



Fetal Mummification In A Friesian Holstein Cow In West Bandung Regency : A Case Report

Anis Aulia¹, Ghinna Aulia Rasyida¹, Fathul Bari², Septiyani^{3,4}, Endang Yuni Setyowati^{3,5}, Faisal Amri Satrio^{3,4*}

¹Veterinary Medicine Profession Study Program, Faculty of Medicine, Padjadjaran University, Sumedang, 45363

²North Bandung Cattle Farmers Cooperative, West Bandung Regency, 40391

³Veterinary Medicine Study Program, Faculty of Medicine, Padjadjaran University, Sumedang Regency, 45363

⁴Department of Biomedical Science, Faculty of Medicine, Padjadjaran University, Sumedang Regency, 45363

⁵Department of Livestock Production, Faculty of Animal Husbandry, Padjadjaran University, Sumedang Regency, 45363

*corresponding author: f.a.satrio@unpad.ac.id

Abstract

This report describes a case of fetal mummification in a Friesian Holstein cow on a smallholder farm in Indonesia. The cow, in its second pregnancy at approximately four months of gestation, had exhibited vaginal discharge for about 10 hours before examination. Clinical inspection revealed a reddish-brown discharge from the vagina, and the cow was found in sternal recumbency. Per-vaginal palpation showed that the cervix was dilated to approximately a hand's width. The palpation also indicated the absence of fremitus, fetal movement, fetal reflexes, placentomes, and amniotic fluid. The fetus was palpable, dry, and firm. Management of the case involved the extraction of the fetus along with the placenta. Pathological findings included the absence of amniotic fluid, a reddish-brown placenta, and a dry fetus with fully developed and intact bones, which had a blood-like odor but was not foul-smelling. The post-treatment included intrauterine administration of Neo-Kotrimok® (four boluses) and an intramuscular injection of Vitol-140® (10 mL). The prognosis was classified as fausta-dubius. Based on anamnesis, clinical examination findings, and pathological findings, the cow was diagnosed with fetal mummification, a reproductive disorder affecting pregnancy.

Keywords: fetal mummification; friesian holstein cow; indonesian smallholder farm; pregnancy disorders

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Introduction

In Indonesia, smallholder farmers predominantly manage cattle production, accounting for approximately 90% of the total industry (Hilmiati et al., 2024). These farmers typically

raise fewer than 10 head of cattle per household (Widiati and Widi, 2016), reflecting the traditional and small-scale nature of the country's livestock sector. Despite its significant contribution to the national cattle industry, this farming system faces several challenges, particularly in terms of productivity, disease management, and reproductive efficiency, which can affect the sustainability and growth of the sector. Reproductive efficiency is crucial in cattle production as it directly influences herd productivity and profitability. However, various reproductive disorders can negatively impact fertility rates, leading to economic losses for farmers (Burns et al., 2010). Among these disorders, fetal maceration and mummification are particularly detrimental, resulting in fetal loss and prolonging the calving interval, which in turn reduces overall reproductive performance and herd productivity (Dutt et al., 2018).

Fetal mummification is a reproductive disorder in which a fetus dies in utero but remains retained within the uterus. A significant reduction in fetal fluids characterizes this condition, marked by the presence of brownish fluid surrounding the fetus, involution of the cotyledons and caruncles, and a firm, dry fetal body (Hendrawan et al., 2019; Manokaran et al., 2024). Fetal mummification has been documented in various domestic species, including cattle, sheep, goats, horses, swine, dogs, and cats, with the highest prevalence reported in swine. However, in cattle, the incidence is relatively low, occurring in less than 2% of pregnancies (Lefebvre, 2015). Despite its rarity, fetal mummification can have a significant impact on reproductive performance, prolonging the calving interval and resulting in economic losses for farmers. Proper diagnosis and timely management are crucial to minimizing these effects and maintaining herd productivity. This case report presents a rare instance of fetal mummification in a Friesian Holstein cow, evaluated through anamnesis, clinical examination, fetal pathological findings, and treatment management. The findings contribute to a better understanding of this condition and underscore the importance of early detection and targeted intervention to enhance reproductive outcomes in cattle.

Materials and Methods

This case involves a 4-year-old Friesian Holstein cow with an estimated live weight of 400 kg and a body condition score (BCS) of 3/5. The cow was in its second pregnancy, approximately four months into gestation, and was kept on a smallholder farm in Suntenjaya, Lembang, West Bandung Regency, West Java, Indonesia. According to the farmer's anamnesis, the cow had been exhibiting vaginal discharge for approximately 10 hours before the examination. There was no reported history of reproductive disorders or complications during the first pregnancy. A comprehensive clinical assessment was conducted to identify the underlying cause of the condition, establish a diagnosis, and determine an appropriate treatment plan.

A thorough clinical assessment was conducted, utilizing visual inspection and palpation, to evaluate the cow's condition. Upon inspection, a reddish-brown vaginal discharge was observed, and the cow was found in sternal recumbency, indicating possible discomfort or distress (Figure 1A). Per-vaginal palpation revealed that the cervix was dilated to approximately the width of a hand, suggesting partial cervical relaxation. Further rectal palpation confirmed the absence of fremitus, fetal movement, fetal reflexes, placentomes, and amniotic fluid, which are indicative of fetal demise. The fetus was palpable within the uterus and characterized by a dry and firm texture. These clinical findings provided substantial evidence to support the diagnosis and guided subsequent case management.

The management of this case involved the extraction of the fetus along with the placenta (Figure 1B). This approach was deemed appropriate given that the cervix had sufficiently

dilated, enabling a safe and controlled delivery. The fetal positioning was assessed as an anterior longitudinal presentation with a dorso-sacral position and normal posture, which facilitated per vaginal delivery. Furthermore, the relatively small size of the fetus allowed for successful extraction per vaginum without requiring surgical intervention—this procedure aimed to minimize complications and support the cow's reproductive recovery.

The pathological examination of the fetus and placenta revealed several characteristic changes associated with fetal (Figure 1C). Notably, there was a complete absence of amniotic fluid, a key indicator of prolonged fetal retention. The placenta appeared reddish-brown and was absent of caruncles, suggesting degenerative changes due to the extended presence of the non-viable fetus in the uterus. The fetus itself was dry, with fully developed and intact bones, confirming that fetal demise had occurred at an advanced stage of gestation. Additionally, the fetus emitted a blood-like odor; however, no foul-smelling decomposition was detected.



Fig. 1 (A) Clinical inspection of the cow showing reddish-brown vaginal discharge (white arrow) and the cow in sternal recumbency; (B) Assisted extraction of the mummified fetus along with the placenta via the vaginal route; (C) Pathological finding of the extracted fetus (black arrow) and placenta (white arrow).

Based on the anamnesis, clinical examination, and pathological findings, the cow was diagnosed with fetal mummification, a reproductive disorder characterised by the retention of a non-viable fetus within the uterus without signs of infection or decomposition. The absence of amniotic fluid, the presence of a dry and firm fetus with intact skeletal structures, and the reddish-brown appearance of the placenta were key diagnostic indicators supporting this conclusion. Given the timely intervention and the successful extraction of the fetus without complications, the prognosis was classified as *fausta-dubius*.

Following the extraction of the mummified fetus, a post-treatment regimen was implemented to support uterine recovery and minimise the risk of secondary infections. The treatment protocol included the intrauterine administration of Neo-Kotrimoxazole (Trimethoprim and Sulfamethoxazole) (PT Tekad Mandiri Citra, Bandung, Indonesia) in four boluses, serving as an antimicrobial agent to prevent bacterial contamination and promote uterine healing. Additionally, Vitol-140® (Vitamin A, D3, and E) (Interchemie, The Netherlands) was administered via intramuscular injection (10 mL) to enhance the cow's overall health, support immune function, and aid in reproductive recovery.

Results and Discussion

Fetal mummification is a significant gestational disorder in domestic animals, characterized by the death of a fetus that remains retained in the uterus along with fetal debris. This condition typically occurs after placentation and fetal ossification, which begins around 70 days of gestation and is most frequently observed between the third and eighth months of

pregnancy (Lefebvre, 2015). According to Drost (2007), fetal mummification in cattle is most commonly observed at the transition between the first and second trimesters. This aligns with our case findings, where the affected cow was within the reported range of fetal mummification occurrence in the fourth month of gestation.

Fetal mummification in cattle can be attributed to both infectious and non-infectious causes. Infectious agents commonly associated with this condition include *Leptospira* spp., bovine viral diarrhoea virus (BVDV), and *Neospora caninum* (Lefebvre, 2015; Kumar et al., 2018; Vikram et al. 2020). In contrast, non-infectious factors contributing to fetal mummification include hormonal imbalances, chromosomal abnormalities, umbilical cord torsion, uterine torsion, defective placentation, and genetic predisposition (Lefebvre, 2015; Kumar et al., 2018; Vikram et al., 2020).

Among these factors, genetic predisposition has been identified as a significant contributor to fetal mummification in cattle. Studies have demonstrated that DNA extracted from mummified fetuses revealed approximately 20% of cases carrying a deficiency in uridine monophosphate synthase (DUMPS), an autosomal recessive genetic defect known to contribute to fetal mortality (Ghanem et al., 2006). Additionally, specific cattle breeds, such as Jersey, Guernsey, and Friesian, have been reported to exhibit a higher susceptibility to fetal mummification due to inherited genetic factors (Tadesse et al., 2015). A more recent study by Ghanem et al. (2005) identified a factor XI gene deficiency in 10 mummified fetuses, a condition that disrupts early-stage blood coagulation and has been previously documented in Holstein cattle (Gentry and Ross, 1993). These findings align with the present case, where the affected cow belonged to the Friesian Holstein breed. This suggests that breed-related genetic factors may have affected fetal mummification.

Fetal mummification is a pathological condition that occurs when a fetus dies after skeletal ossification is complete but remains in a sterile uterine environment, allowing it to undergo dehydration rather than decomposition. Several key factors contribute to this process. First, fetal death must occur after skeletal ossification; otherwise, rapid autolysis will lead to the disintegration of soft tissues before the endometrium can resorb them. Second, the resorption of amniotic and allantoic fluids must occur efficiently to facilitate the dehydration and preservation of the fetal remains. Third, the intrauterine environment must remain hypoxic throughout the process, as exposure to oxygen could accelerate tissue degradation. Lastly, the uterus must be free from bacterial contamination (Lefebvre, 2015; Tadesse et al., 2015). As fetal dehydration progresses, the caruncles undergo involution and eventually disappear, further contributing to the desiccation process. The longer the mummified fetus is retained in the uterus, the drier, firmer, and leatherier its tissues become. Over time, the fetus transforms into a compact, immobile mass devoid of placental fluid or placentomes (Tadesse et al., 2015). These findings align with our per-vaginal palpation and pathological examination results, further supporting the diagnosis and underlying pathophysiological mechanisms.

Tadesse et al. (2015) also reported that fetal mummification results from autolytic changes in fetal tissues and the resorption of fetal fluids within a sterile uterine environment. These findings are consistent with our observations. The deceased fetus undergoes dehydration as water is lost from its tissues, leading to mummification. Additionally, hemorrhaging between the endometrium and placenta imparts a characteristic reddish-brown coloration to the fetus and fetal membranes. It is essential to differentiate fetal mummification from fetal maceration, a condition characterized by fetal putrefaction resulting from bacterial invasion and oxygen exposure in the uterine cavity, typically occurring with an open cervix. Unlike mummification, which preserves the fetal structure, maceration leads to the

progressive breakdown of fetal tissues, increasing the risk of uterine infection and systemic complications (Tadesse et al., 2015; Ciplak et al., 1993).

The primary clinical indication of fetal mummification in cattle is an abnormally small abdominal size relative to the expected stage of gestation. Additionally, the fetus remains in the uterus beyond the anticipated time of parturition. Affected cows typically do not exhibit significant systemic illness or other major health complications, except for the potential occurrence of spontaneous abortion, which may or may not take place (Lafebvre, 2015). Vikram et al. (2020) also reported that while spontaneous abortion can occur in cases of fetal mummification, it is relatively rare. This observation is consistent with our findings, which suggest a suspected case of spontaneous abortion associated with fetal mummification. It is hypothesized that this may be linked to secondary infections after mummification. However, current evidence remains insufficient to establish a direct correlation between secondary infection and spontaneous abortion in cattle with fetal mummification.

The preferred treatment for fetal mummification is luteolysis, which is achieved through the administration of prostaglandin F_{2α} (PGF_{2α}). In cases where medical treatment proves ineffective, surgical interventions such as hysterectomy via colostomy or cesarean section through a caudal flank laparotomy may be necessary (Kumar et al., 2018). However, in our case, the chosen therapeutic approach involved the manual extraction of the mummified fetus along with the placenta. This method was appropriate as the cervix had sufficiently dilated, allowing for a safe and controlled delivery. This approach minimizes potential complications and supports the cow's reproductive recovery. After the extraction of the mummified fetus, a post-treatment protocol was administered to promote uterine healing and reduce the risk of secondary infections. This regimen included the intrauterine application of antimicrobial agents to prevent bacterial contamination and the administration of multivitamins to enhance overall health, strengthen immune function, and support reproductive recovery. Agent to avoid bacterial contamination and promote uterine healing. Additionally, Vitol-140® (Vitamin A, D3, and E) (Interchemie, The Netherlands) was administered via intramuscular injection (10 mL) to enhance the cow's overall health, support immune function, and aid in reproductive recovery.

Conclusion

In conclusion, this case highlights the successful diagnosis and management of fetal mummification in cattle through a combination of clinical, pathological, and therapeutic approaches. Timely intervention, including careful extraction of the mummified fetus and appropriate post-treatment care, was crucial in ensuring a favorable outcome. Future research should focus on identifying the genetic and environmental factors contributing to this condition and developing improved preventive measures to reduce its occurrence in cattle.

Conflict of Interest

The authors confirm that they have no conflicts of interest to disclose.

Acknowledgment

The authors extend their special appreciation to the farm owners for their cooperation and permission to conduct this case study.

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