

Handling of endometritis in dairy cow after infection with foot and mouth disease and abortion

Amalia Nadila Faradillah¹, Galuh Chandra Agustina^{2*}

¹ Koperasi Agro Niaga, Jabung, Malang Regency, East Java, Indonesia

² Faculty of Veterinary Medicine, Brawijaya University, Malang, Indonesia

* Corresponding author, e-mail: galuh.agustina@ub.ac.id

Open access under CC BY – SA license, DOI: [10.20473/ovz.v12i2.2023.107-113](https://doi.org/10.20473/ovz.v12i2.2023.107-113)

Received May 24 2023, Revised July 5 2023, Accepted August 7 2023

Published online August 2023

ABSTRACT

This study aims to report the handling of endometritis in a dairy cow at Koperasi Agro Niaga Jabung, Malang, Indonesia. A Holstein Friesian cross heifer was diagnosed at 258 days pregnant and clinically suffering from Foot and Mouth Disease. On the 266th day of pregnancy, the fetus died, an abortion was diagnosed, and the delivery was assisted by the veterinarian. Furthermore, the cow was treated with 15 mL oxytetracycline intramuscularly. The next day, the veterinarian treated the retained placenta. On the third day after the abortion, the farmer reported that the cow had vaginal discharge which was cloudy white, reddish and smelled bad. The veterinarian treated the cow with an injection of 15 mL of Oxytetracycline. On the sixth day after the abortion, the farmer reported that vaginal discharge still coming out again. Clinical symptoms were, thick, purulent, cloudy, pink discharge from the vagina that hanged in the vulva area and smelled bad. Physical examination showed a body temperature of 40°C, and rectal palpation revealed the uterine wall to be thick, hard, stiff, and getting warmer. Furthermore, the cow was given intrauterine flushing with 1% povidone-iodine (diluted in distilled water), followed by intrauterine administration of 15 mL Oxytetracycline, analgesics, antipyretics, and antispasmodics. Fifteen mL of vitamin B12, ATP, and minerals (Magnesium, Potassium, Sodium selenite) was injected intramuscularly.

Keywords: abortion, endometritis, foot and mouth disease, Holstein Friesian cross, retained placenta

INTRODUCTION

Smallholder dairy cows contribute to fulfilling community's need for milk and its main products. Reproductive health is needed to ensure the continuity of the milk production cycle and to produce calves once a year as a source of income for farmers. However, in some conditions, reproductive disorders can reduce milk production, causing infertility and sterility. One of the reproductive disorders is abortion. Abortion is the inability of the fetus to

survive after the completion of the organogenesis process. Infectious and non-infectious factors can cause abortion in dairy cows. Non-infectious factors can come from genetic problems, nutrition, trauma, twin fetuses, and artificial insemination in early pregnant cows. Meanwhile, infectious causes generally come from viruses, bacteria, and protozoa. Viruses that are commonly known to trigger abortions in general are Infectious Bovine Rhinotracheitis, Rhinotracheitis, Infectious Bovine Necrotic

How to cite this article: Faradillah AN, Agustina GC. 2023. Handling of endometritis in dairy cow after infection with foot and mouth disease and abortion. *Ovozoa: Journal of Animal Reproduction*. 12: 107-113.

Rhinotracheitis, Necrotic Rhinitis, Red Nose Disease, Bovine Coital virus. In addition, abortion can be triggered by the Foot and Mouth Disease (FMD) virus in pregnant cows (Ranjan *et al.*, 2016). Since FMD outbreaks returned to Indonesia, only one report has been published on FMD in pregnant dairy cows, followed by abortion (Ismail *et al.*, 2023).

Improper handling of abortion will cause secondary infections such as endometritis which can threaten the fertility of dairy cows. Endometritis is defined as inflammation of the endometrium. Endometritis begins with the mobility of the normal bacterial flora from the cervix and vagina into the uterine cavity (Zobel, 2013). Furthermore, secondary infection occurs by anaerobic species such as Peptostreptococcus, Peptococcus, Bacteroides, Prevotella, and Clostridium; and aerobic species include Streptococcus sp, Enterococcus, Staphylococcus, Klebsiella pneumoniae,

Proteus sp, and Escherichia coli (Wagener *et al.*, 2014). The uterine cavity and its contents are generally sterile during gestation and before parturition. At the time of parturition or shortly after, the uterine lumen is contaminated with microorganisms from the environment, skin, and animal feces (Appiah *et al.*, 2020). Secondary infections can exacerbate endometritis. This study discusses the first report of endometritis in dairy cow after FMD infection and abortion.

METHODS

This case occurred at the Koperasi (Cooperative) Agro Niaga, Jl. Suropati No. 4-6, Putuk Rejo, Kemantren, Kec. Jabung, Malang Regency, East Java 65155. The coordinates of the cooperative were at 7.9454° S, 112.7485° E (Figure 1).

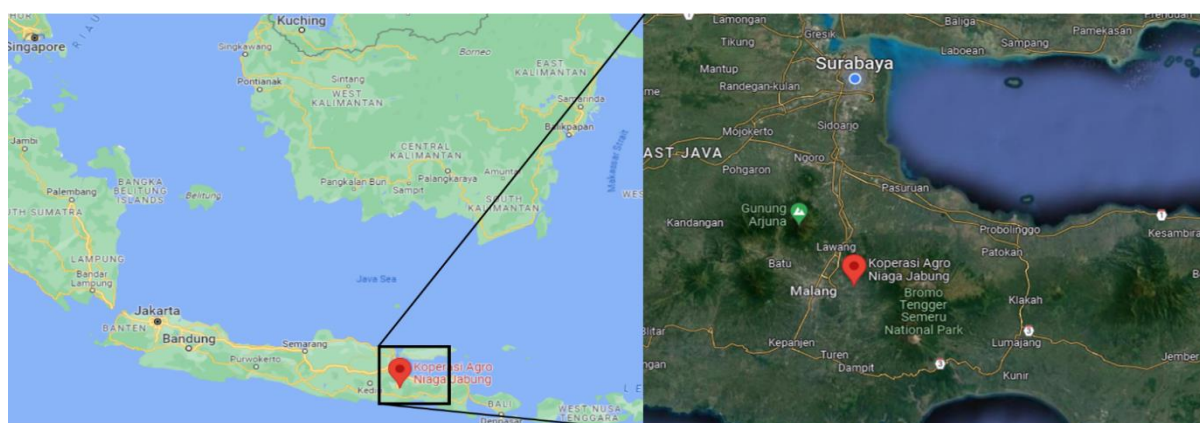


Figure 1 Location of endometritis case in dairy cow after FMD infection and abortion in Koperasi Agro Niaga Jabung, Malang, Indonesia

Anamnesis

In this case, the dairy cow was Holstein Friesian cross heifer, about two years old, weighing about 150 kg, and had a body condition score of 1 on five-point scales (Figure 2). On 12 November 2021, the cow was in estrus and was artificially inseminated. Rectal diagnosis on 28 July 2022 determined the cow was pregnant. Based on the date of artificial insemination, gestational age was 258 days. However, on that date, the cow was clinically

diagnosed with FMD. On 5 August 2022 (266 days of pregnancy), the cow showed signs of calving and were assisted by a veterinarian, but unfortunately, the fetus died. Up to 24 hours after delivery, the cow reportedly had not released its placenta and was being treated by a veterinarian. On 8 August 2022 (two days after being diagnosed with retained placenta), there was cloudy reddish white vaginal discharge that smelled bad, and the case was handled by a veterinarian. Three days after treatment (11

How to cite this article: Faradillah AN, Agustina GC. 2023. Handling of endometritis in dairy cow after infection with foot and mouth disease and abortion. *Ovozoa: Journal of Animal Reproduction*. 12: 107-113.

August 2022), the farmers reported again that vaginal discharge was still coming out of the cow's vagina.



Figure 2 Dairy cow with endometritis after FMD infection and abortion (weighing approximately 150 kg, body condition score of 1 on a 5-point scales).

Clinical symptoms

Thick, cloudy, purulent, pink vaginal discharge (Figure 3), hanged over the vulva area, and had unpleasant odor. The cow had a fever, constantly strained, and the tail was often lifted.

Physical examination

The cow had a fever with a rectal temperature of 40°C. Manual rectal palpation reveals that the uterine wall was thick, hard, stiff, and warmer than usual and discharged purulent, cloudy, thick, pink mucus from the vagina.

Diagnosis

Based on the history, physical examination, and clinical findings, the dairy cow was

diagnosed with post-abortion endometritis. Whereas abortion was presumably caused by FMD infection.



Figure 3 Purulent pink discharge from the vagina of a dairy cow with endometritis after FMD infection and abortion



Figure 4 Intrauterine treatment of endometritis in dairy cows after FMD infection and abortion

RESULTS

When abortion occurred, the cow was treated with 15 mL intrauterine oxytetracycline. After 24 hours post-abortion, retained placenta was treated by manual removal of the placenta followed by an intrauterine deposition of 15 mL oxytetracycline. Two days after the treatment for retained placenta, when the vaginal discharge cloudy white, reddish and smelled bad, the cow was treated with 15 mL oxytetracycline intrauterine. However, three days later, vaginal discharge was still coming out. Cow was treated intrauterine flushing using 1% povidone-iodine in distilled water (Figure

4). Treatment was followed by intrauterine administration of 15 mL of Oxytetracycline and intramuscular injection of analgesics, antipyretics, antispasmodics, vitamins, ATP, and the minerals, 15 mL each respectively.

DISCUSSION

FMD can cause abortion in pregnant cows due to vertical transmission of the virus to the fetus (Ranjan *et al.*, 2016). Ismail *et al.* (2023) reported that of 69 FMD pregnant cows in Sukamuni, Cilawu, Garut, West Java, Indonesia, 5 (7.25%) had abortions, and one cow (1.45%) had a premature delivery. Abortion and the body condition score significantly affected retained placenta (Islam *et al.*, 2012). Usually, the bovine placenta expelled 3-8 hours after parturition. Placental retention occurs if the fetal membranes fail to be released 12-24 hours after calf delivery (Li *et al.*, 2022). Retained placenta can increase the risk of endometritis, metritis, and pyometra, which cause cow infertility (Li *et al.*, 2022).

Endometritis is inflammation of the endometrial lining of the uterus. Endometritis generally occurs after 20 days postpartum, very abnormal parturition (Rouse *et al.*, 2019), such as abortion, retained placenta, premature birth, multiple births, dystocia, and injuries caused by tools used during less clean births (Osawa, 2021). Fetal death, seasonal factors, and bacterial infections were factors for endometritis in smallholder dairy farms (Lee *et al.*, 2018). The pathogenesis of endometritis begins with a bacterial infection that enters the vagina and penetrates the cervical canal, causing uterine contamination and disrupting the defense system and normal uterine function. Bacterial infection can enter when the cervix is open such as during the peripartum period. Endometritis could originate from a non-aseptic retained placenta (Mamas, 2018). The condition of the surface of the epithelial cells of the postpartum uterus will be damaged, filled with cell debris and fluids that facilitate bacterial growth (Sicsic *et al.*, 2018). Pathogenic organisms in the endometrium will penetrate the epithelial cells and release toxins. The high

concentration of lipopolysaccharide causes an immunodepressant, preventing leukocyte cells from entering the uterus to fight bacteria. The animal's immunity will decrease, and there will be an increase in inflammatory cells in the uterus which interfere with reproductive performance (Sheldon *et al.*, 2019). This inflammation will result in delayed uterine involution, embryo damage, follicular changes in the ovaries, and disruption of the luteal phase, which can end in infertility or infertile conditions (Chastant and Saint-Dizier, 2019; Negasee, 2020).

The most prominent and observable abnormality in clinical endometritis is purulent or mucopurulent discharge from the vulvar opening (de Lima, 2020). Additionally, the endometritis cows will appear feverish, with temperatures above average up to 40°C (Liu *et al.*, 2019), accompanied by dull fur, decreased appetite, and decreased milk production (Espadamala *et al.*, 2018). Rectal palpation is the most commonly used diagnosis of endometritis in the field; the uterus will be felt stiff and inelastic (Okawa *et al.*, 2017). Another way of diagnosis is with a vaginoscope. The vaginoscope allows evaluation of fluid characteristics in the anterior vagina and external cervix for the diagnosis of endometritis (Leutert *et al.*, 2012). Purulent discharge in the uterus with a cervical diameter greater than 7.5 cm after 20 days postpartum or purulent discharge after 26 days postpartum indicated infection of the lining of the uterus (Negasee, 2020). Post-abortion endometritis in cows can be treated by intrauterine flushing using 1% povidone-iodine in distilled water (Mido *et al.*, 2016; Yoshida *et al.*, 2020). povidone-iodine is an effective bactericide for intrauterine therapy in endometritis (Okawa *et al.*, 2017). Intrauterine administration of Oxytetracycline (15 mL) was intended to inhibit and terminate the growth of bacteria. Therapy using oxytetracycline is widely carried out to treat endometritis. Oxytetracycline binds to the 30S ribosomal subunit of pathogenic bacteria. After this antibiotic bind, this antibiotic will interfere with the formation of the bond between the aminoacyl-tRNA and the mRNA molecule,

How to cite this article: Faradillah AN, Agustina GC. 2023. Handling of endometritis in dairy cow after infection with foot and mouth disease and abortion. *Ovozoa: Journal of Animal Reproduction*. 12: 107-113.

thereby inhibiting bacterial protein synthesis (Mamas *et al.*, 2018).

Supportive treatment for endometritis can use intramuscular injections of analgesics, antipyretics, and antispasmodics, as well as vitamins and ATP, 15 mL each (Mileva *et al.*, 2020). Cow in this study were given 15 mL Dipyron® (containing 250 mg Dipyron and 2% lidocaine) intramuscularly. Dipyron is a non-opioid analgesic, antipyretic, and antispasmodic drug for the relief of persistent and severe pain and fever (Kötter *et al.*, 2015). Dipyron has an anti-inflammatory effect caused by reducing the production of prostaglandins at the site of inflammation. The antipyretic and analgesic effects of dipyron block the synthesis of endogenous pyrogens (prostaglandins D and E) (Passoni *et al.*, 2022). Meanwhile, lidocaine also functions as an analgesic by blocking sensory nerve fibers before motor nerve fibers and allows selective sensory blockade at low doses (Imani Rastabi *et al.*, 2018). Injectable drugs containing Vitamin B12 are intended to maintain the liver for at least 28 days (Gonzalez-Rivas *et al.*, 2021). Adenosine Triphosphate and minerals (Magnesium, Potassium, Sodium selenite) were administered to restore animal health (Buczinski *et al.*, 2022).

CONCLUSION

A pregnant cow infected with Foot and Mouth Disease had an abortion at 266th day of pregnancy; a retained placenta was diagnosed a day later, and endometritis was detected for up to five days. Cow was treated by intrauterine flush using 1% povidone-iodine (in distilled water), followed by an intrauterine administration of 15 mL Oxytetracycline, as well as intramuscular injection of Dipyron (analgesics, antipyretics, antispasmodics, and lidocaine), vitamin B12, ATP, and minerals (Magnesium, Potassium, Sodium selenite), 15 mL respectively.

REFERENCES

- Appiah MO, Wang J, Lu W. 2020. Microflora in the reproductive tract of cattle: A review. *Agriculture* 10: 232.
- Buczinski S, Morin MP, Roy JP, Rousseau M, Villettaz-Robichaud M, Dubuc J. 2022. Use of ATP luminometry to assess the cleanliness of equipment used to collect and feed colostrum on dairy farms. *J Dairy Sci.* 105: 1638-48.
- Chastant S, Saint-Dizier M. 2019. Inflammation: friend or foe of bovine reproduction? *Anim Reprod.* 16: 539-47.
- de Lima FS. 2020. Recent advances and future directions for uterine diseases diagnosis, pathogenesis, and management in dairy cows. *Anim Reprod.* 17: e20200063.
- Espadamala A, Pereira R, Pallarés P, Lago A, Silva-Del-Río N. 2018. Metritis diagnosis and treatment practices in 45 dairy farms in California. *J Dairy Sci.* 101: 9608-16.
- Gonzalez-Rivas PA, Chambers M, Liu J. 2021. A pilot study comparing the pharmacokinetics of injectable cyanocobalamin and hydroxocobalamin associated with a trace mineral injection in cattle. *J Vet Pharmacol Ther.* 44: 406-10.
- Imani Rastabi H, Guraninejad S, Naddaf H, Hasani A. 2018. Comparison of the application of lidocaine, lidocaine-dexamethasone and lidocaine-epinephrine for caudal epidural anesthesia in cows. *Iran J Vet Res.* 19: 172-7.
- Islam MH, Sarder MJU, Rahman M, Kader MA, Islam MA. 2012. Incidence of retained placenta in relation with breed, age, parity and body condition score of dairy cows. *Int J Nat Sci.* 2: 15-20.
- Ismail I, Indarjulianto S, Yusuf S, Purba FY. 2023. Clinical examination of foot and mouth disease of dairy cows in Sukamurni, Cilawu, Garut, West Java, Indonesia. *IOP Conf. Series: Earth and Environmental Science* 1174: 1-6.
- Kötter T, da Costa BR, Fässler M, Blozik E, Linde K, Jüni P, Reichenbach S, Scherer M. 2015. Metamizole-associated adverse events: a systematic review and meta-

How to cite this article: Faradillah AN, Agustina GC. 2023. Handling of endometritis in dairy cow after infection with foot and mouth disease and abortion. *Ovozoa: Journal of Animal Reproduction.* 12: 107-113.

- analysis. PLoS One. 10: e0122918.
- Lee SC, Jeong JK, Choi IS, Kang HG, Jung YH, Park SB, Kim IH. 2018. Cytological endometritis in dairy cows: diagnostic threshold, risk factors, and impact on reproductive performance. *J Vet Sci.* 19: 301-8.
- Leutert C, von Krueger X, Plöntzke J, Heuwieser W. 2012. Evaluation of vaginoscopy for the diagnosis of clinical endometritis in dairy cows. *J Dairy Sci.* 95: 206-12.
- Li Y, Wen H, Yang Y, Zhao Z, Gao H, Li H, Huang M. 2022. Potential prognostic markers of retained placenta in dairy cows identified by plasma metabolomics coupled with clinical laboratory indicators. *Vet Q.* 42: 199-212.
- Liu J, Li L, Chen X, Lu Y, Wang D. 2019. Effects of heat stress on body temperature, milk production, and reproduction in dairy cows: a novel idea for monitoring and evaluation of heat stress - A review. *Asian-Australas J Anim Sci.* 32: 1332-9.
- Mamas MA, Riady G, Daud R. 2018. Terapi endometritis menggunakan Oksitetrasiklin pada sapi Aceh yang didiagnosa dengan alat metricheck. *J Ilmiah Mahasiswa Veteriner* 2: 221-9.
- Mido S, Murata N, Rawy MS, Kitahara G, Osawa T. 2016. Effects of intrauterine infusion of povidone-iodine on endometrial cytology and bacteriology in dairy cows with clinical endometritis. *J Vet Med Sci.* 78: 551-6.
- Mileva R, Karadaev M, Fasulkov I, Petkova T, Rusenova N, Vasilev N, Milanova A. 2020. Oxytetracycline pharmacokinetics after intramuscular administration in cows with clinical metritis associated with *Trueperella pyogenes* infection. *Antibiotics* 9: 392.
- Negasee KA. 2020. Clinical metritis and endometritis in dairy cattle: A review. *Vet Med Open J.* 5: 51-6.
- Okawa H, Fujikura A, Wijayagunawardane MMP, Vos PLAM, Taniguchi M, Takagi M. 2017. Effect of diagnosis and treatment of clinical endometritis based on vaginal discharge score grading system in postpartum Holstein cows. *J Vet Med Sci.* 79: 1545-51.
- Osawa T. 2021. Predisposing factors, diagnostic and therapeutic aspects of persistent endometritis in postpartum cows. *J Reprod Dev.* 67: 291-9.
- Passoni MT, Krebs Ribeiro DC, França de Almeida SC, Furtado da Costa B, Grechi N, Lima Tolouei SE, Curi TZ, Degraf Cavallin M, Romano RM, Romano MA, Spercoski KM, Carvalho Dos Santos A, Carvalho Souza RI, Dalsenter PR, Martino-Andrade AJ. 2022. The analgesic Dipyrone affects pregnancy outcomes and endocrine-sensitive endpoints in female and male offspring rats. *Toxicol Sci.* 187: 80-92
- Ranjan R, Biswal JK, Subramaniam S, Singh KP, Stenfeldt C, Rodriguez LL, Pattnaik B, Arzt J. 2016. Foot-and-mouth disease virus-associated abortion and vertical transmission following acute infection in cattle under natural conditions. *PLoS One.* 11: e0167163. /
- Rouse CE, Eckert LO, Muñoz FM, Stringer JSA, Kochhar S, Bartlett L, Sanicas M, Dudley DJ, Harper DM, Bittaye M, Meller L, Jehan F, Maltezou HC, Šubelj M, Bardaji A, Kachikis A, Beigi R, Gravett MG. 2019. Global alignment of immunization safety in pregnancy (GAIA) postpartum endometritis, infection following incomplete or complete abortion work group. Postpartum endometritis and infection following incomplete or complete abortion: Case definition & guidelines for data collection, analysis, and presentation of maternal immunization safety data. *Vaccine* 37: 7585-95.
- Sheldon IM, Cronin JG, Bromfield JJ. 2019. Tolerance and innate immunity shape the development of postpartum uterine disease and the impact of endometritis in dairy cattle. *Annu Rev Anim Biosci.* 7: 361-84.
- Sicsic R, Goshen T, Dutta R, Kedem-Vaanunu N, Kaplan-Shabtai V, Pasternak Z, Gottlieb Y, Shpigel NY, Raz T. 2018. Microbial communities and inflammatory response in the endometrium differ between normal

How to cite this article: Faradillah AN, Agustina GC. 2023. Handling of endometritis in dairy cow after infection with foot and mouth disease and abortion. *Ovozoa: Journal of Animal Reproduction.* 12: 107-113.

- and metritic dairy cows at 5-10 days post-partum. *Vet Res.* 49: 77.
- Wagener K, Grunert T, Prunner I, Ehling-Schulz M, Drillich M. 2014. Dynamics of uterine infections with *Escherichia coli*, *Streptococcus uberis* and *Trueperella pyogenes* in post-partum dairy cows and their association with clinical endometritis. *Vet J.* 202: 527-32.
- Yoshida R, Kitahara G, Osawa T. 2020. Intrauterine infusion of povidone-iodine: Its effect on the endometrium and subsequent fertility in postpartum dairy cows. *J Vet Med Sci.* 82: 926-34.
- Zobel R. 2013. Endometritis in Simmental cows: Incidence, causes, and therapy options. *Turk J Vet Anim Sci.* 37: 134-40.