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A Case of Atresia Ani in an Anatolian Water Buffalo Calf*

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Summary: In this case report; an Anatolian water buffalo calf with defecating problem since birth, was referred to the our clinic, was evaluated. Clinically no anal opening of anus was visible. There was a soft swelling under anal region which suggested us the case to be atresia ani. The animal was prepared for surgery. Following anaesthesia plus (+) shape like incision was made over the anal region, skin retracted. Greyish colour of rectum end was seen in two cm inside of the skin. Rectum was withdrawn towards anal skin and fixed. After fixation, rectal end was perforated and meconium coming up to was observed. This case, atresia ani alone was reported first time in an Anatolian water buffalo calf with case report in Turkey.
Key words: Atresia ani, congenital defect, water buffalo calf

Bir Anadolu Manda Buzağısında Atrezia Ani Olgusu

Özet: Olgu doğduğu günden itibaren dışkı yapamama şikâyeti ile kliniğimize gelen bir Anadolu manda buzağısında değerlendirildi. Klinik olarak anüsün anal açıklığın olmadığı görüldü. Anüse yapılan palpasyonda, kapalı anüs derisinin altında içersinde mekonyum dolu rektum palpe edildi ve atresia ani teşhisi konuldu. Hayvan ameliyat için hazırlandı Anesteziyi takiben anal bölge üzerinde bir artı (+) şeklinde insizyon yapıldı ve deri geri çekildi. Rektum ucunun grimsi rengi cildin iki cm içerisinde görüldü. Rektum anal deriye doğru çekildi ve anal bölgeye sabitlendi. Fiksasyondan sonra rektal uç delindi ve mekonyum çıkışı görüldü. Bu olgu Türkiye'de bir malakta bildirilen ilk vaka raporudur.
Anahtar kelimeler: Atresia ani, konjenital defekt, manda buzağısı.

Introduction

Congenital defects are the functional anomalies that present in birth. Genetic or environmental factors alone or together cause these defects. In many occasions, reasons behind this are not known. The most widespread environmental teratogens for cattle are; eating toxic plant by mother cow, viral infections during pregnancy and maternal-fetal viral infections (6,13). Atresia ani is a congenital anomaly reported in all domestic animals which characterized with anal opening closure and end up with blind pouch under the skin (6,18,27).

Clinically observed findings are, the absence of feces, dullness, anorexia, abdominal strain, discomfort and tension associated with defecation attempt (2,6). In domestic animals, to correct atresia ani, various surgical techniques have been suggested (14,28). In surgical techniques; + like incision and circular incision are the most common used surgical methods. But, stenosis like complication has been reported to developed in above techniques (1,3,23).

In this case report, the presence of atresia ani in an Anatolian water buffalo was described which is seen rarely and applied surgical method were also presented.

Case Report

The animal was referred to University of Erciyes, Faculty of Veterinary Medicine Clinics for defecating problem since birth. Body temperature, respiratory and pulse frequency were as 37.8°C, 24/min and 124/min respectively. Clinically no anal opening was visible (Figure 1A). There was a soft swelling under anal region which suggested us the case to be atresia ani (Figure 1B and Figure 2A). Therefore, the animal was prepared for surgery. Before the operation 8 mL of blood were taken from the vena jugularis of the animals to tubes containing K_3EDTA. Whole blood count were made using Mindray BC 2800 Vet (Table 1). Blood gas

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Table 1. Haematological findings in the Anatolian water buffalo calf with atresia ani

Parameters	Findings	References Mean ±SD (8)
WBC(10^9/l)	65.5	11.08 ± 1.12
RBC (10^{12}/l)	9.05	9.53 ± 0.71
HGB(g/dl)	13.4	12.77 ± 1.00
HCT(%)	42.7	41.49 ± 4.10
MCV(fL)	47.2	43.43 ± 1.90
MCH(pg)	14.8	13.39 ± 0.23
MCHC (g/dl)	31.3	30.80 ± 1.14
RDW (%)	15.9	21.10 ± 0.97
PLT (10^9/l)	756	259.86 ± 73.67
MPV	4.5	10.67 ± 1.23
PDW	16.5	41.01 ± 1.07
PCT	0.340	0.28 ± 0.08

WBC: White blood cells; RBC: Red blood cells; HGB: Haemoglobin; HCT : Hematocrit; MCV: Mean corpuscular volume; MCH: Mean corpuscular haemoglobin; MCHC; Mean corpuscular haemoglobin concentration; RDW: Red blood cell distribution width; PLT: Platelet; PCT Platelet crit; MPV: Mean platelet volume ; PDW: Platelet distribution width

Figure 1 A-B. Appereance of atresia ani, **A;** Clinical appearance of atresia ani, **B;** Swelling seen due to deposited meconium

analysis was also made by taking 3 mL blood using Irma true point blood gas analyser (Table 2). Following administration of 0.1 mg/kg xylazine-HcL IV, 10 mL of local infiltrative anaesthetic agent injected to the surgical area (Figure 2A). Plus (+) shape like incision was made over the anal region, skin retracted (Figure 2B). Subcutaneous tissues and the muscle encountered were separated bluntly. Greyish colour of rectum end was seen two cm inside of the skin (Figure 2C and Figure 2D). Rectum was withdrawn towards anal skin and fixed by interrupted suture to anal area using 1 USB number of polyglaction 910 (Figure 2E). After fixation, rectal end was perforated and meconium flowing observed (Figure 2F).

Discussion and Conclusion

Atresia ani; develops at the embryonic stage as a result of formation failure in cloacal plate dorsal pieces (6,10,18,27). In other words, a thin membrane covering normal anal canal does not disintegrate. Furthermore, cattle are more susceptible to chromosal anomalies causing mutations at 14-42 days of embryonic age (15). Atresia ani is congenital and hereditary and is an autosomal recessive gene anomalies occurred at embryonic stage.

Environmental factors, plant toxins, and viral infections may also cause in the development of atresia ani. But in many cases, reasons behind development of anomaly is not clearly understood (4,22).

The animal was the first calf of the mother in the farm. No anomalies in mother sisters calves were also noted. There were no signs of feeding material causing any teratogenic effects. Newman et al. (19) have reported that rectal ultrasonographic examination made twice in per week, from the day of 28 to 90. Days of pregnancy may contribute to atresia ani development. In our case no rectal ultrasonographic examination was made till the end of pregnancy and therefore no possible relationship was detected with rectal examination and atresia ani development. The most frequently encountered intestinal anomaly is the atresia ani in ruminants. The anomaly occurs usually in urogenital and skeleton-muscle system.

Atresia ani and recti have been frequently reported in male lamp and female calves (20,21)

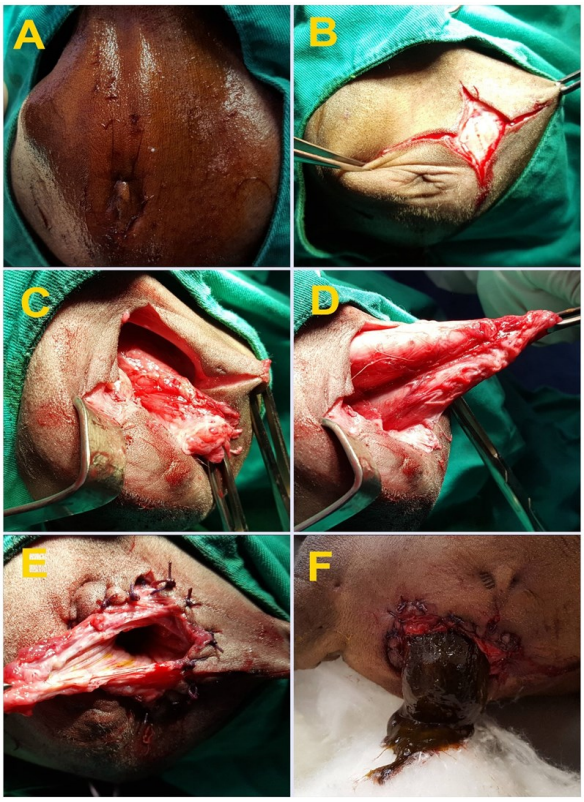

Figure 2 A-F. Appearance of atresia ani before and after treatment, **A;** Appearance before operation, **B;** Plus (+) shape like incision was made over the anal region; **C-D;** Greyish colour of rectum end was seen two cm inside of the skin **E;** Rectum was withdrawn towards anal skin and fixed by interrupted suture to anal area **F;** After fixation, rectal end was perforated and meconium flowing observed

Atresia ani in literatures has been classified as four types according to various degree of anus and rectum agenesis. In Type I, anus is open but narrows (anal stenosis), rectum develops normally. In type II, anus coats with a thin membrane. Rectum is located just in front of anal membrane as a blind sac. In type III, anus is not developed and rectum locates cranially as a blind sac. In type IV, terminal section of rectum and anus are normal but there is rectal atresia in pelvic canal (rectal agenesis) (17,24,25).

Atresia ani associated with rectovestibular fistula and vulvar agenesi together have been reported in water buffalo by Sreenu et al. (30) Moreover, Velavan et al. (32) have recorded a buffalo calf with atresia ani and recti. Krishna et al. (16) have also recorded vulva agenesis and terminal urethra with ani and recti in a buffalo calf.

In the present study, the buffalo calf had atresia ani and the rectum was as blind sac located in front of anal membrane which was in type II classification. The clinical signs of anorectal anomalies are associated with the duration of meconium retention (1). Anomalies should be treated surgically, otherwise death occurs due to disruption of physiological feeding and endotoxemic shock (1,16). Physiological leucocytosis may associate with stress, stimulation, fear or pregnancy in ruminants. Short term physiological leucocytosis may be seen after releasing of epinephrine.

The causes of pathological leucocytosis are infections, endogen and exogen intoxications, hormonal and central nervous disorders, ana-

Table 2. Blood gas findings in the Anatolian water buffalo calf with atresia ani

Parameters	Findings	References Mean ±SD (10,11,29)
pH	7.404	7.36 ± 0.01
pCO_2 (mmHg)	51.9	54.7 ± 1.3
pO_2 (mmHg)	29.0	37.0 ± 1.2
Na^+ (mmol)	138.9	134.0 ± 4.0
K^+ (mmol)	4.06	4.3± 0.24
iCa (mmol)	1.43	2.85± 0.07
HCO_3 (mmol)	32.0	23.8 ± 1.2
TCO_2	33.6	32.5 ± 0.83
BEb (mmol)	5.8	-1.10 ± 0.10
BEecf (mmol)	7.3	NR
O_2Sat (+)	54.7	42.4 ± 11.0

pH: Actual blood pH; pCO_2: Partial pressure of carbon dioxide; pO_2; Partial pressure of oxygen; Na^+: Sodium; K^+: Potassium; iCa: Iyonized calcium; HCO_3: Bicarbonate; TCO_2: Total carbon dioxide; BEb: Standard base excess blood; BEecf: Base excess extrasellüler fluid; O_2Sat(+): Oxygen saturation; NR: Not Recorded

In contrary to these studies, the animal in our study was male.

phylactic shock, leukemia and cattle leucocytes adhesion (26). In parallel to these facts, white blood cells (WBC) (65.5 10^9/l) values detected before surgery was high (Table I). The possible reasons of leucocytes might be attributed to stress, endotoxemia and inflammation due to lack of defecation.

Thrombocytosis may occur in ruminants as a result of splenic narrowing which induces by epinephrine. Essential or primer thrombocytosis is a condition of rare myeloproliferation. Cytokine releasing is triggered in reactive or secondary thrombocytosis and is seen in connection with stress, chronic blood loss, inflammation, neoplasia and iron deficiency (26).

In the lights of these informations, platelet (PLT) level in this study was found as 756x10^9/l. The possible reason in high PLT was considered due to inflammation associated with no defecation (Table I).

Furthermore, venous blood gas measurement of HCO_3, BEb and pH were 32.0 mmol, 5.8 mmol and 7.404 respectively which were higher than those of references values (Table II). The alternations of gas values were attributed to metabolic alkalosis arising from absence of defecation (31).

Surgical intervention in atresia cases should be initiated as early as possible. The place of constructed artificial anus is over the side of swelling area (12). The most common complications encountered postoperatively are functional insufficiency of anal sphincter or fecal incontinent depending on disruption of sphincter muscles during surgery (1,23). Moreover, some authors have suggested that a plus (+) shape of incision over the anus resulted in excessive tissue formation which induced anal stenosis (1,5). However, from 32 of cases with atresia that treated with an incision like +, only one animal had anal stenosis (12). Dreyfuss and Tulleners (7) used different techniques for anal reconstruction and they detected no signs of anal stenosis following circular incision. The anus was constructed by a plus shape of incision in the present study. Moderate degree of stenosis and little sign of straining in defecation were determined two months after surgery.

In conclusion, atresia ani was alone reported first time in an Anatolian Water Buffalo calf. The anal construction was made with a plus (+) shape of incision up to 2x2 cm in length. Moderate degree of anal stenosis was experienced in the animal. Therefore, longer incision might result in less complication for the further interventions.

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