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Persistent Hymen in a Jersey Crossbred Heifer-A Novel Approach with Borescope

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ABSTRACT

Background: Visualizing the internal genital organs in cattle using vaginoscope or endoscope is a costly affair and practically it is not possible to use this instrument in diagnosis of anatomical defects causing infertility under field conditions. An attempt was made to replace the costly instruments with low cost and easily available borescope in the diagnosis of persistent hymen in a Jersey crossbred heifer and the procedure has been reported for the benefit of field veterinarians and theriogenologists.

Methods: A Jersey crossbred heifer with normal estrous cycle length and that failed to conceive even after 6 inseminations with fertile semen was presented to the Gynaecological ward. Rectal examination revealed a fluctuating swelling in the vagina. Vaginal examination revealed obstruction in the passage and the vaginal speculum could not be progressed into the vagina. Ultrasonographic examination revealed hypoechoic fluid in the vaginal cavity. A novel approach with borescope revealed a clear view of the membranous obstruction at the level of vagino-vestibular junction. Hence, the case was diagnosed as persistent hymen and hymenotomy was performed.

Result: Upon hymenotomy, about two litres of thick, gummy, tenacious reddish brown colored mucus was evacuated from the vagina. The patency was checked and the animal was treated with antibiotics for three days. The animal was inseminated at the subsequent estrus on the 22nd day and pregnancy was confirmed on 45th day. The animal calved normally and delivered a live male calf. Thus, the borescope could be effectively used in the field of animal reproduction as an alternative tool for the diagnosis of developmental defects in the vagina.

Key words: Borescope, Infertility, Heifer, Hymenotomy, Persistent hymen.

INTRODUCTION

Hymen is formed by the epithelial linings of the vaginal canal, the urogenital sinus and a thin intermediate layer of mesoderm (Roberts, 1971). It is located as a transverse membranous fold at the vagino-vestibular junction. It is well defined in the ewe and mare, but ill-defined in the cow and sow (Kumar, 2009). Persistent hymen is the developmental defect of the external tubular genetalia. This may be seen as a constriction in the vagina in front of the urethral opening as a partition between vagina and vulva.

The diagnosis of the persistent hymen was reported through rectal examination (Kumar *et al.,* 2016), vaginal examination (Kumar *et al.,* 2020), vaginal speculum with ultrasound (Sutaria *et al.,* 2015) and endoscope in mare (Dascanio, 2014). Infertility due to development defects were poorly diagnosed, neglected and the animals were culled in the field level. Borescope could be an alternate diagnostic tool to endoscope and vaginoscope under field condition. The current study reports a borescopic aided clinical diagnosis of persistent hymen and its successful surgical management in a Jersey crossbred heifer upto its delivery.

MATERIAL AND METHODS

Clinical observation

A 2½ years old Jersey crossbred heifer was presented to VCC, VCRI, TANUVAS, Namakkal with the history of frequent bellowing, mounting on other animals, absence of cervical mucus discharge, expressed estrus for 6-7 times at an interval of 18-21 days, but failed to perform artificial insemination during estrus by an inseminator and a field veterinarian.

Clinical examination

General clinical examination revealed the animal had 38.6°C temperature, 64/ min heart rate, 30/min respiratory rate with normal rumen motility. Thus all the vital parameters were found to be normal.

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Rectal and vaginal examinations

Rectal examination revealed fluctuating swelling in the vagina and the cervix. The uterus was tonic and the ovaries were found to be normal. Vaginal examination revealed an obstruction in the birth passage. On careful vaginal examination using vaginal speculum, urethral opening was found normal and further vagina was non patent with presence of transverse membranous fold (Fig 1) in the posterior part of vagina adjacent to urethral opening, which was occluding the passage communicating with rest of tubular genitalia. Urinary catheterization was done to check the involvement of the urinary bladder. The urinary passage was found normal.

Ultrasonographic examination

Ultrasonographic examination showed hypoechoic to echogenic fluid that filled the vagina and revealed grayish white grainy particles floating in the fluid (Fig 2). Uterus and ovaries were visualized to be normal.

Borescopic examination

In the present case, borescope was used as a new diagnostic aid in the field of animal reproduction. Borescope (Fig 3) is an instrument used to visualize the bore pipes to know the depth of water in bore well and applied with applicator, which can be connected to mobiles, laptops *etc*., using USB port. It could be an alternate for endoscopy and vaginoscope which are costly and not readily available for field condition. Whereas, the borescope is a portable, cheap and highly useful in the field condition to diagnose this type of cases. It aided in the confirmative diagnosis and for the easy hymenotomy to revive the fertility of the animal.

RESULTS AND DISCUSSION

Borescopic examination added the view to confirm the case as persistent hymen and to visualize its complete structure. During borescopic examination, a thick transverse membranous muscular band was diagnosed as persistent hymen in front of vestibulo-vaginal junction (Fig 4). The animal was given epidural anesthesia with 2% Lignocaine HCl @ 1 ml/100 kg b. wt. The hymen membrane was punctured by borescopic aided hymenotomy using obstetrical hook for small ruminants. Subsequently, the punctured hymen was completely torn by passing the hand with gentle pressure. Further, borescopic examination through the passage revealed accumulation of mucus like fluid in the vagina (Fig 5). About 2 litres of thick, gummy, tenacious, reddish brown colored mucus was evacuated from the vagina (Fig 6)**.** Immediate borescopic examination revealed patency of the vagina**.** Later, intra-vaginal douche was given with 5-6 litres of 2% potassium permanganate solution. After flushing, vagina was examined using borescope through vaginal speculum and revealed normal patent vagina (Fig 7). Animal was injected with Inj. Streptopenicillin 5 grams i/m, Inj. Chlorpheniramine maleate 100 mg i/m and intra-uterine administration of suspension Ciprofloxacin and tinidazole 30 ml.

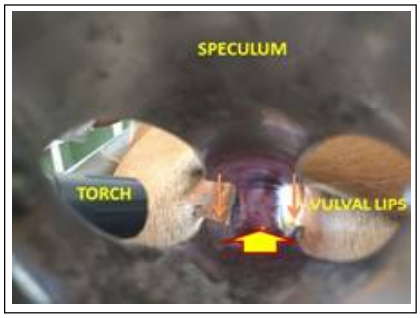


Fig 1: A transverse membranous fold is seen through vaginal speculum indicated by an arrow.



Fig 2: Ultrasonographic examination showed hypoechoic to echogenic fluid filled in the vagina with grayish white grainy particles floating in the fluid.

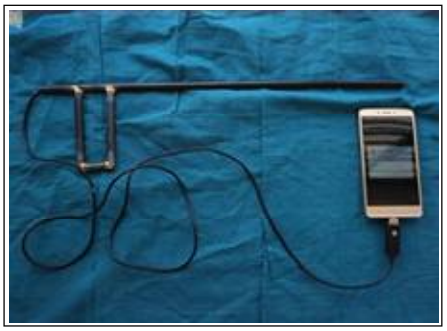


Fig 3: Borescope assembly.



Fig 4: Borescopic examination confirmed the presence of persistent hymen.

The treatment was repeated for 2 more days and the vaginal patency was checked using borescope. Animal showed an uneventful recovery and was observed in estrus after 22 days of hymenotomy. Animal was inseminated successfully and diagnosed pregnant after 45 days. By telephonic communication, the animal was followed continuously and the owner reported that the animal calved a male calf normally after 282 days of artificial insemination.

Persistent hymen was relatively rare in cattle, occasional in buffaloes (Kumar *et al.,* 2016) and also reported in human beings (Yu and Lin, 1993). Complete obstruction of hymen in the present case caused accumulation of secretions in the vagina. Accumulation occurred as the normal outflow of the uterine secretions was prevented by the complete persistency of the hymen leading to accumulation of fluid that increased with the age and the cyclic ovarian activity of the animal (Troiano and McCarthy, 2004). In the presented case, about 2 litres of thick, gummy, tenacious, reddish brown colored mucus was evacuated from the vagina. Similarly, red copious discharge was evacuated by Kumar *et al.* (2020) in a HF heifer. Madhusudhan *et al.* (2016) found that the duration and the volume of fluid accumulated might had affected the endometrium via pressure atrophy leading to embryonic loss if fertilization had occurred or some permanent blockage might have occurred that prevented fertilization. But in the present case, the animal conceived in the subsequent estrum itself, which might be due to the sterile environment maintained in the uninfected uterus.

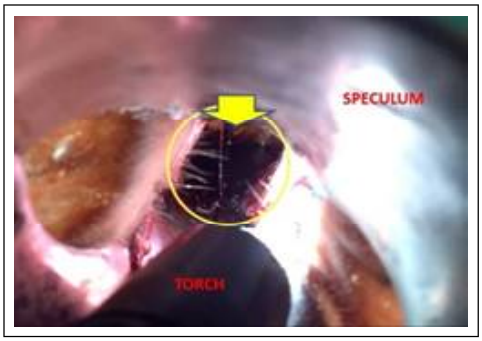


Fig 5: Borescopic examination through the passage using vaginal speculum revealed accumulation of mucus like fluid in the vagina.



Fig 6: About 2 litres of thick, gummy, tenacious, reddish brown colored mucus was evacuated from the vagina.

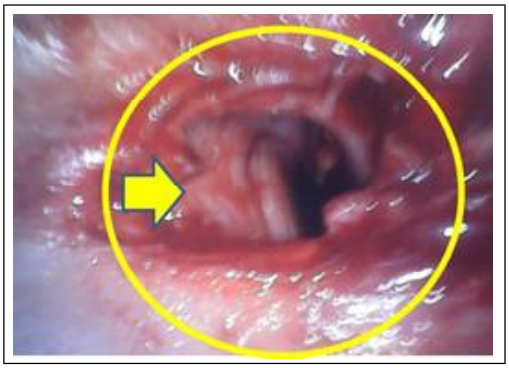


Fig 7: Borescopic examination revealed patency of the vagina.

In this case, hymenotomy was performed by puncturing the hymen using sharp long obstetrical hook for small ruminants. Incising the hymen at the point of greatest bulge followed by enlarging the incision at the right angles longitudinally in all four directions or by circular incision on outer hymenal border was recommended by Roberts (1971). Dascanio (2014) suggested that if the hymen does not rupture with digital pressure, a surgical procedure may be needed to open the thickened membrane. The patency of the hymen was achieved by making circular incision using BP blade No. 22 (Chaudhary *et al*., 2007) and trocar guarded by finger and the opening was further dilated by digital pressure (Kumar *et al.,* 2016). The recurrence of the condition was noticed by Singh and Singh (1999) which did not occur in the present case. The recurrence could be prevented by douching of vagina with potassium permanganate and boroglycerine lotion (Singh and Singh, 1999). In the present case, intravaginal douching was done with 2% potassium permanganate solution to prevent adhesions at incision site and the patency was visualized with borescope.

In the present case, ultrasonographic view revealed ovaries were normal with follicles. Singh and Singh (1999) have reported a successful treatment of a heifer that calved subsequently. Similarly, in this case the prognosis in terms of fertility was good and the animal had calved successfully. In the present case, borescope was used as a new diagnostic aid in the field of animal reproduction as an alternative for endoscope and vaginoscope which are costly and not available under field condition. Whereas, the borescope is portable, cheap and highly useful to diagnose defects in the vagina and external os of the cervix. The device is also helpful in documentation of the conditions by recording the videos and pictures through a mobile phone or a laptop.

Conflict of interest

All authors declare that they have no conflict of interest.

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