

## A Case of Imperforate Hymen with Hydrocolpos in a Holstein Heifer

Ill-Hwa Kim<sup>1</sup>, Hyun-Gu Kang and Tai-Young Hur\*

College of Veterinary Medicine, Chungbuk National University, Cheongju 361-763, Korea

\*National Institute of Animal Science, RDA, Cheonan 330-801, Korea

(Accepted: August 06, 2012)

**Abstract :** A vaginal speculum examination of a 17-month-old Holstein heifer with a history of repeated artificial insemination (AI) failures via the cranial vagina revealed the presence of an intact hymen (imperforate hymen) beyond the external urethral orifice, which resembled the vaginal wall. An ultrasonographic examination detected hypoechoic fluid within the vaginal cavity between the intact hymen and the cervix, indicating the presence of hydrocolpos. After sedation and epidural anesthesia, the intact hymen was incised using a scalpel and scissors and removed, while the incised portions were sutured using a simple interrupted method. The heifer became pregnant after three consecutive estruses with the intervals of approximately 20 days and concomitant AIs. The heifer gave birth to a healthy male calf with no complications after a 291-day gestation period. This case reports the presence of an imperforate hymen with hydrocolpos in a Holstein heifer, followed by successful insemination, conception and delivery after removal of the imperforate hymen.

**Key words :** Holstein heifer, hydrocolpos, imperforate hymen.

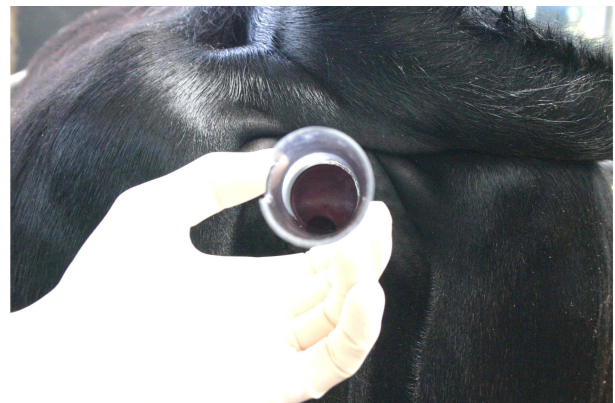
### Introduction

The hymen is formed via the fusion of the Mullerian ducts and the urogenital sinus, and it disappears during the fetal period or after birth in domestic animals, although it remains as a mucous membrane fold in human females (5). The persistence of an intact hymen (imperforate hymen) is regarded as a congenital reproductive anomaly, which has been reported rarely in animals, e.g., mares (4,7,10), bitches (8,9), and a Murrah buffalo heifer (6). This condition may result in the blockage of the vagina in female animals, thereby preventing the outflow of genital secretions and the formation of a hydrocolpos or hydrometrocolpos (2), which results in infertility due to the failure of successful copulation or artificial insemination (AI). This case study reports an imperforate hymen with hydrocolpos in a Holstein heifer that had a history of repeated failures of AI via the cranial vagina, which was referred to the Veterinary Medical Center, Chungbuk National University to determine the cause of the reproductive anomaly.

### Case

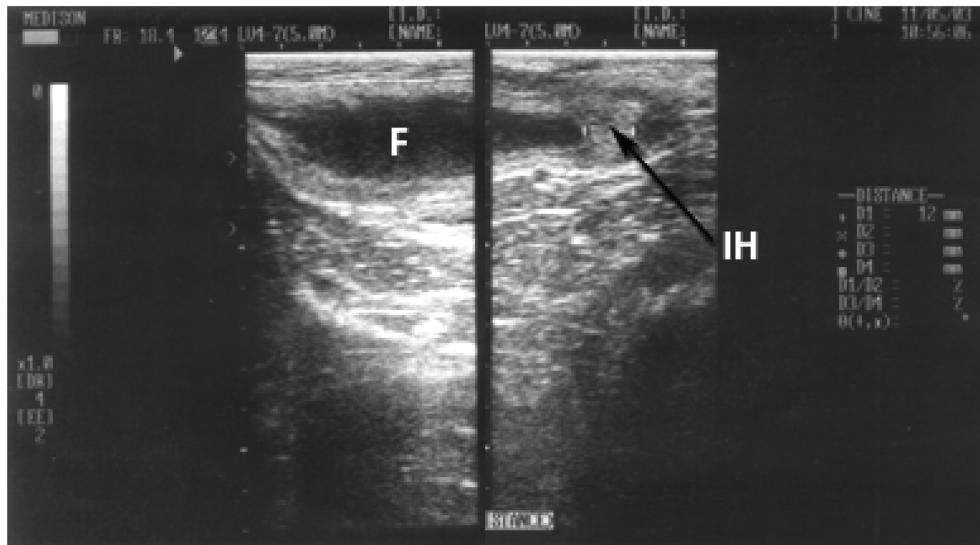
A 17-month-old Holstein heifer with a history of repeated failures of AI via the cranial vagina presented at the Veterinary Medical Center, Chungbuk National University. Rectal palpation of the reproductive organs including the cervix,

uterus and ovaries indicated normal structures, but a vaginal speculum examination detected an intact hymen (imperforate hymen, Fig 1) beyond the external urethral orifice, which resembled the vaginal wall. An ultrasonographic examination (Sonoace 600 with 5.0 MHz linear-array transducer; Medison Co Ltd, Seoul, Korea) detected the presence of hypoechoic fluid within the vaginal cavity between the intact hymen and the cervix, indicating the presence of hydrocolpos (Fig 2). However, the ultrasonographic examination showed that the cervix and uterus did not contain fluid. Furthermore, there was a corpus luteum on the right ovary and a follicle on the left ovary, which appeared to be normal. Based on the vaginal speculum and ultrasonographic examinations, the heifer was diagnosed with imperforate hymen and hydrocolpos.



**Fig 1.** Diagnosis of the imperforate hymen by vaginal speculum examination.

<sup>1</sup>Corresponding author.  
E-mail : illhwa@cnu.ac.kr



**Fig 2.** Ultrasonographic images of the cranial vagina sectioned longitudinally. This image was obtained by the assembly of sequential images. F indicates the fluid accumulated within the vaginal cavity between the intact hymen and cervix. IH indicates the imperforate hymen.



**Fig 3.** Insertion of a urinary catheter into the bladder prior to surgery.



**Fig 4.** Suturing of the incised portions of the hymen using a simple interrupted method.

After sedation with 0.1 mg/kg xylazine hydrochloride (Rumpun<sup>®</sup> 2% inj, Bayer, Korea) and epidural anesthesia with lidocaine HCL (Lidocaine<sup>®</sup> 2% Inj, Dai Han Pharm Co Ltd, Korea), a vaginal speculum was inserted into the vaginal cavity, followed by insertion of a urinary catheter into the bladder (Fig 3). Subsequently, the intact hymen was incised from the border of the vaginal wall using a scalpel and scissors, while the incised portions were sutured using a simple interrupted method (Fig 4). After the intact hymen was cut, a dark red-brown mucoid fluid discharged from the vagina. The sutured area was disinfected with povidone iodine solution (Betadin<sup>®</sup>, Korea Pharm, Korea) daily for five days. Antibiotics, 1,250 mg/kg Cefazolin sodium (Cefazol<sup>®</sup> inj, Eagle Vet, Korea) were administered intramuscularly for five days following surgery.

Natural estrus was detected nine days after surgery. However, AI was not applied. The heifer became pregnant after

three consecutive estruses with intervals of approximately 20 days and concomitant AIs. The heifer gave birth to a healthy male calf weighing 40 kg with no complications, following a 291-day gestation period.

## Discussion

This case reports an imperforate hymen with hydrocolpos in a Holstein heifer, which was determined by vaginal speculum examination and subsequent ultrasonographic assessment. The procedure used for diagnosis of the present case was similar to other reports, i.e., vaginoscopy and ultrasonography were used for a mare (7), although vaginoscopy alone was used for a buffalo heifer (6). However, endoscopy, ultrasonography, and radiography were used to diagnose this abnormality in a bitch (9). The main motivation for the determination of an imperforate hymen and hydrocolpos in this case was a breed-

ing problem, i.e., repeated failures of AI via the cranial vagina, but with no other complaints. Similar breeding problems attributable to imperforate hymen have been reported, e.g., eight failures of natural matings in a Murrah buffalo heifer (6) and repeated refusals of a stallion's services in a grey hunter mare (4). However, previous reports have included other complaints related to an imperforate hymen, such as a mass protruding from the vulva (7) and abdominal pains (10) in mares. Signs of dysuria and dyschezia, presumably due to the displacement of the urinary bladder and expansion of the urethra, were reported in a bitch (9). In addition, abdominal pain, distension of the lower abdomen, and acute urinary retention were reported in a human female (3).

In the present study, there was a thick hymen measuring 12 mm in width (based on ultrasonographic examination), which resembled the uterine wall and this was similar to a previous case in a mare (7). The persistence of the imperforate hymen beyond the external urethral orifice in the present case caused the accumulation of a dark red-brown mucous fluid in the vagina. A previous report also stated that about 4 L of mucus accumulated in the vagina of a buffalo heifer (6). A brown-red fluid or thick green-brown fluid was also reported in bitches (8,9). The brownish color of the fluid that accumulated in the vagina may have been due to postestrus bleeding in our heifer, whereas it was due to proestrus bleeding in bitches in other reports (8,9). However, a mucoid opaque fluid was discharged from the vagina of a virgin mare that had never been in estrus or bred.

In the current case, the intact hymen was cut with a scalpel and scissors along the border of the vagina and the cut area was sutured using a simple interrupted method. In a previous report, however, the hymen wall was punctured with pointed scissors and dilated using a vaginal speculum but without suturing in a buffalo heifer (6). Similarly, three incisions were made from the center of the hymen to the periphery, followed by manual expansion of the incisions in a mare (7). By contrast, the treatment of a human female involved a central oval incision and subsequent insertion of a 16F Foley catheter for 14 days (1). Ovariohysterectomy was performed on a bitch with imperforate hymen and hydrocolpos, and the dissected part of the hymen was sutured around the vaginal wall (9). Following surgery to remove the imperforate hymen in the present case, successful AI, conception, and delivery with no

complications may indicate a good prognosis for the reproductive abnormality. Similarly, an 11-year-old grey hunter mare with imperforate hymen was served without trouble and eventually foaled following the removal of the hymen (4).

The present report demonstrated that a diagnosis of imperforate hymen with hydrocolpos was made using vaginal speculum and ultrasonographic examinations of a Holstein heifer with a history of breeding problems. Surgical removal of the imperforate hymen allowed the animal to become pregnant and deliver with no complications.

### Acknowledgments

This work was carried out with the support of the "Cooperative Research Program for Agriculture Science & Technology Development (Project No. PJ008464)" Rural Development Administration, Republic of Korea.

### References

1. Acar A, Balci O, Karatayli R, Capar M, Colakoglu MC. The treatment of 65 women with imperforate hymen by a central incision and application of foley catheter. *BJOG* 2007; 114: 1376-1379.
2. Adaletli I, Ozer H, Kurugoglu S, Emir H, Madazli R. Congenital imperforate hymen with hydrocolpos diagnosed using prenatal MRI. *AJR* 2007; 189: W23-W25.
3. Bakos OB, Berglund L. Imperforate hymen and ruptured hematosalpinx: a case report with a review of the literature. *J Adolesc Health* 1999; 24: 226-228.
4. Harris AS. Persistent hymen in the mare. *Vet Rec* 1956; 68: 618.
5. Hobday AJ, Haury L, Dayton PK. Function of the human hymen. *Med Hypotheses* 1997; 49: 171-173.
6. Phogat JB, Chandolia RK, Gupta SL. Persistent hymen in a murrah buffalo heifer. *Ind Vet J* 1993; 70: 75.
7. Raggio I, Lefebvre R, Vaillancourt D. Theriogenology question of the month. Persistence of an intact hymen (imperforate hymen). *J Am Vet Med Assoc* 2005; 226: 205-207.
8. Somers SM. Case of persistent hymen. *Vet Rec* 1991; 23: 288.
9. Tsumagari S, Takagi K, Takeishi M, Memon MA. A case of a bitch with imperforate hymen and hydrocolpos. *J Vet Med Sci* 2001; 63: 475-477.
10. Wright IM. Unusual cause of abdominal pain in a filly. *Vet Rec* 1982; 111: 283-284.

## 홀스타인 미경산우에서 질수증을 동반한 무공질판막 일례

김일화<sup>1</sup> · 강현구 · 허태영\*

충북대학교 수의과대학, \*국립축산과학원

**요 약** : 질을 경유한 반복된 인공수정 실패의 병력을 가진 17개월령 홀스타인 미경산우에서, 질경 검사로 바깥요도구 명 후방에 무공질판막의 존재를 확인하였으며, 이것은 질벽과 비슷한 외관을 보여주었다. 초음파검사 결과 질판막과 자궁경 사이 질강 내에 저에코성 액체의 존재, 즉 질수증의 동반을 확인하였다. 미경산우를 진정 및 경막외마취 후, 수술용 칼과 가위로 무공질판막을 절개 및 제거하였으며, 절개 부위는 단순결절봉합 하였다. 미경산우는 약 20일 간격의 3회 연속 발정에 따른 인공수정 후 임신되었으며, 수정일로부터 291일 경과 후 건강한 수컷 송아지를 순산하였다. 본 증례는 홀스타인 미경산우에서 질수증을 동반한 무공질판막의 발생과 질판막의 제거 수술 후 성공적인 인공수정, 임신 및 분만을 보고한다.

**주요어** : 홀스타인 미경산우, 질수증, 무공질판막