Abstract

The calf was brought to Chakaria Upazilla Veterinary Hospital (CUVH) in Cox'sBazar district with the complaint of incontinence of feces and urine on the day of its birth. No anal opening is the primary clinical finding, which is followed by a protrusion of a muscular balloon-like structure. The most prominent clinical symptoms are straining, depression, tenesmus, and abdominal pain. This case was diagnosed as having atresia ani, along with agenesis of the vulva. A surgical correction was required and surgery was performed where 2% lidocaine was used for local anaesthesia (low epidural, ring block), diazepam for sedation, and permanent opening of the anus and urethral orifice was performed. The post-operative care includes Pronapen 40lac (preparation of benzyl penicillin 30 lac iu and procaine penicillin 10 lac iu) at 20,000-40,000 IU/kg i/m, Meloxicam @ 0.5 mg/Kg, S/C and application of Vaseline through the inner permanent opening to repel the further adhesion and application of topical antiseptic, sulphanilamide powder on the external of the surgical wound. Injectable treatment was continued for 7 days, but topical application was continued for 15 days. The patient was followed up for two month. After 1 month no problem was found. Defecation and urination was satisfactory dealing with the other normal body functions.

Key words: Congenital anomali, Atresia ani, Agenesis of vulva, Low epidural, Ring block.

Introduction

Congenital defects can be defined as structural or functional abnormalities that occur during intrauterine life and can be identified prenatally, at birth or, sometimes, can only be detected later in the early post birth stages. During early embryonic development, both males and females possess similar ducts, tubules, and external genitalia (WHO, 2016) this embryonic stage involves the development of two symmetrical duct systems, the paramesonephric (Mullerian, female) and mesonephric (Wolffian, male). Later, paramesonephric duct develops into uterine tubes, uterine horns and bodies, cervix and cranial vagina, metamesonephric tubes become retes and contribute to the sex cords of the ovary. An individual's genital and reproductive organs may develop normally as either male or female, depending on the progression of the opposing sex's ducts (Schlafer and Foster et al., 2016).The first separation of primitive cloaca (embryo and initial fetal stages) occurs through the rectum and the urogenital sinus by the urorectal bend. And later urogenital sinus differentiate to urinary bladder and urethra. However, Atresia ani results from incomplete separation of the urachal fold from the primitive cloaca (Vianno and Tobias et al., 2005). In general it is hard to recognize and identify about 65% cases of major congenital malformation (S Baldacci et al 2018). These malformation occurs probably for inherited genetic condition, poor diet, toxic exposure of the fetus (e.g. alcohol, birth injury) and there are many unknown reasons for congenital anomalies (H Dolk 2003). Multifactorial causes of congenital anomalies includes the genetic factors (Chromosomes, single gene mutation) which is believed to be accounted for 15 to 20% of all congenital anomalies (AM Ahmed et al. 2011). The other 80 percent of multifactorial inheritance includes environmental exposures (H Dolk et al. 2010). Risks factors like infectious agents, chemical compounds, radiation, use of medication, maternal metabolic diseases, multiple births, maternal life event stress, prematurity, occupational exposure are associated with higher congenital disorder.

Atresia ani is more frequently found in indigenous calves in comparison with cross breed calves. The percentage of occurring atresia ani in indigenous calves is about 71.74% and in cross breed, it is about 28.26% (MB Hossain et al 2014). The prevalence of atresia ani was higher in males (60%) than females (40%) and in the indigenous breed (65.63%) than cross-breed (34.37%). The prevalence was higher in the autumn season (33.733%) and lower in the summer season (16%) (MA Islam et. al. 2021). However**,** both atresia ani and agenesis of vulvi (often called atresia vulvi) are less common in same individual. Atresia ani has four anatomic variants (Bright and Bauer, 1994): Type I: a membrane over the anal opening remains, with the rectum ending as a blind pouch just cranial to the closed anus; Type II: the anus is closed as in type I, but the rectal pouch is located somewhat cranial to the membrane overlying the anus; Type III: the rectum ends as a blind pouch cranially within the pelvic canal (rectal atresia), whereas the terminal rectum and anus are normal; Type IV: occurs in females and atresia ani exist with agenesis of vulva as well as missing of the urethral opening very often. Based on these definitions, the actual case reported is an atresia ani type IV.

Atresia ani was reported as a possible genetic defect in Swedish Highland Cattle, Holsteins, and other breeds (Servet Bademkiran et. al., 2009). It is the most common intestinal defect in sheep and is believed to be due to an autosomal recessive gene (Servet Bademkiran et. al. 2009). In a series of 64 cases of atresia ani in sheep, 42 (62%) were associated with defects of other body systems, especially the urogenital and musculoskeletal systems (Newman ET al.1999; Ghanem et al., 2004; Kilic, and Sarierler 2004; Loynachan et al. 2006; Rahman et al. 2006; Magda and Youssef 2007; Bademkıran 2009).

The survivability of affected animal is up to 10 days which is identified by certain characteristics. The characteristic of clinical signs include depression, anorexia, colic, marked gradual abdominal distension and lack of feces. (Radostitis et al., 2000).

The objective of this study:

1. To investigate if surgical correction of atresia ani and agenesis of vulva can be achieved under clinical conditions in the Sahiwal cross calf.

2. To describe an operative procedure using local anesthesia for atresia ani and agenesis of vulva simultaneously.

Case Observation:

Case history:

History of Dam of calf includes-

a. Parity Number: 3 b. Breed: Sahiwal (cross) c. History of Insemination: Artificial insemination d. Company of semen straw: ADL (American Dairy limited).

e. Blood percentage of semen straw: Sahiwal 85%

f. Gestation period: 290 days (From A.I. to date of birth)

f. Feeding: Concentrates (Rice polish, wheat bran, maize, soybean meal, Til oil cake) Roughage, Straw and vitamin mineral mixture with the feeding ration.

History of calf includes-

Body weight- 28kg, color- Red, Breed- Sahiwal cross.

a. Feeding habit normal.
b. Gait and posture normal.
c. No urination and defecation after birth due to failure of anal and urethral opening for agenesis of vulva. (Chief complain)
d. The calf was brought to Chakaria Upazilla Veterinary Hospital just 12 hour after birth.

Clinical signs:

a. No anal opening and the agenesis of vulva with false muscular diverticulum.
b. Having muscular diverticulum following the urethral orifice.
c. Abdominal straining, depression, tenesmus.
d. No defecation and urination but the other vital signs are normal (Body temperature- 102 degree Fahrenheit, Respiratory rate 35 breath per minute, Heart rate 100 beats per minute)

Physical Examination findings: Palpation below the base of tail was felt as having the anal canal beneath the skin. Again palpation on the false musculature balloon following the urogenital tract was difficult to understand either having canal or not. A needle puncture was also performed on the musculature in order to aspirate fluid, but no fluid was found after the aspiration.

Diagnosis: Finally the case was diagnosed as atresia ani and agenesis of vulva.

Materials and Methods

Necessity of instruments:

Syringe with needle, Surgical blade, Scalpel blade handle, Artery forceps, Tissue forceps, Needle (traumatic and atraumatic), Needle holder, Suture materials (chromic cat gut, silk), Gauze, Cotton.

Chemical used:

Antiseptic solution (10% potassium iodide solution, 70% ethyl alcohol), Injectable Normal saline solution (0.9% NaCl), 2% Lidocaine hydrochloride (Jasocaine 2%, Jayson pharmaceuticals – Bangladesh), Diazepam.

Patient preparation:

Shaving and washing with the antiseptic in the periphery of the perineum region was performed before sugery. And then Diazepam (0.2 mg/kg body weight was administrated intravenously to sedate the patient.

Anesthesia

Local anesthesia was performed by using the technique of low epidural anesthesia and ring block at the site of incision by injecting 2% Lidocaine The dosage of lidocaine was calculated so that it couldn't exit over 8mg/kg body weight.

Surgical operative procedure of atresia ani:

A circular incision was performed on the skin of perineum. Then, the subcutis and tissue incision was performed in searching of anal canal. During searching, blunt object was inserted to confirm the location and direction of anal canal. Exact location, direction and position of anal canal was found finally. After finding of the anal canal, a cruciate incision was performed by creating the four flabs of mucosal fold were found. Mucoid feces was defecated by calf after opening of the anal canal through incision. The folds were directed to opposite surface where the mucosal surfaces of the four flaps take place in outward surface of body due to folding of flabs in an opposite manner which may be like the opening of a cane lid where one side lid is permanently attached with the cane. Simple interrupted suture was performed to fix the flabs of mucosal fold providing the stable position with the nearest skin of perineum. Here, 4 numbers of simple interrupted suture were performed by using silk. After suturing the flabs of mucosal fold, a greasy (Vaseline) substance was applied through the inner canal of anal opening to repel the further adhesion of newly created mucosal flabs.

Surgical operative procedure of the correction of agenesis of vulva:

Again, protruded portion of musculature following the urogenital tract was incised in searching of urethral orifice. But, there was no urethral orifice showing the false canal filled with muscles. The musculature structure was amputed where the blood vessels were ligated to stop the hemorrhage by using chromic cat gut (size-1). A blunt object (6-7 mm) was inserted to find out the direction and exact location of urogenital tract. Finally, urogenital tract was found in which circular incision was made first and then cruciate incision was performed to make flabs of mucosal fold. The flabs of mucosal fold were fixed with nearest skin by simple interrupted suture by using silk. A greasy (Vaseline) like substance was also used through the inner canal which was newly created to repel the further adhesion of newly created mucosal flabs of urogenital tract. During the surgical correction of creating the permanent urogenital opening, a forcefully urination was found at the time of incision.

Figures of surgical operative correction:

Figure-1: Low Epidural Anaesthesia

Figure-2: Ring Block at the site of the incision of perineum.

Figure-3: Circular incision at the skin of perineum for reconstruction of anal opening.

Figure-4: Holding tissues for further incision in search of anal opening.

Figures of surgical operative correction:

Figure-5: Reconstruction of anal opening prior to suturing.

Figure-6: Agenesis of vaginal floor and vulva missing urogenital opening.

Figure-7: Balloon like segmented muscular structure without urogenital opening. This musculature was firm to touch.

Figure-8: After completion of suture. (Simple interrupted by using silk)

Post-operative care

The following enlisted antibiotics and anti-inflammatory drugs were prescribed-

1. Pronapen 40 lac @ 1ml/10kg (40,000 iu/kg body weight), intramuscularly bid for 7 days.
2. Injection. Melocam @ 1ml/10kg (0.5mg/kg body weight), subcutaneously for 5 days.
3. Dressing of the surgical wound with povisep 10% solution (10% solution of potassium iodide) and application of topical antibiotics (Sulphanilamide powder).

Results

Atresia ani and agenesis of vulva were successfully reconstructed through the creation of permanent anal and urogenital tract openings.

During the postoperative period, surgical wounds heal completely without any significant complications. Aside from mild digestive discomfort, there were no clinical side effects after surgery. There was no need for specific care or interference since the defecation and urination excellency were acquired with no assistance, which facilitates the improvement in animal health and weight gain according to the age of the animals. Following wound healing, which took about a month after surgery, the anal stoma was fully functional. The patient was followed up for 2 month where the data (Feeding intake, body weight gain, defecation, urination) was satisfactory.

Discussion

Anomalies could be due to genetic cause or habitat influence and produce structure or functions alterations which may be lethal, semi-lethal or compatible with life (Ghanem et al., 2004). In maximum cases, the causes are unknown (Lomberdero and Yllera et al., 2014). In this case, the cause is unknown and the defect was lethal as the calf couldn't excrete urine and feces naturally due to lack of continuity ending part of digestive and urogenital tract. If it was not corrected by surgical operation, the sequel would be a possible secondary hydro nephrosis, rupture of urinary bladder, ureters and intestines, peritonitis, sepsis and death.

The three calves were reported (Gamal et al., 2006) with the following clinical signs: the first day old calf had neither passed meconium nor urine but there was no reported swelling; the second passed a thin stream of fluidy meconium via a pin point orifice of the vulva, suggesting a recto-vaginal fistula; while the third one presented with a thin stream of urine during straining from a narrow (vulval) orifice (Gamal, 2006). In this case, no anal opening and the agenesis of vulva with false muscular diverticulum, having balloon like muscular diverticulum following the urethral orifice, abdominal straining, no defecation and urination, but the other vital signs are normal (Body temperature- 102 degree Fahrenheit, Respiratory rate 35 breaths per minute, Heart rate 100 beats per minute).

During embryonic development, the urorectal septum grows caudally and separates the cloaca into dorsal and ventral chambers with dorsal portion forming anal folds while the ventral one forming urogenital folds. Failure of the differentiation of cloacal folds into anal and urogenital folds results in the malformation of the anus and vagina the anus and vagina (Noden and deLahunta et al., 1985). In this case, failure of differentiation of cloacal folds into anal and urogenital folds resulted with malformation of anus (no opening and swelling) and vulva (agenesis of vulva occupying the vaginal floor with balloon like pseudo canal muscular mass without urethral opening). In this case, vagina and rectum had no common interconnection via a rectovaginal fistula, but having congenital interconnection between rectum and vagina is a common feature in female calves (Gamal et al., 2006).

Presence of the tubercle with a blind end with tiny opening is found in case of agenesis of vulva (Moses N Wamaitha et al., 2015). In this case report, blind tuber of marble like round structure was found below the balloon like pseudo muscular mass of vulva, but there was such no tiny opening. The report of Sreenu et al., 1998 on atresia ani with recto-vestibular fistula and vulvar agenesis in a non-descript buffalo calf. But, in this case the calf acquired recto-vestibular fistula due to continuous straining of abdomen and further narrowing of created surgical urethral opening due to adhesion of inner lined muscle of the new urethral opening (which was created by surgical operation) at the age of 1.5 month. Azizi et al., 2010 described a good survival rate in response to atresia ani rectification by removing a circular skin piece and unifying the excised rectal loop with skin. In this case, the normal harmony of body activity was very good in terms of feed intake, body weight gain, defecation and urination according to age.

Limitation

- Lack of well-equipped Operation Theater in Chakaria Upazilla Veterinary Hospital.
- No laboratory for hematology and blood biochemistry.
- The surgical case was the only single case.

Conclusion

Agenesis of the vulva and atresia ani can be corrected surgically in a safe and cost-effective manner in animals. There is no alternative way without surgical correction, so the only option is to have surgery. Using this study, the field veterinarian can correct such a type of condition in newborn calves in a smooth and easy manner.

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Author

April, 2021

Questionnaire:

SL. No. Date:

Session-1: Farmers information

a. Name:……..
b. Sex: Male/Female, Age:…….. Year
c. Education:
d. Occupation : e. Training: Yes/No f. Source of investment: Own/Loan

g. Grazing land: Yes/No

h. Status:

Session-2: Farm's information-

a. No of animal: b. Source of animal:
c. Having other species: Chicken, Turkey/Duck/Goat/Sheep/Other species
d. No of other animal:

Session-3: Animal information:

a. Breed b. Age: c. Identification mark: d. No. of calf:
e. Parity: f. Body weight: g. BCS: …….. h. Vaccination: Yes/No i. Deworming history: j. breeding system: natural/AI

k. Company of semen straw: l. Blood percentage:

m. Breed of semen straw:

Session-4: Animal husbandry.

a. Rearing system : free range/ semi intensive/intensive/tethering
b. Floor system: Soil/Sand/ Concrete floor/Others
c. Cleaning materials: Yes/No d. Cleaning frequency of floor: once/twice in a day.
d. Feeding materials : Roughage/Concentrate/Both

Sign of Farmer Signature of Collector:

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Biography

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