



Surgical Repair of Congenital Anomalies in Ruminants in Two Different Region of Bangladesh

Mahmudul Alam ^{1*}, DVM, MS
Mizanur Rahman ², DVM, MS

¹ *Department of Surgery and Obstetrics, Bangladesh Agricultural University,
Mymensingh-2202, Bangladesh.*

² *Upazilla Veterinary Surgeon, Gopalpur, Rajshahi, Bangladesh.*

Abstract

Objective- To get a concrete information about nature, cause and geographic distribution of ruminant congenital malformation in certain areas of Bangladesh.

Design- Clinical study.

Animals- A total 76 ruminant calves and kids having congenital deformities were studied.

Procedures- Surgical intervention for each case was carried out after proper diagnosis and post operative care with systemic antibiotic and antihistamine was done properly.

Results- There were 17 atresia ani, 5 atresia ani et recti, 4 pervious uracus, 13 dermoid cyst, 25 umbilical hernia, 6 recto vaginal fistula, 4 contracted tendon, 2 urethral diverticulum. In this study we have got 57 male and 15 female calves presented with various surgical affection whereas 4 male malformed kids were found but in we did not get any malformed female kids.

Conclusion and Clinical Relevance- This study will help to get a quick information regarding prevalence of malformed ruminant.

Key Words- Ruminant, surgical disorder, geographic distribution.

* Corresponding author:

Mahmudul Alam, DVM, MS
Department of Surgery and Obstetrics,
Bangladesh Agricultural University, Mymensingh-2202, Bangladesh.
E-mail address: mahmuddso@yahoo.com

Introduction

Congenital defects, abnormalities of structure or function present at birth, may be caused by genetic or environmental factors, or a combination of both; in many cases, the causes are unknown.¹ Developmental defects may be lethal, semi-lethal, or compatible with life causing aesthetic defects or having no effect on the animal.² Susceptibility to agents that affect development varies with fetal stages, but in general decreases with gestational age. Before day 14 of gestation in cattle (period of pre-attachment), the zygote or embryo is resistant to agents that can cause congenital malformations (teratogens) but is susceptible to genetic mutations.³ During the embryonic period (day 14-42), the embryo is highly susceptible to teratogens, but this decreases with embryonic age, as the critical periods for the formation of various organs are passed.⁴ The fetus (Day 42) becomes increasingly resistant to teratogenic agents with age, except for the late differentiating structures, e.g. cerebellum, palate and urogenital system.^{2,5}

A concise description of congenital malformations observed in this study is reported here:

Atresia ani, (imperforated anus), is the failure of the anal membrane to break down. The rectum is intact and attached to the membrane. Atresia ani is most frequently encountered in calves and pigs.⁶ If the rectum ends blindly as a cul- de sac a short distance cranial to the anal membrane, the condition is called rectal atresia or atresia ani et recti.⁷

A fistulous tract may form between rectum and vagina called recto-vaginal fistula. It appears uncommon in the general population but with a relatively high incidence in certain cross-breeds.⁸

Persistent (pervious, patent) urachus is often conceived to be the result of a failed occlusion due to some congenital defects of the urachus or of the umbilical ring.⁹ Navel infection was reported to be interpreted as either the cause or the effect of the open urachus.⁸ Normally the urachus closes and degenerates along the border of the median ligament of the bladder. If it remains open, urine will be excreted from this tube at the umbilicus and the condition will be called persistent urachus or urachal fistula. This fistula is a source of infection to the bladder.

Umbilical hernia is a congenital defect in umbilicus in which eviscerated abdominal organs are covered by amnion rather than skin.¹⁰ Due to improper closing of umbilicus after birth, the abdominal organ particularly intestine protrude through that opening and covered by skin.

Dermoid cyst also occurred congenitally in several forms leading to corneal erosion and ulceration.¹¹

The present study aimed to discuss the differential diagnosis and surgical management of the prevalent surgical malformations in farm animals.

Materials and Methods

The experiment was conducted in two regions of Bangladesh, at Bangladesh Agricultural University Veterinary clinics and Upazilla Livestock office, Gopalpur, Rajshahi, Bangladesh from 2006 to 2008.

Analgesics, antibiotics and sutures

Differential diagnosis was followed by surgical treatments in some congenital malformations of calves and kids. Surgical interventions were performed under locally infiltrated analgesia using Lidocaine HCl 2% (Jasocaine®, Jayson Pharmaceututicals, Dhaka, Bangladesh) or xylazine HCl, Rompun® (Bayer, Germany) was used intramuscularly for pre-operative tranquillization at doses of 0.1 mg/kg in calves and lambs and 0.05 mg/kg in kids. For suture chromic catgut no. 2 (Catgut® , India) was used for calves internally and no. 1 for kid.

External suture was accomplished by nylon. Post operatively systemic antibiotics, Penicillin + streptomycin (Streptopen®, Renata Limited, Dhaka, Bangladesh), Chloramphenicol eye drop (Chloramphenicol® Beximco Pharmaceuticals limited, Dhaka, Bangladesh,) and antihistamine, pheniramine maleate (Astavet®, Acme Laboratories, Dhaka, Bangladesh).

Patient handling

Atresia ani was treated by excision of a circular piece of skin. The blind end of the rectum was stitched to the circular skin opening by four stitches (dorsally, ventrally and on both sides). The tip of the blind end of the rectum was snipped to evacuate the contents. The circumference of the rectal opening was sutured to the skin opening using nylon.

Atresia ani et recti was treated by making an anus preternaturalis. A midventral prepubic laparotomy was performed and the colon was sutured to the caudal part of the laparotomy wound. The bowel wall was opened after completion of suturing.

Rectovaginal fistula was treated by performing an artificial opening at the site of the normal anus. The index finger of the left hand was introduced into the blind rectal end through the rectovaginal opening and was directed caudally to make a skin bulge to mark the opening site. An artificial anus was then performed. The rectovaginal opening was closed through the anal opening. Its brim was incised circumferentially and the opening was closed transversally using No. 0 chromic catgut in an interrupted pattern. The sutures did not include the rectal mucosa.

Persistent urachus was treated by a fusiform laparotomy incision around the umbilicus which was resected along with the urachus. In two cases the urachus was double ligated and excised close to the bladder. The stump was inverted by sutures in the other cases the urachal wall was excised as much caudad as possible. The aperture was closed by double row of inverting lembert's sutures.

In case of ocular dermoid cyst, after mild sedation the skin was carefully removed from cornea and conjunctiva with the point edge of surgical blade.

A circular incision was given around the umbilicus in case of treating umbilical hernia. This was followed by opening of protruded mass, replacement of organ and overlapping mattress suture to close the ring.

Contracted tendon was treated by tendon suturing after sedation and local infiltration to place. An effort was taken to lengthen the tendon.

Urethral diverticulum was treated in two kids. Free drainage of urine was performed by a considerable incision of the swelling ventrally in the dependent part.

Results

Seventy-six congenital malformations were recorded: 17 atresia ani, 5 atresia ani et recti, 13 dermoid cyst, 25 umbilical hernia, 6 recto vaginal fistula, 4 contracted tendon, 4 pervious uracus, 2 urethral diverticulum (Table 1).

Atresia ani

Atresia ani was recorded in 15 males (13 cattle calves, 2 kids) and 2 female cattle calf. There was no anal opening, but a bulge at its site. The size of the bulge increased with induced distension of the abdomen by hand pressure on the abdomen. Excision of a circular piece of skin about two cm. in diameter in calves and about one cm. in diameter in kids facilitated undermining of the blind end of the rectum. Stitching of the blind end of the rectum before its

opening by four stitches (dorsally, ventrally and on both sides), minimized the subcutaneous contamination. The circular skin opening promoted free evacuation.

Table 1. List of animals with various congenital anomalies which were surgically repaired

Affections	Calf		Kid		Total
	Male	Female	Male	Female	
Atresia ani	13	2	2	-	17
Atresia ani et recti	5	-	-	-	5
Ocular dermoid cyst	11	2	-	-	13
Umbilical hernia	21	4	-	-	25
Rectovaginal fistula	-	6	-	-	6
Contracted tendon	3	1	-	-	4
Persistent urachus	4	-	-	-	4
Urethral diverticulum	-	-	2	-	2
Summation	57	15	4	-	76

Atresia ani et recti

Atresia ani et recti was recorded in 5 male cattle calves. There was neither anal opening nor bulge at the anal site even with hand pressure on the distended abdomen. The distal part of the colon could be lodged via a mid ventral prepubic laparotomy. A segment was confined toward the end of the laparotomy incision. The incision was closed leaving a part for the colon segment which was sutured circumferentially with seromuscular sutures to the left. The colon was incised and the edges were sutured to the skin to develop an anus preternaturalis.

The vaginal diameter was too small to enable suturing of the recto-vaginal opening. It was sutured through the induced anal opening. The rectal mucosa was dissected and elevated along the brim of the opening of the fistula. The opening was closed by inverting sutures which did not include the rectal mucosa. After closure, the rectal mucosa appeared as a covering non-sutured protecting layer.

Persistent urachus

Persistent urachus was diagnosed in 4 cattle calves (all males). Edema, suppuration and inflammatory signs of the umbilical region were evident in 2 cases. The signs were intermittent dribbling of urine and wetness of the hairs in the umbilical area. Inversion of the skin around the urachal opening by a continuous inverting suture offered protection against contamination especially in infected cases. The narrow fusiform incision around the umbilicus enabled safe dissection, isolation and excision of the infected umbilicus along with the urachus.

The index finger of the left hand gave a protective guide for the laparotomic incision around and caudal to the umbilicus. The persistent urachus was about the size of the index finger in four cases. It was resected after double ligation closer to the bladder wall. The stump was inverted by one row of Lembert's inverting chromic catgut sutures. In the 7 remaining cases, the enlarged urachus was in the shape of a cone where its base merged with no definite demarcation with the bladder wall. The urinary bladder appeared elongated to attach the umbilicus.

Urethral diverticulum

Urethral diverticulum was detected in 2 kids. The penile urethral diverticular extension was ovoid in both cases. Exploratory puncture gave urine. It was tender when the diverticular swelling was pressed where urine came from the normal urethral opening. Free drainage of

urine was obtained, by a considerable incision of the swelling ventrally leaving no gap distally.

Dermoid cysts

Dermoid cysts in eyes were recorded in 13 cattle calves (11 male and 2 female). There was epiphora, ocular irritation, impairment of vision. Three types of dermoid were identified; ocular dermoid, corneal dermoid and corneo-conjunctival dermoid. Among all the patients, 9 cases were unilateral and remaining 4 were bilateral. After mild sedation with xylazine hydrochloride and local infiltration in the stalk of cyst, full thickness wedge resection of the involved conjunctiva was performed. The stump were anchored with chromic catgut number 1. Topical antibiotics Chloramphenicol were instilled twice daily in both eyes for 7 days.

Umbilical hernia

Umbilical hernia was found in 25 cattle calves (21 male and 4 female). There was protrusion in umbilical region consisted of abdominal masses covered by skin, which returned to abdomen on pressing. In five cases there were adhesion between hernial ring and abdominal mass. After dedation and field block, a circular incision was given around the umbilicus. Following opening of hernial sac replacement of hernial mass was done and overlapping mattress suture to close the ring using chromic catgut no.2. Muscles and skin was sutured with catgut and nylon respectively. Systemic antibiotic Penicillin and streptomycin was given one daily for 7 days. Skin suture was removed after healing of wound.

Contracted tendon

Patients having contracted tendon (3 male and 1 female cattle calves) were unable to walk due to bend leg. After sedation and local infiltration tendons were exposed and lengthen using tendon suture. Post operatively systemic antibiotic and antihistamine were used (penicillin and streptomycin and pheniramine maleate respectively).

Discussion

Congenital defects and abnormalities presented in this study were recorded as sporadic cases originating from 2 different geographic sites in Bangladesh. Therefore these animals probably might be subject to different genetic and/or environmental factors. Most congenital malformations were recorded with variable frequencies, in farm animals. Atresia ani and persistent urachus were recorded only in calves whereas urethral diverticulum was diagnosed only in kids. Atresia ani was most frequent in males which is in agreement with other.⁶ The reason may be due to genetic variation and hormonal influences. Atresia ani et recti was recorded only in males which was also similar to other researcher.¹² Atresia ani with urinary bladder agenesis may be considered the first naturally occurring case recorded in buffaloes and in the domestic animals as well. Only experimentally induced cases are recorded in rats.¹³ Treatment of atresia ani by excision of a circular piece of skin facilitates dissection of the blind end of the rectum, and its fixation by stay sutures to the skin opening minimizes contamination of the subcutaneous tissue.

Ventral colostomy was an effective treatment for atresia ani et recti. The sero-muscular sutures of the colon segment to the abdominal wound provided a safe measure against contamination of the peritoneal cavity in such cases. However, when the intestinal contents are gaseous the prognosis is usually fatal. The cause may be an undetected occlusion hindering the passage of the intestinal contents.

No treatment was tried for atresia ani with vaginal and urinary bladder agenesis. Closure of the recto-vaginal fistula in cases of anus vaginalis may be easier by accessing through the anal opening. The transverse closure was preferred in order to avoid the effect of the transverse tension on the sutures due to rectal distension during defecation. The circumferential dissection of the mucosa provided a raw sub-mucosal surface for effective closure. The non sutured mucosa provided a protective covering layer for the suture line. This technique is simple and avoids the more invasive transverse perineal approach.¹⁴ Most cases of persistent urachus have a wide lumen with no obvious demarcation between the urinary bladder and urachal tissues. Therefore, the surgical excision was the appropriate treatment. Cauterization of the umbilical opening of the urachus.⁸ might be considered as unsuitable approach. Urethral diverticulum was found only in kids in this study. Generally, it was large in size affecting most of the penile urethra. Performing a wide urethral fistula was an acceptable treatment for these animals in order to obtain a longer survival time. Dermoid cysts were treated successfully in all the cases. In case of bilateral cases, treatment was done one by one to avoid complete impairment of vision. Similar approach was adopted by Barkyoumb and Leipold.¹⁵

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درمان جراحی اختلالات مادرزادی جراحی در نشخوارکنندگان در دو منطقه از بنگلادش

محمودل عالم^۱، میزانور رحمان^۲

^۱ بخش جراحی و مامایی، دانشگاه کشاورزی بنگلادش، میمنسینک، بنگلادش.

^۲ گروه جراحی دامپزشکی اوپازیلا، گوپالپور، راجشاهی، بنگلادش.

هدف: بدست آوردن اطلاعات واقعی در مورد طبیعت و انتشار جغرافیایی ناهنجاری‌های مادرزادی در ناحیه مشخص از کشور بنگلادش

طرح مطالعه: مطالعه بالینی

حیوانات: تعداد ۷۶ راس گوساله واجد ناهنجاری‌های مادرزادی مورد مطالعه قرار گرفتند.

روش کار: برای هر مورد بعد از تشخیص مناسب، عمل جراحی انجام گردید و مراقبت بعد از جراحی با آنتی‌بیوتیک سیستمیک و آنتی-هیستامین بخوبی انجام شد.

نتایج: ۱۷ مورد فقدان مقعد، ۵ مورد فقدان مقعد و راست روده، ۴ مورد باقی ماندن اوراکوس، ۱۳ مورد کیست درموئید، ۲۵ مورد فتق نافی، ۶ مورد فیستول مقعدی مهبل، ۴ مورد تاندون منقبض شده، و ۲ مورد ته‌کیسه میزراه گزارش شد. در این مطالعه ۵۷ مورد گوساله نر و ۱۵ مورد گوساله ماده با مراقبت‌های جراحی متنوع مطرح شدند، که ۴ گوساله نر واجد ناهنجاری یافت شد اما هیچ گوساله ماده واجد ناهنجاری گزارش نگردید.

نتایج و کاربرد بالینی: این مطالعه امکان دسترسی به اطلاعات در مورد میزان رخداد نشخوارکننده واجد ناهنجاری را فراهم می‌کند.