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Complete persistent hymen and vaginal agenesis associated with Mucometra in a Jersey crossbred heifer

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Abstract

A Jersey crossbred heifer was brought to the Gynaecology unit with the history of straining to void urination, prolapse of vagina while lie down for past one week. Further, owner reported that animal was inseminated three months back with local inseminator. Vaginal speculum examination revealed a thick band of tissue in front of urethral orifice obstructing the external vaginal passage. Massive enlargement of genitalia with fluid thrill and without any clear demarcation of genital parts was observed on rectal palpation. Excessive amount of anechoic to hypo-echogenic fluid accumulation visualized in front of vaginal band during trans-rectal ultrasonographic assessment. Based on gynaecological, speculum and ultrasonographic examination the case was diagnosed as imperforate hymen.

Keywords: Persistent hymen, crossbred jersey heifer, Mucometra, vaginal agenesis, vaginal speculum

Introduction

In early embryonic life the hymen is formed from the epithelial lining of mesoderm of paramesonephric duct and also from the Uro-genital sinus at the vagino-vestibular junction in domestic animals (Roberts, 1974) [1]. Communication between the lumen of the caudal portion of vagina and vestibule occurs through canalization of the hymen during fetal period or at birth (Roberts, 1974) [1]. If failure of canalization of hymen result in persistent of hymen, which culminate to blockage of vagina there by preventing the outflow of genital secretion (Parkinson, 2001) [2]. Complete failure of canalization of hymen (persistent hymen) has been reported previously in Jersey crossbred (Kumar *et al.*, 2017 and Satheshkumar *et al.*, 2020) [3, 4], Holstein Friesian (Kim *et al.*, 2012 and Kumar *et al.*, 2020) [5, 6] and Murrah buffalo (Kumar *et al.*, 2016 and Singh *et al.*, 2022) [7, 8] heifers.

Usually persistent hymen condition can be corrected by circumferential incision made over the hymen to reach the cervix and evacuate the content which is present in the vagina and uterus (Kumar *et al.*, 2016) [7] whereas the present paper places on record on a rare case of imperforate hymen with absence of vaginal passage, where the circumferential incision directing the hands to peritoneum instead of cervix or internal genital organ.

Case history and clinical observation

A two and half year old Jersey crossbred heifer was brought to the Gynaecology unit, Veterinary Clinical Complex, Veterinary College and Research Institute, Salem with the history of straining to void urination and prolapse of vagina while lying down for past one week. Further, owner reported that animal was inseminated more than five times local inseminator and last insemination was done three months back. On averting of vulval lips there was a thick band like structure anterior to the urethral orifice which was completely obstructing the vaginal passage was noticed. The vaginal speculum examination also confirmed the complete obstruction by the band about 2 inches cranial to the urethral orifice (Figure 1).

There was massive enlargement of genitalia with fluid thrill and without any clear demarcation of vagina, cervix and contour of uterine horn was observed on rectal palpation. Excessive amount of anechoic to hypo-echogenic fluid accumulation visualized in the genitalia through trans-rectal ultrasonographic assessment.

The anechoic fluid distention was observed cranial to the vaginal obstruction. Based on gynaecological, vaginal speculum, rectal and ultrasonographic examination the case was diagnosed as imperforate hymen culminate to excessive accumulation of genital secretion.

Treatment and discussion

The cattle was restrained in trevis and epidural analgesia was performed by using 2% lignocaine (3 ml) at sacro-coccygeal space. Perineal area was cleaned using 1% KMNO₄ solution and disinfected with Povidone iodine. The persistent hymen was demarcated and a BP blade with scalpel was used to remove an oval-shaped ellipse (circumferential) of the center of the hymen (Figure 2). Once this layer was removed, there was a continuation of fibrous tissue adhesion, which would be unusual for an imperforate hymen. Further, the opening was extended manually after through lubrication. That extended opening did not route to the cervical canal, instead of that the extended opening routing the hand towards the caudal abdominal cavity (Figure 3). At this point, it was decided to terminate the surgical procedure with the concern of damaging or injuring the bladder or the floor of the rectum and uncertainty of where the external os of the cervix was located. Hence, the case was concluded as imperforate hymen coupled with vaginal agenesis and mucometra in heifer. The advice was given to the animal owner about the failure of future breeding potential of animal. The case was discharged from the hospital campus.

On perusal of literature, there was no such reports were available in cattle and buffalo. Hence, the first report to place on record a case of imperforate hymen coupled with vaginal agenesis and mucometra in farm animal. In early embryonic life, paramesonephric duct fused to form the tract of female genitalia, where the vaginal agenesis is caused by the underdevelopment of the paramesonephric duct and the urogenital sinus failing to form the caudal portion of the vagina, resulting in fibrous tissue replacing the cranial vagina (Hoffman *et al.*, 2020) [9]. In human patients with imperforate hymen and vaginal agenesis often present with additional urological problems like discomfort in urination (Hoffman *et al.*, 2020) [9]. Similarly in the present case also animal exhibited discomfort while urination. The present case recorded similar clinical signs with the reports of Satheskumar *et al.* (2022) [10] who also observed clinical signs like severe straining and occasional prolapsing of vaginal mass with scanty urination. However, they recorded persistent hymen with hydrocolpos in pregnant heifer, they opined that possibility of pregnancy to micro-perforation in the persistent hymen or spontaneous closure of hymen during pregnancy. In the present case also, owner brought the animal with the history of heifer was inseminated by local inseminator 3 months back, but no positive signs of pregnancy was visualized in trans-rectal ultrasonographic examination. Failure of pregnancy in the present case might be due to failure of artificial insemination catheter to pass through the birth canal.

First-line treatment is ideally to puncture the imperforate hymen and surgical creation of a neo-vagina is a more immediate option in human (Hoffman *et al.*, 2022) [11], whereas in farm animal creation of neo-vagina is not possible because narrow lumen of the caudal portion of the genitalia. Interestingly, Kim *et al.* (2012) [5] recorded imperforate hymen with hydrocolpos in a Holstein heifer, followed by successful insemination, conception and delivery after removal of the imperforate hymen. On the other hand Kumar

et al. (2016) [7] found buffalo heifer failed to conceive with follow-up for one year after the treatment of imperforate hymen. They opined that duration and volume of fluid accumulation could have affected the endometrium via pressure atrophy leading to embryonic loss if fertilization occurred which might be the reason for the reproductive failure. In the present case, no passage to reach cervical canal, hence the animal was not suitable for breeding and advised to owner accordingly.



Fig 1: Thick Persistent hymen 2 inches cranial to the urethral orifice



Fig 2: The persistent hymen was demarcated and a BP blade with scalpel was used to remove an oval-shaped ellipse (circumferential) of the center of the hymen



Fig 3: Extended opening on the hymen did not route to the cervical canal, instead of that the extended opening routing the hand towards the caudal abdominal cavity

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Conclusion

This report documents a rare case of imperforate hymen coupled with vaginal agenesis and mucometra in a Jersey crossbred heifer. The condition led to straining during urination and prolapse of the vagina, with extensive enlargement of the genitalia observed upon examination. Surgical intervention attempted to correct the imperforate hymen, but unexpected findings of fibrous tissue adhesion and the absence of a route to the cervical canal prompted the termination of the procedure. This unique case underscores the importance of considering anatomical abnormalities in reproductive disorders of farm animals. While human patients may undergo surgical creation of a neo-vagina, such options are not feasible in farm animals due to anatomical constraints. The absence of a passage to the cervical canal rendered the animal unsuitable for breeding. This case highlights the need for further research and awareness regarding reproductive anomalies in livestock.

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