

## PREVALENCE OF *Atresia ani* IN NEW BORN CALVES AND THEIR SURGICAL MANAGEMENT

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### ABSTRACT

This study was conducted in 46 calves to investigate the prevalence of *atresia ani/atresia ani et recti* in calves at Veterinary Teaching Hospital, & Department of Surgery and Obstetrics, Bangladesh Agricultural University (from June 2009- June 2011) and Shombugong area (Mymensingh District) from January 2008- December 2009. The total percentage of the affections was 23% among the surgical affections in new born calves. The frequency and location of intestinal malformations and gender distribution of affected calves were investigated. The occurrence of *atresia ani/atresia ani et recti* in cross bred or indigenous bred were also studied. *Atresia ani* with or without other intestinal malformations was diagnosed by the Veterinarian at day 1 (25 calves), day 2 (13 calves), day 3-4 (3 calves) and day 5-8 (2 calves) after birth. The affected calves were reported to have been nursed normally immediately after birth but clinical sign became progressively worse with abdominal distension, loss of appetite and abdominal straining. There was no anal opening, but a bulge appeared at its site. Male calves were more frequently affected with *atresia ani* than those of female calves. The ratio of the male and female affections was approximately 5: 2. The total percentage of indigenous calves affected with *atresia ani* was 71.74% and the crossbred were 28.26%. Surgical correction is the only successful technique for *atresia ani*. The prognosis of surgical correction of *atresia ani* in calves was found good.

**Key words:** New born calves, *atresia ani*, surgical affections, surgical management

### INTRODUCTION

*Atresia ani* is the failure of the anal membrane to break down to make an anal orifice. It has been reported a most frequently encountered surgical affection in calves (Hossain *et al.*, 1986; Das and Hashim, 1996; Samad, 2008). Anal atresia affects males and females with equal frequency (Das and Hashim, 1996). Perineal inspection reveals the absence of anus.

Clinical study suggests that along with indigenous calves, a considerable number of crossbred calves also suffer from various congenital diseases like *atresia ani* (Das and Hashim, 1996). Artificial insemination has brought a revolution in the livestock sector of Bangladesh. Crossbred calves are showing great susceptibility to *atresia ani*, may be due to defective bull semen or other conditions. Anal atresia requires surgical corrections and the goal is to preserve an artificial anus.

This study was carried out to establish baseline information and the surgical management, prognosis of the affections in the calves.

### MATERIALS AND METHODS

The proposed research work was conducted at Veterinary Teaching Hospital, Bangladesh Agricultural University (BAU Vet Teaching Hospital), Department of Surgery and Obstetrics, BAU and Shombugong area (Mymensingh District). The reported new born calves were separated to determine the prevalence of *atresia ani* in calves. Calves with intestinal atresia (June 2009 - June 2010; July 2010 - June 2011) admitted for surgical treatment was enrolled in this study. The case morbidity rate of intestinal atresia was determined for the total hospital population of newborn calves.

### Study variables

The study variables (discrete and continuous) were selected on the basis of nature of disease and prospective observational epidemiologic study designed as follows: Demographic variables--Breed, type of breeding

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(artificial insemination, natural mating obtained from breeding record of dams raised under small holder system and client declaration for range system), sex, age, anamneses, physical examination findings, surgical treatment, and postoperative outcome. Environmental variables- Location of villages, source of disease and season. Ecological variables-- Relative humidity, ambient temperature and rainfall. Responsive variables- The presence or absence of anus and rectum and other abnormalities. Diagnosis was obvious when the anus was absent. In these calves, there was a pronounced protrusion of the perineal region with deep palpation of abdomen.

### **Instruments and appliances**

Surgical handle and blade, straight scissors, forceps, blade, nylon thread, catgut, draping cloth, towel clips, tissue forceps, probe, traumatic needle, needle holder, syringe, anaesthetic agent like 2% Lidocaine hydrochloride (Jasocaine<sup>R</sup>, Jayson Pharmaceuticals, Bangladesh) and antiseptic like 0.001% potassium permanganate (PPM).

### **Surgical techniques**

Each calf was administered supportive fluid therapy based on clinical findings. The calf was positioned on lateral recumbency (Fig. 2). The perineum was infiltrated with 6-7 ml 2% lidocaine, and after routine aseptic preparation of the surgical field, a cruciate incision, (2.5 × 2.5 cm), was made through the skin and subcutaneous tissue at the site where the anus should normally be situated. Careful blunt dissection was used to locate the rectal pouch, which was secured to the skin edge with 4 full-thickness sutures of nylon, then the rectum was incised and its mucosa was sutured to the skin with simple interrupted sutures. After that, the rectum was irrigated to wash the meconium (Fig. 3) by 0.001% PPM using Duche Cane. PPM results mechanical irritation to the intestinal mucosa, thus straining occur, which helps in early expulsion of meconium. Finally, the rectal pouch was sutured to the skin.

### **Postoperative care**

1. After evacuation of the rectum and cleaning of the surgical wound, Neobacrin ointment (Neomycin) was applied to the region 3-4 times daily upto recovery.
2. Coconut oil or glycerine were introduced into the rectum through anal opening to lubricate the incision area by finger twice daily until healing of the wound.
3. In warm seasons, insect repellent spray was also used. Procaine penicillin (20,000 IU/kg intramuscularly [IM], benzyle penicillin (5,000 IU/kg and dihydrostreptomycin (10 mg/ kg IM) were administered for 7 days.
4. Intravenous fluid therapy was prescribed until animals start eating or drinking.
5. Sutures were removed after 7-10 days.

## **RESULTS AND DISCUSSION**

Out of 200 newborn calves admitted to the Veterinary Teaching Hospital, BAU and Shambugong clinic for surgical affections, 46 calves had *atresia ani* (Figure 1) during the study period. Age of the calves ranged from 4 hours to 15 days. The percentage of *atresia ani* among the affected calves was 23% (46 out of 200 calves). These results (Table 1) correspond to the study reported by Hashim and Das (1997). They found that the occurrence of *atresia ani* is the second highest among the surgical affections in calves. The defect found just after birth and the calves are brought for the treatment within 0-6 days after birth.

*Atresia ani* with or without other intestinal malformations was noticed by the owners and diagnosed by the Veterinarian at day 1 (25 calves), day 2 (13 calves), day 3-4 (3 calves) and day 6-8 (2 calves) after birth; otherwise, the abnormality was detected in hospital (3 calves). In calves with *atresia ani*, tenesmus was evident a few hours after birth and they usually were dehydrated with a distended abdomen. *Atresia ani* was recorded in 28 calves at BAU Veterinary Teaching Hospital. There was neither anal opening nor bulge at the anal site even with hand pressure on the distended abdomen. Three cases returned postoperatively with partial narrowing of the anus.

The total numbers of male affected with *atresia ani* at BAU Veterinary Teaching Hospital were 16 whereas the total number of female was 9 suffering from this affection. In six (6) calves there were complications of the

affections e.g. there was no separate anal or urinary tract found after operation, anus becomes constricted after few days of operation due to improper care. In one calf ani et vulvi was present in which laparotomy was carried out. All the hermaphrodites affected with *atresia ani* were died within few days after operation.

The total number of male affected with atresia ani at Shombugong area was 12 whereas the total numbers of female was 3. The ratio of the male and female affections was approximately 5:2. In two calves there were complications of the operation i.e. the artificial anus became constricted.

The total number of male affected with *atresia ani* at both BAU Veterinary Teaching Hospital and Shombugong area was 28 whereas the total number of female was 12. The ratio of the male and female affections was approximately 5:2. Azizi *et al.* (2010) found no gender predilection for *atresia ani*. Likewise, found no significant correlation between gender and occurrence of atresia coli, but (Martens *et al.*, 1995) without statistical analysis of the distribution of the sexes, stated most of their calves (76%) with intestinal atresia were male. Our findings are in agreement with the later study.

Thirty three indigenous and thirteen crossbred calves have been observed suffering from this affection. The total percentage of indigenous calves affected with *atresia ani* was 71.74% and the crossbred was 28.26%.

The principal clinical signs of the disease are depression, anorexia, and abdominal distention. Frequently, the owner does not see the calf pass muconium or feces. However, some owners are conscious to observe at the perineal region (if defecation occurs) for noticing *atresia ani*.

*Atresia ani* can be diagnosed by visual inspection of the perineal region or by limited digital palpation if a vestigial anal opening is present.

Table 1. Total percentage of atresia ani cases found at Veterinary Teaching Hospital BAU & Shombugong area

Malformations	Total cases found	Breed		Incidence in breeds (%)		Sex		Incidence		Incidence of cases (%)
		Ind.	Cross	Ind.	Cross	M	F	M	F	
Atresia ani	28	22	06	78.57	21.43	20	08	71.42	28.57	60.86
Atresia ani et recti	11	09	02	81.82	18.18	06	02	54.54	18.18	23.91
Rectovaginal fistula	01	-	01	-	100	-	01	-	100	2.17
Agenesis of urethra	02	01	01	50	50	02	-	100	-	4.34
Atresia ani et double urethra	01	-	01	-	100	-	1	-	100	2.17
Atresia ani et vulvi	01	-	01	-	100	-	-	-	-	2.17
Atresia ani et recti without urethra	01	-	01	-	100	-	-	-	-	2.17
Atresia ani et two tails	01	01	-	100	-	-	0	-	100	2.17
<b>Total</b>	<b>46</b>	<b>33</b>	<b>13</b>	<b>71.74</b>	<b>28.26</b>	<b>28</b>	<b>12</b>			

\*Ind. = indigenous, M = Male, F = Female

The frequency and location of intestinal atresia of affected calves are shown in Table 2 and 3.

Table 2. Sites of intestinal congenital malformation and gender distribution in 29 calves found at Veterinary Teaching Hospital, BAU.

Malformation	Male	Female	Hermaphrodite	Anal reconstruction	Complication
Ani	11	07	-	Successful	02
Recti	4	-	02	Successful	2 complicated and died
Rectovaginal fistula	-	01	-	Successful	Complicated
Agenesis of urethra	01	-	01	Successful	1 complicated
Ani et vulvi	-	-	01	Successful	Died
Ani et two tails	-	01	-	Successful	-

Out of 46 calves, 44 were treated surgically by anal reconstruction. In 10 calves along with *atresia ani*, other congenital abnormalities (e.g. two tails, urinary agenesis) were also identified. Twenty eight calves with *atresia ani* had anal reconstruction and all calves recovered without dehiscence; suture abscesses occurred in 3 calves. All calves survived one (1) month after surgery with normal weight gain and without evidence of anal stricture. Preoperative assessment and correction of dehydration, acid- base, and serum electrolyte and glucose concentration imbalances is essential.

Table 3. Various congenital malformations in calves at Shombugong area of Mymensingh district (from January 2008-December 2009).

Malformations	Male	Female	Hermaphrodite	Type of anal incision	Complication
Atresia ani	9	1	-	Circular	1
Atresia ani et	2	2	1	Elliptical or circular	1
Double urethra (umbilical & ischial)	-	-	1	Oval	Urination in dripping
Atresia ani et recti without urethra	1	-	-	Lower flank fixation of colon	Died after 10 days

In this study, all calves underwent anal construction via a cruciate incision ventral to the base of the tail. Both subsequently developed anal stricture necessitating surgical revision.

The pathogenesis of intestinal atresia is unknown. Environmental toxins or infective agents have not been reported. Palpation of the amniotic vesicle at the time of pregnancy examination during the period of principle organogenesis is the cause of intestinal atresia in between 36 and 42 days of gestation (Azizi *et al.*, 2010). The heritability of intestinal atresia is controversial and poorly understood.

Clinical history supported that the cause of anal stricture was due to abnormal use of anal lubricant e.g. coconut oil or Neobacrin ointment. *Atresia ani* with or without other anomalies such as congenital rectovaginal fistulae, two tails, and renal agenesis can be treated surgically.

Jubb and Kennedy (1970), stated that atresia of ileum in Swedish highland calves and atresia jejuni in Jersey calves were hereditary. *Atresia coli* was thought to be due to homozygous recessive genes for a defective allele in Holstein calves. However, Johnson *et al.*, 1983, concluded nonhereditary cause of *atresia coli* and stated that atresia of colon in cattle was due to development of spiral colon. Vascular development and extensive spiraling of the colon occurs during organogenesis (days 12-45 of gestation) in the fetus. (Brenner and Orgad, 2003) noted when the early pregnancy diagnosis by amniotic vesicle palpation was applied; intestinal atresia was associated with it in a frequency- dependent manner.



Fig. 1 Typical case of atresia ani in an indigenous calf.



Fig. 2 Clipping of perineal region for the operation of atresia ani in a calf



Fig. 3 Duche canning for the removal of meconium

In conclusions, surgical correction of atresia ani in calves is the only successful treatment method for *atresia ani*. The prognosis of surgical correction was also found good. A circular anal skin removal technique should be considered for anal reconstruction in atresia ani to minimize stricture formation. This study did not look for etiology of *atresia ani*, so a study may be conducted to find out the etiology of *atresia ani* in calves.

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