and urethral openings.

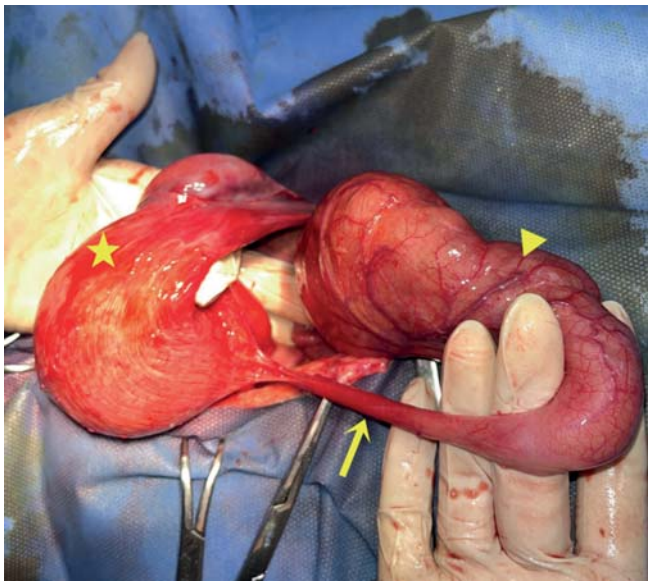

Figure 2 - Star: Vesica urinaria. Arrowhead: Colon. Arrow: Band-like structure.

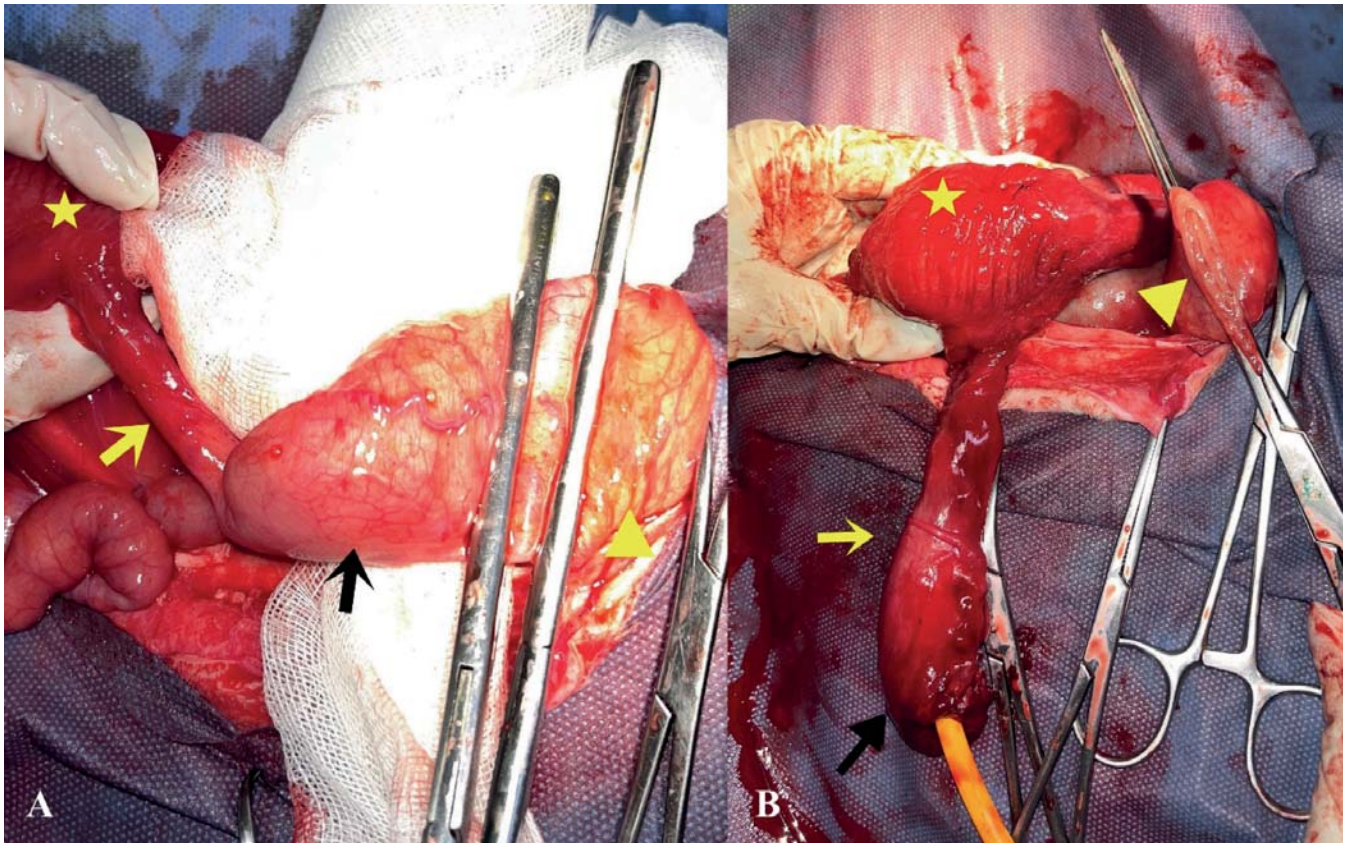

Figure 3 - A: Enteretomy side was restricted with penses. B: Foley catheter was reached to vesica urinaria. Star: Vesica urinaria. Yellow arrow: band-like structure. Black arrow: The portion of the colon that remains connected to the band-like structure after enterotomy. Arrowhead: Colon.

Figure 4 - Ventral colostomy (yellow arrow) and urethral opening (black arrow).

Figure 5 - Postoperative first week follow up.

DISCUSSION

Atresia ani and urogenital agenesis develop during the embryonic stage as a result of malformation of the cloacal folds. Atresia ani is a developmental anomaly caused by an autosomal recessive gene. Atresia ani et recti may be associated with recto-vaginal fistula, vagino urethral agenesis, absence of tail, hypospadias and diphallus [9-11]. In this case, the reason could not be certain. The calf was suffered from atresia ani et recti, uretrhral agenesis and absence of the genital organs. This con-

dition is a rare occurrence [8,12].

Previous studies have reported atresia of vagina-urethra and anus [13] in a hybrid calf, atresia ani with recto vestibular fistula and vulvar agenesis in buffalo calf [14], in another buffalo calf atresia ani et recti with agenesis of the vulva and terminal urethra [8], and agenesis of the vulva with atresia ani-et-distal recti in a heifer calf [7]. Vahar et al [15] reported a case of colonobladder fistula in a lamb. In the present case, there was a band-like structure between the colon and the urinary bladder, but this structure was not a channel like a fistula.

Studies have reported that in cases of intestinal and urethral agenesis, the patient can survive with early surgical treatment. Surgical treatment should be performed before the condition leads to death from autointoxication, circulatory failure, or fecal peritonitis following intestinal and/or vesica urinary rupture [4,7,8,16]. When the calf was brought to the clinic at 1 day of age, blood analyses and general condition were found suitable for surgical treatment. Surgical correction was performed under general anesthesia. The patient awoke from the anesthesia without any problems, and in the follow-up 1 week later, the general condition of the patient was good. When the owner of the patient was contacted by phone 1 month later, he reported that he could not bring the calf, but that the calf was healthy.

Due to high frequency of multiple malformations and the role of genetic inheritance in calves with intestinal atresia, it is recommended not to breed these animals, as continued breeding of such animals may have an impact on the persistence of the malformation in the population; even some researchers even recommend the euthanasia for these calves [16]. In the present study, the patient was only a livestock animal, as the calf had no genital organs. Patients often do not accept euthanasia, especially because they are more emotional about calves. In this case, the owner of the patient stated that he wanted treatment without considering the cost.

Because atresia ani is often associated with one or more malformations, a careful and complete physical examination should be performed. If perineal bulging does not occur with abdominal pressure, atresia recti should be suspected in addition to atresia ani. Atresia ani et recti with urogenital agenesis are rare cases. Surgical treatment should be aimed at achieving urination and defecation. Treatment should be done in the first few days before problems with food and urea accumulation occur.

Conflict of Interest

The authors declare no conflicts of interest related to this report.

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