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Mucometra as an unusual cause of repeat breeding due to cystic ovarian disease in a Holstein Friesian crossbred cow

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Abstract

Mucometra is characterized by accumulation of mucin like substance in the uterus which has significant effects on the reproductivity in cattle and lead to economic loss.

A 3-year-old Holstein Friesian Crossbred (HF) cow was presented to the Veterinary Clinical Complex, Lokmangal Veterinary College, with a history of repeated return to estrus despite of multiple artificial inseminations. On Gynaeco-clinical examination, normal vulval mucous membrane and slightly edematous vulva noticed. Per-rectal examination revealed cervix was relaxed with tonic, enlarged, distended and doughy with edematous consistency of uterus. Further, right ovary was enlarged and a large fluid filled thick-walled structure was palpable with pitting. Further ultrasonographic examination revealed mixed echogenicity fluid without evidence of pregnancy in the uterus, suggestive of mucometra and anechoic fluid-filled cavity with diameter of 22.5 x 23.3 mm on right ovary. The case was diagnosed as mucometra due to follicular cyst. The animal was subjected to Co-synch protocol with Inj GnRH analogue @ 20µg intramuscularly on day 0. Re-examination after 7 days showed the presence of corpus luteum (CL) on the right ovary and for lysis of the corpus luteum. Inj Cloprostenol Sodium 500 mcg intramuscularly. Clinical improvement was observed following treatment, with evacuation of the uterine contents and restoration of normal reproductive function. This case highlights the importance of ultrasonography in differentiating mucometra from pregnancy and other uterine disorders in repeat breeder cows. Early diagnosis and appropriate hormonal therapy can successfully restore fertility and improve reproductive performance in affected animals.

Keywords: Holstein Friesian cow, Mucometra, Repeat breeding

Introduction

Mucometra is an uncommon uterine disorder characterized by the accumulation of sterile mucus or mucinous secretions within the uterine lumen. Depending on the degree of hydration of the retained secretion, the condition is referred to as either mucometra or hydrometra, with hydrometra containing relatively more watery fluid than mucometra (Roberts, 1971) ^[10]. The condition has been reported in cattle, horses, dogs, sheep, and goats, with an estimated incidence of approximately 1.78% in cows (Al-Dahash and David, 1977) ^[1]. In bovines, mucometra may occur secondary to congenital abnormalities such as imperforate hymen, segmental aplasia of the vagina, cervix, uterus unicornis, persistent corpus luteum, or prolonged cystic ovarian disease (Roberts and Fox, 1968) ^[11]. In ovines and caprine, mucometra is commonly associated with increased progesterone stimulation while in cow, mare and bitch it is because of increased progesterone or estrogen stimulation. Long-standing follicular cysts induce hypertrophy and cystic dilatation of the endometrial glands, resulting in excessive mucus secretion and accumulation within the uterine lumen (Jeengar *et al.*, 2014). Persistent follicular cysts cause hypertrophy of the endometrial glands, culminating in hydrometra/mucometra further, maintaining abnormal hormonal activity that promotes cystic endometrial hyperplasia and glandular dilatation, ultimately leading to excessive mucus production and retention within the uterus (Jeengar *et al.*, 2014). Consequently, affected animals frequently exhibit infertility, repeat breeding, anestrus, or irregular estrous cycles,

causing considerable economic losses to the dairy industry (Smith, 2015) [12]. Cystic ovarian disease is one of the most prevalent reproductive disorders in dairy cattle and is recognized as an important cause of subfertility and reduced reproductive efficiency (Smith, 2015) [12]. Ovarian cysts are defined as enlarged anovulatory follicular structures measuring 17-20 mm or more in diameter that persist in the absence of a functional corpus luteum and interfere with normal ovarian cyclicity (Noakes *et al.*, 2019) [8]. Depending on the degree of luteinization, ovarian cysts are classified as follicular or luteal cysts (Smith, 2015) [12]. Their development is associated with dysfunction of the hypothalamic-pituitary-ovarian axis and is influenced by factors such as high milk production, negative energy balance, heat stress, and management-related stress (Smith, 2015; Enginler *et al.*, 2012) [5]. In sheep and goats, the condition is primarily related to prolonged progesterone stimulation, whereas in cattle, mares, and bitches it may result from prolonged progesterone or estrogen stimulation (Roberts, 1971) [10]. Rectal palpation, progesterone concentration in milk and ultrasonography provides reliable evaluation of uterine contents and ovarian structures (Enginler *et al.*, 2012). Simultaneous ultrasonographic examination of the ovaries facilitates identification of associated follicular or luteal cysts, thereby improving diagnostic accuracy and treatment planning (Peter, 2004; Suresh *et al.*, 2020) [9, 13].

The present case report describes the diagnosis and successful therapeutic management of mucometra in a 3-year-old Holstein Friesian cow presented with a history of repeat breeding and cloudy discharge. The report highlights the importance of transrectal ultrasonography in differentiating mucometra from other uterine disorders and emphasizes the role of timely hormonal therapy in restoring normal reproductive function.

Case history and Clinical observation

A 3-year-old Holstein Friesian cow was presented to the Veterinary Clinical Complex, Department of Veterinary Gynaecology and Obstetrics, with a history of repeated failure to conceive despite of several artificial inseminations. According to the owner, the animal had been exhibiting regular estrous cycles at approximately 21-day intervals and had undergone multiple inseminations over the past few months without conception. The cow maintained normal feed intake, milk production was reduced and with no previous history of dystocia, retained fetal membranes, or postpartum reproductive disorders. On physical examination, the vital parameters including rectal temperature, heart rate, and respiratory rate were within normal physiological limits. External examination of the vulva revealed no evidence of abnormal swelling or purulent vaginal discharge. A small quantity of clear mucoid secretion was observed from vulva, while vaginal discharge was without any foul-smelling, suggesting the absence of active uterine infection. Per-rectal examination revealed cervix was relaxed with tonic, enlarged, distended and doughy with edematous with a distinct fluid-filled consistency of uterus. No fetal membrane slip, placentomes, or middle uterine artery fremitus could be detected, thereby eliminating pregnancy. Right ovary was enlarged and a large fluid filled thick-walled structure was palpable with pitting while on left ovary no functional structures were palpable.



Fig 1: Mucoid discharge during per- rectal examination



Fig 2: Atypical Fern pattern

The uterine fluid was aspirated and found to be watery and cloudy. An atypical fern pattern was observed, characterized by discontinuous fern branches that were poorly defined and did not exhibit clear secondary branching.

To establish a definitive diagnosis, transrectal ultrasonography was performed using a 7.5 MHz linear-array transducer. Ultrasonographic examination demonstrated accumulation of mixed echogenic fluid within the uterine lumen (Fig.3) without the presence of fetal structures or placental attachments and endometrial thickness was >8 mm. which also revealed presence of cystic follicle (Fig.4) on right

ovary with average diameter of 22.9 mm. The uterine fluid was aspirated and found to be watery and cloudy. Based on the history of repeat breeding, findings of transrectal palpation, and characteristic ultrasonographic appearance of sterile intrauterine fluid, the case was diagnosed as mucometra.

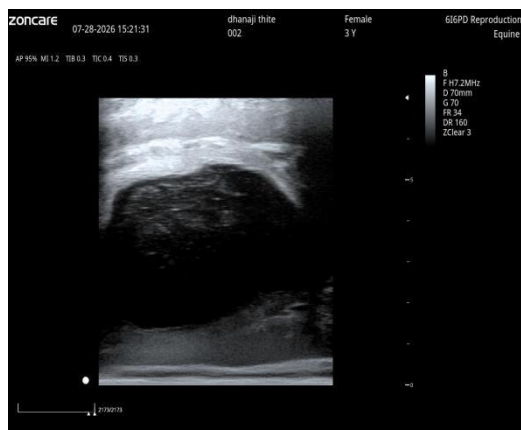


Fig 3: Ultrasound of uterus filled with fluid of mixed echogenicity



Fig 4: Ultrasound image of right ovary showing cystic follicle

Treatment and Discussion

Co-synch Protocol was implemented by administering Inj. GnRH @ 20 µg on day 0 along with evacuation of the uterine contents by per rectal manipulation was performed followed by re-examination after 7 days showed the presence of corpus luteum on the right ovary and dominant follicle on left ovary. Further, for lysis of the corpus luteum Inj. Cloprostenol Sodium 500 mcg intramuscularly administered. second GnRH @ 10 µg on day 9 IM after 2 days estrus was observed but mating was avoided. In addition to it, Inj. Dexamethasone @ 40 mg, Inj. Vit AD₃E @10 ml, Inj. Tonophosphan 15 ml I/M along with oral administration of Bolus. Cyclomin 7 for 7 days. Clinical improvement was observed following treatment, with evacuation of the uterine contents manually. Various workers (Roberts and Fox 1968, Al-Dahash and David 1972, Vahida and Jayakumar 2000) reports mucometra or hydrometra associated with multiple reproductive pathologies. Cystic ovarian follicle causes constant high blood estradiol that leads to accumulation of mucin and thinning of uterine wall (Roberts and Fox, 1968).^[11] Mucometra may be confused with the early pregnancy, which can be differentiated by absence of fetal membrane slip and ultrasonography (Dutt *et al.*, 2019).^[4] The estrogens produced by the follicular cysts have a preventive effect on ovulation (Kangonu *et al.*, 2023).^[7] The mucometra was

accompanied by endometrial hyperplasia and dilation of the endometrial glands, which can be concluded to be caused by persistent follicular cysts (Kangonu *et al.*, 2023).^[7]

Follicular cysts can be treated with GnRH, which causes the release of luteinizing hormone (LH) and luteinization of the cyst. The luteinized cyst can be sensitive to PGF₂α, and regress about 8-9 days later with the administration of PGF₂α (Brito & Palmer, 2004)^[3]. This luteinized structure can be treated with PGF₂μ later (Peter, 2004).^[9] In majority of cases, cystic follicles need repeated hormonal treatment because of non- responsiveness and chronicity of cases to various treatment regimes. But in present case, animal was repeat breeder no treatment was given previously. Therefore, removal of the cyst will destroy the estrogen source, promoting new follicular development and ovulation (Amiridis, 2009).^[2] Therefore, Co-synch protocol resolved the the present case of mucometra associated with cystic ovarian follicles.

Conclusion

The present report describes a case of mucometra due to follicular cysts, is an uncommon cause of repeat breeding in dairy cows and can be mistaken for early pregnancy or other uterine conditions which causes economic loss. Further, its diagnosis and management with Co-synch protocol successfully restored normal reproductive function. This case shows that early diagnosis and timely hormonal treatment can effectively manage mucometra associated with cystic ovarian disease and improve fertility in affected cows.

Conflict of Interest

Not available

Financial Support

Not available

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