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Surgical Correction of Recto-Umbilicus Fistula by Diverting the Rectum to the Lower Right Abdominal Wall in a Cross-Breed Calf

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Case Report

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ABSTRACT

The congenital disability, *atresia ani* or *atresia ani et recti* or recto-vaginal fistula, is one of the most common types of congenital malformation disability. A 45-day-old male cross-breed calf was admitted to Patuakhali Science and Technology University's Veterinary Teaching Hospital with complaints of leaking feces through the umbilicus and was clinically confirmed as a recto-umbilicus fistula. This congenital condition was corrected successfully by making an artificial opening in the lower right abdominal wall. Corrective surgery was the only successful technique for repairing the recto-umbilicus fistula. The prognosis for surgical correction of the recto-umbilicus fistula in a cross-breed calf was indicated to be good.

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Introduction

"Congenital disability" refers to morphological abnormalities that appear during embryogenesis and are visible after birth. The congenital disability may affect only one system, or it may affect multiple organs. The congenital abnormality is caused by a variety of teratogenic substances, as well as chromosomal or genetic alterations (Corsello and Giurè, 2012). The severity of the aberration might range from minor anatomical flaws to life-threatening or semi-life-threatening disorders. However, several congenital disabilities in cattle, such as *anal atresia*, anal *atresia et recti*, recto-vaginal fistula, and congenital hydrocephalus, require rapid surgical intervention.

The congenital disability in food animals can directly affect the economics of dairy products. Every calf with a congenital problem must be eliminated from the herd at a low price. Furthermore, dystocia during parturition can also be caused by severe congenital abnormalities in the calf. There have been reports of many forms of congenital disability in cattle elsewhere (Blowey and Weaver, 2011; Janmeda et al., 2014), where different types of organs are involved. Presently, different types of congenital disabilities are gradually increasing. It would be hazardous if many organs were involved during embryogenesis, resulting in multiple congenital abnormalities.

Recto-vaginal fistula is very common in dairy calves and communicated between the dorsal vagina wall and the ventral portion of the rectum. During the development of the large intestine, the rectum does not reach the anal opening. It attaches to the umbilicus and urethra, causing a rectourethral-umbilical fistula in the calf (Blowey and Weaver, 2011). The passage of excrement through the umbilicus causes omphalitis and navel illness as a clinical indicator. However, there is no way to recuperate on its' own. A new case of recto-umbilical fistula has been admitted to Veterinary Teaching Hospital, Patuakhali Science and Technology University, Babuganj Campus, Barishal. Co-existence of the umbilical and rectum in calves is uncommon, and the management of this case has never been documented.

Case Description

A 45-day-old cross-bred male calf is weighing 35 kg presented at the Veterinary Teaching Hospital, Patuakhali Science and Technology University (PSTU), Barishal Campus, Barishal, Bangladesh. A congenital abnormality was present when the calf was born. The rectal canal was adjuncted with the navel cord and open through the navel region, not open in its' usual place, below the base of the tail, and feces were coming out of the navel opening. The navel opening steadily narrowed after 40 days of birth, resulting in excrement passage obstruction and abdominal distension. The calf was fed normally for the previous four days before being brought to the Veterinary Teaching Hospital, PSTU, Barishal Campus, Barishal, Bangladesh.

The calf was born after an entire gestation period. It was the first issue—artificial insemination with frozen semen used for breeding. No errors in this semen have been reported before.

Surgical Procedure

The calf was positioned laterally to the left. The atropine sulfate (Inj. Atropin®, Edruc Ltd, Bangladesh) was given intramuscularly at the rate of 0.04 mg/kg. The diazepam HCl (Inj. Sedil®, Square Pharmaceutical Ltd, Bangladesh) was administered intravenously after five minutes. A local anesthetic agent, lignocaine HCl (Inj. Jasocaine®, Jeyson Pharmaceutical Ltd, Bangladesh), was administered subcutaneously in a circular pattern around the navel region of the calf. During the surgery, 1000 ml of cholera saline (Inj. Koloride® IV, Beximco Pharmaceuticals Ltd, Bangladesh) was administered slowly intravenously into the calf through the jugular vein. The navel area and the right abdominal wall directly above the naval region were clipped and saved. Povidone-iodine (Povisep®, Jayson Pharmaceutical Ltd, Bangladesh) solution was applied to the area multiple times before being rinsed with 75 percent ethyl alcohol.

A window drape is used to cover the surgical area aseptically. At first, a linear incision was made on the linea alba caudal to the umbilical region. The abdominal muscle was dissected, and the rectum was separated cautiously from the navel region and secured by a simple knot on the rectum end. After evaluating and confirming the rectum's position, a circular incision was made on the lower right abdominal wall's skin just above the navel region to create an artificial rectal opening. The circular skin and muscle were excised. The diverted rectum wall was attached to the abdominal muscle wall first. Finally, the rectum wall was attached to the skin of the abdomen around the artificial orifice using absorbable suture materials by a simple interrupted suture technique. To reduce fluid accumulation, a subcuticular suture technique was used with absorbable suture materials (catgut). Nonabsorbable suture material (Nylon) was applied to stitch the skin around the artificial opening. The umbilical opening was sutured according to the standard procedure.

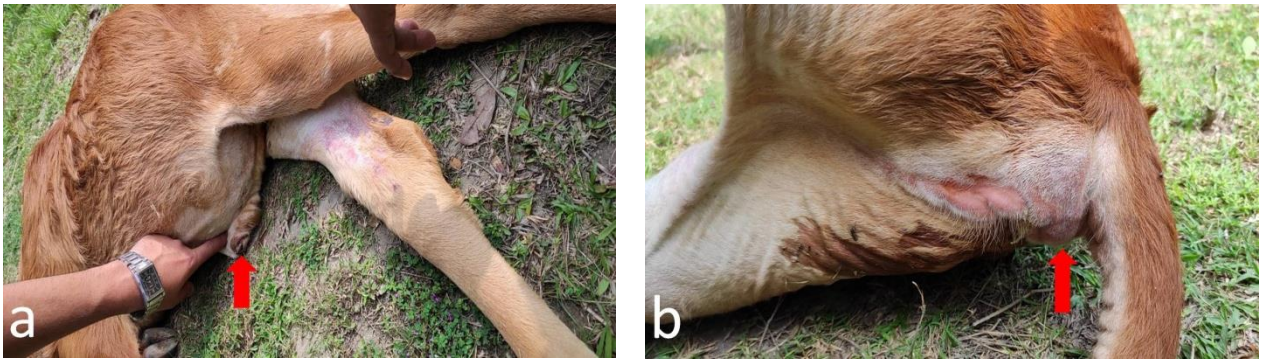

Figure 1. Appearance of recto-umbilical fistula in a cross breed calf, umbilical opening was narrowing and calf was unable to voided the feces (a), there was an absence of anal opening below the base of tail and there was no any buldging in this area (b).

Post-Operative Care and Follow-Up

To prevent bacterial contamination, ceftriaxone sodium (Inj. Renacef, 2 gm/vial, Renata Ltd, Dhaka, Bangladesh) was used intramuscularly at a dose rate of 20 mg/kg for seven consecutive days. A painkiller, meloxicam (Inj. Mel-vet, 20 mg/ml, ACME Laboratories Ltd. Bangladesh), was used intramuscularly at a dose rate of 0.5mg/kg for five days. Sulphanilamide (Sumid-vet powder, Square Pharmaceuticals Ltd., Dhaka, Bangladesh) powder was applied locally to prevent secondary bacterial infection. Diluted glycerin was used in the artificial making cannel for smooth defecation. After weaning, the calf was sacrificed for meat purposes.

Discussion

During embryogenesis, an unknown occult factor can influence the corresponding organs or tissue and deliver unlikely developmental abnormality. Some abnormalities are easily corrected by surgical means, but others are not. However, some congenital abnormalities must be surgically corrected for the animals to survive. It occurs in all breeds of cattle. The most common and frequent bowel abnormalities in domestic mammals are *atresia ani* and recto-vaginal fistula, but this was the first description of a recto-umbilicus fistula. It was an uncommon case that had never been recorded previously.

Figure 2: An artificial rectal opening was made on right lateral abdominal wall (a). Loose feces came out after attachment of rectal wall to the lateral abdominal wall (b).

The actual etiology of this recto-umbilicus fistula has yet to be determined. It is still unknown whether this example is caused by failure of organ development during embryogenesis, hereditary defects, or exposure to some teratogenic chemicals during pregnancy (Wicpolt et al., 2019). However, due to a lack of national artificial insemination (AI) data management practices, it was unclear which causes were accountable for this congenital abnormality in this case. According to the breeding history, this calf was born via AI with frozen Holstein Frisian sperm.

The specific breeding history was not preserved, making analysis impossible. Atresia ani et recti, or recto-vaginal fistula, was found to be quite prevalent in Holstein newborn calves (Hossain et al., 2014). The specific breeding history was not preserved for this case, making analysis impossible. Atresia ani et recti, or recto-vaginal fistula, was prevalent in Holstein newborn calves (Hossain et al., 2014).

Atresia of the ileum in Swedish highland calves and atresia jejuni in Jersey calves have been reported previously and may be inherited. Atresia coli was thought to be due to homozygous recessives genes for a defective allele in Holstein calves. However, Johnson et al. (1983) concluded that atresia coli was not inherited and that atresia of the colon in cattle was caused by the faulty development of a spiral colon. The course of the rectum was not studied in this case due to a lack of invasive technology facilities (x-ray and ultrasonography). Aseptically, the end of the atretic rectum was attached to the lower part of the abdomen. After a few days, the external wound healed successfully, but the feces was continuously dropped out. However, after the weaning period (about seven months) sacrificed the calf for meat purposes.

Conclusions

In conclusion, it stated that corrective surgery was the only treatment option for the recto-umbilical fistula of a newborn calf. Successful surgery can save the calf's life until weaning.

Conflict of interest

The author declare that they have no conflicts of interest.

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