

The treatment of congenitally developed fused vulva labia in a Brown-Swiss heifer

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Abstract: A case of congenitally developed fused labia in a 13-month-old Brown-Swiss heifer, an uncommon entity, is described. On gross appearance of vulva, it was observed that there were only 2 small openings in the dorsal and ventral vulvar commissures. Ultrasonography of the genital tract revealed the presence of left and right ovaries, uterine horns, and cervix uteri. The abnormality of the vulva was surgically corrected. The heifer was synchronized and artificially inseminated postsurgically. During delivery, no complication was observed and a healthy male calf was born. To the authors' knowledge, this is the first report describing both the surgical treatment of and delivery of a heifer with congenitally developed fused labia in Brown-Swiss cattle.

Key words: Congenital fused labia, no vulva, surgery, estrous synchronization, parturition

1. Introduction

Congenital defects present at birth occur frequently in cattle (1) and congenital malformation may enhance perinatal mortality, decrease maternal productivity, and reduce the value of defective neonates (2). Genetic factors or environmental factors (3), or a combination of these factors (4), cause the abnormalities.

The congenitally fused labia (CFL) syndrome is defined as a variable occlusion of the labia majora by connective tissue (5). The CFL syndrome was described in an elderly woman (6) and in common marmosets (5,7). This phenotype in heifers was reported by Oettlé and Coubrough (8) and Balasubramanian et al. (9) and recently in a calf (10). However, no information regarding the subsequent fertility parameters was recorded. This case report describes the surgical and hormonal treatment of CFL and a normal parturition after pregnancy in a Brown-Swiss heifer.

2. Case history

A 13-month-old Brown-Swiss heifer was referred to the university animal hospital with the complaint of mating problems because of abnormality of the vulva. The owner noted that the heifer did not show any estrous behavior, since it was born with a closed vulva. On gross appearance of the vulva, only 2 small openings of 0.7 and 0.3 cm in diameter in the dorsal and ventral vulvar commissures were observed, respectively (Figures 1A and 1B). The dorsal opening had a connection with the vagina, whereas

the ventral opening presented a blind pouch. It was detected that normal vulvar skin covered a thick band of fibrous tissue between the 2 openings. Vaginal examination was achieved by small animal vaginal speculum, since the vulva was too narrow to use a large speculum. The hymen and vaginal mucosa were clearly observed. During the examination, the heifer urinated spontaneously. However, the urine spurted from the dorsal opening. Ultrasonography (6.0–8.0 MHz linear array transducer, Falco Vet 100, Maastricht, the Netherlands) of the genital tract was then performed.

Blood samples were obtained from the jugular vein and submitted for hormonal analysis. Serum progesterone, 17 β -estradiol, and testosterone concentrations were determined by electrochemiluminescence immunoassay (ECLIA, Cobas E, Roche Diagnostics GmbH, Mannheim, Germany), according to the manufacturer's instructions. Finally, the heifer was submitted to surgery.

Caudal epidural anesthesia was performed with lidocaine HCL (Vilkain; 20 mg/mL; Vilsan, Ankara, Turkey). The perivulvar area was prepared for aseptic surgery. Moreover, infiltration anesthesia was performed for the left and right vulva labia. After anesthesia, the thick band of fibrous tissue between the 2 openings of vulva was carefully incised by surgical blade to avoid any irregular incision on the vulva mucosa. The longitudinal section of the vulva confirmed that the vaginal canal was present and communication was evident from the vulva to the vagina and cervix uteri (Figure 1C). The closure of

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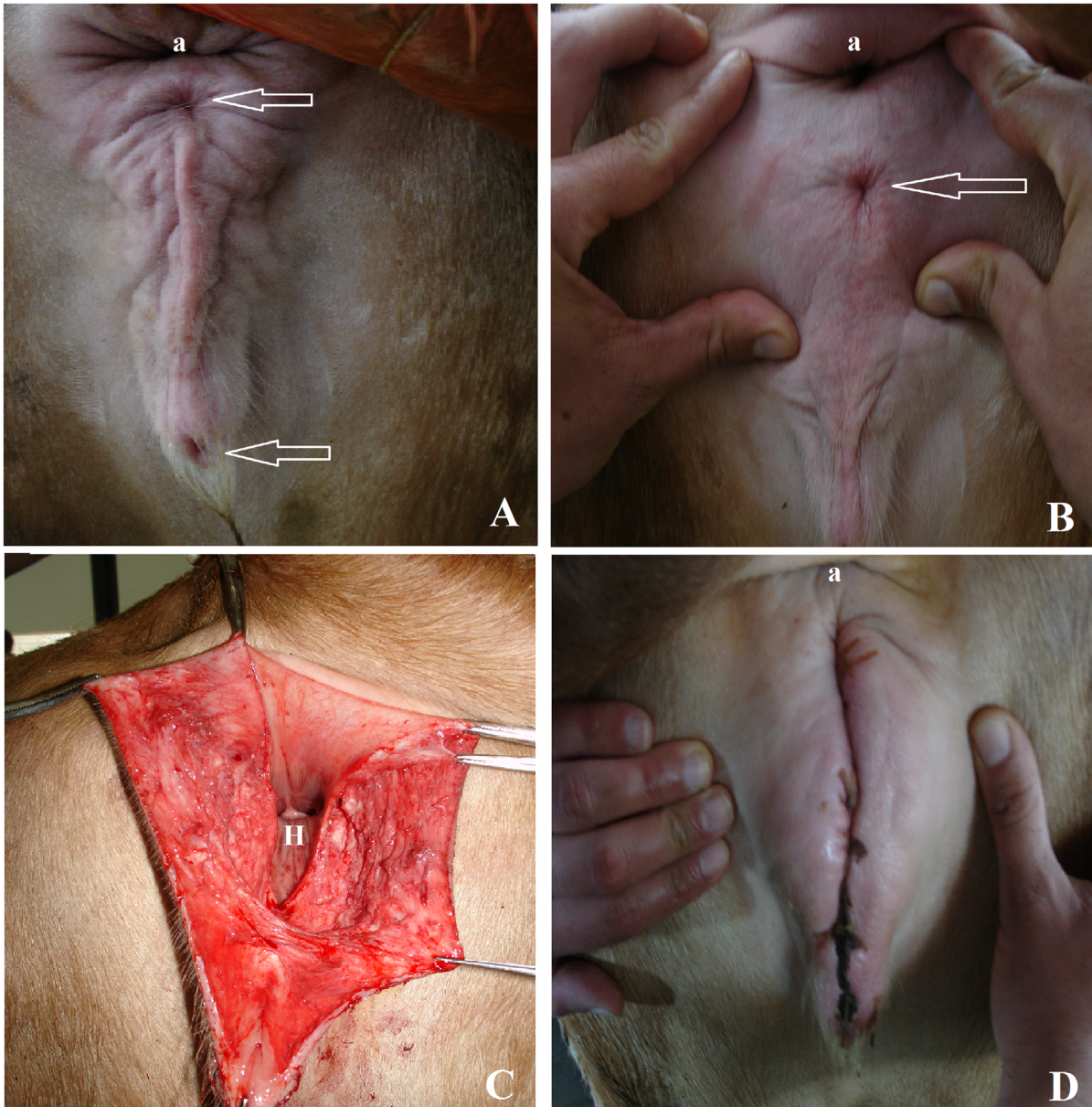


Figure 1. Fused vulva labia in a Brown-Swiss heifer. A and B) Gross appearance of vulva with only 2 small openings (arrows) of 0.7 and 0.3 cm in diameter in the dorsal and ventral vulvar commissures, respectively. It was observed that normal vulvar skin covered a thick band of fibrous tissue between the 2 openings. C) During surgery, the connection of the dorsal opening with the vagina and the presence of a blind pouch in the ventral opening proved the findings of vaginal inspection. Moreover, the hymen and vaginal mucosa were clearly evident. D) On day 9 following surgery, physiological edema was present on both vulva labia. a: anus, H: hymen.

the vulva mucosa was achieved with sterile 2/0 polyglactin 910 sutures (Vicryl, Ethicon, İstanbul, Turkey). At the end of the surgery, a single dose of intramuscular ketoprofen (Vilprofen, 3 mg/kg, Vilsan) was administered.

During the postoperative period, the heifer was medicated with an intramuscular injection of 1 mg/kg ceftiofur hydrochloride (Ceftivil, Vilsan) for 3 days. The

patient was scheduled to visit on postoperative day 9 and the removal of the sutures was accomplished. Although physiological edema was present on both vulva labia, no mucopurulent/purulent discharge was observed (Figure 1D). Twenty-eight days after surgery, the heifer showed a spontaneous standing heat. On the seventh day after standing heat, ultrasonography revealed that a corpus

luteum was evident in the right ovary. An intramuscular single dose of prostaglandin $F_{2\alpha}$ ($PGF_{2\alpha}$) analogue (*d*-cloprostenol, 0.15 mg, Sincromic, Vilsan) was given to the heifer and artificial insemination (AI) was performed at approximately 72 h following the $PGF_{2\alpha}$ injection. The conceptus was monitored by ultrasonography on day 28 following AI. During normal delivery of a healthy male calf no complications, i.e. external genital tract abnormality of calf, dystocia, retentio secundinarium, or vaginal prolapse, were observed.

3. Results and discussion

Leipold and Dennis (11) reported congenital defects in cattle involving the musculoskeletal system (24% of defects), respiratory and alimentary tracts (13%), central nervous system (22%), abdominal wall (9%), urogenital system (4%), cardiovascular system (3%), skin (2%), and others (4%). It is still not known how CFL plays a role in the prevalence of genital system abnormalities in cattle breeding and what the fertility properties are of animals affected with CFL. Therefore, this case report describes not only the development of congenital malformation of the vulva labia in a heifer, but also its successful treatment process. Since Balasubramanian et al. (9) reported CFL in a heifer and Oral et al. (10) defined a similar case in a calf, fused vulva has not been frequently described in a large ruminant in the last 2 decades. Therefore, it may be suggested that CFL is not a regular obstetric formation in ruminants.

Genetic or environmental factors, or a combination of both, are frequently pointed to as the causative factors of congenital defects (12). However, the causes of CFL are still unknown. There are some suggestions that external as well as internal congenital anomalies of the female reproductive tract may be the result of enzymatic defects or prenatal drug exposure (13) and consumption of certain types of synthetic steroids in early pregnancy (14). In the presented case, the birth of a healthy calf from a heifer with CFL might support the hypothesis that this defect was inherited recessively, as previously emphasized by Isachenko et al. (7) in common marmosets.

Ultrasonography of the genital tract revealed the presence of left (1.72×0.91 cm in diameter) and right

(2.23×1.37 cm in diameter) ovaries, both uterine horns, and cervix uteri. The right ovary presented 3 follicles of 0.53, 0.57, and 0.65 cm in diameter, whereas the left ovary had follicles of smaller than 0.5 cm in diameter. Moreover, serum progesterone, 17β -estradiol, and testosterone concentrations were 0.38 ng/mL, 37.18 pg/mL, and 2.5 ng/dL, respectively. In this case, the vulvar abnormality might be related to intersexuality or freemartin syndrome, since the owner noted no standing heat and the urine spontaneously spurting during clinical examination. Vaginal length of only 8–10 cm, the absence of a cervix (15), and occasionally an enlarged clitoris (16) such that urine may spurt upward when the animal urinates (17) are the consistent clinical finding in the mature freemartin. In the present case, the hormonal status of the prepubertal heifer was not suitable to decide whether the heifer was fertile. However, ultrasonographic examination confirmed the presence of ovaries, uterine horns, and cervix uteri. Therefore, the possible diagnosis of intersexuality or freemartin syndrome was eliminated and surgical treatment was performed.

The greater length of the vulvar portion dorsal to the ischiadic arch/pelvic bottom and greater angulation of vulva, shorter perineum and longer vulvar length, and presence of vulvar aperture demonstrate an increased risk for the occurrence of pneumovagina and/or urovagina. Moreover, it was assumed that pneumovagina and/or urovagina was the most important predisposing factors for uterine infections (18). Therefore, when approaching a clinical situation such as CFL, any postoperative complication such as pneumovagina and urovagina or both would be expected after surgical treatment. Nevertheless, in this case, purulent/mucopurulent/foamy vaginal discharge was not observed, except for physiological edema, during the postoperative period. These clinical findings suggested that the surgical therapy was successfully performed without any deformity in the vulva of the heifer.

To conclude, this is the first report describing the treatment process for CFL from the beginning of the surgical therapy to the end of the parturition. The presented case provides evidence that CFL may be easily treated surgically.

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