

Fetal Mummification Causes Failure of Pregnancy in Animals

Shafa Adea Puspitadesy¹, Rief Ghulam Satriya Permana², Anggitya Nareswari³, Suryo Ediyono⁴

¹Profession Education of Veterinary Medicine, Faculty of Veterinary Medicine, Universitas Gadjah Mada, Yogyakarta, Indonesia

²Veterinary Science Doctoral Program, Postgraduate School, Faculty of Veterinary Medicine, Universitas Gadjah Mada

³Mindi Clinic, Petshop and Care, Sleman Yogyakarta

⁴Faculty of Cultural Sciences, Sebelas Maret University, Surakarta, Indonesia

ABSTRACT: Many cases of failure to conceive can be caused by infectious or non-infectious agents. One of the cases that arise during pregnancy is fetal mummification. Fetal mummification is the death of the fetus in the mother's uterus without experiencing microbial contamination, and the amniotic fluid is absorbed by the body so that the fetus becomes dry. Mummification is caused by non-infectious agents, can be diagnosed by ultrasound, and hormone therapy or surgery can be performed.

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Corresponding Author:
Shafa Adea Puspitadesy

INTRODUCTION

Pregnancy in animals is a happy thing that women look forward to *owner* animal. Pregnancy in animals is an important thing to pay attention to, just like in humans. Pregnancy begins with fertilization when a sperm cell meets an egg cell and then becomes a zygote. The zygote develops into an embryo which will attach and grow in the wall of the mother's uterus, then continue to develop until it becomes a fetus and future offspring that are ready to be born. There are many factors to maintain pregnancy so that undesirable things don't happen, such as ensuring the animal's nutrition is balanced, providing a comfortable place for the animal, diligently cleaning the cage, taking the animal to the vet if the animal is sick, providing a sense of security and comfort for the animal, all this at the same time. to give *five freedom animal welfare* for animals.

Many cases of failure to conceive are caused by infectious or non-infectious agents. *Owner* must recognize and understand the various types of cases that arise during pregnancy. One of the cases that arise during pregnancy is fetal mummification. Fetal mummification will be detrimental for breeders, especially from an economic perspective, because the offspring will not survive, and the mothers will be less than optimal in reproducing. Fetal mummification is the death of a fetus in the uterus without microbial contamination and no stimulation sufficient for uterine contractions. Fetal mummification usually occurs in mid or late pregnancy. Treatment of cases of fetal mummification can be done by administering hormones *oxytocin* to stimulate uterine contractions, but if hormone therapy is given there is no response *Section Caesar* (SC). The choice of therapy must take into account the condition of the broodstock. The parent must be in a stable condition if this is to be done *Section Caesar*. The disadvantage of performing SC is that it must be carried out by a professional veterinarian, requires adequate tools and materials, and also requires more costs. Fetal mummification can be detected using *ultra sonography* (ultrasound). Fetal mummification incidents often occur in livestock such as cows and goats, apart from that in small animals, cats and dogs, it is not uncommon to find cases of fetal mummification. Fetal mummification will have the impact of disrupting the reproductive cycle on the mother, because the mother needs time for uterine involution (returning the uterus to its normal state). *Owner* must observe pregnancy in the animal, so that first treatment can be carried out when a disorder is discovered.

LITERATURE REVIEW

During pregnancy, many cases often arise during pregnancy, such as:

Abortion

Abortion is a pregnancy that ends with the expulsion of a fetus of a size that is not yet capable of surviving, it can be caused by trauma, nutritional deficiencies, plant poisons, hormones, viruses, bacteria, fungi. Treatment that can be done is to observe the parent first, give antibiotics to the parent if there are indications of bacterial infection, support assistance such as infusions, vitamins and minerals (if needed) (Manan, 2002).

Fetal Maceration

Fetal maceration is a condition where a dead fetus is retained in the uterus, infection occurs leaving rotten fetal tissue and bone remains. Usually caused by infectious agents, including bacteria (*Camphylobacter fetus*) and protozoa (*Trichomonas fetus*). The specific characteristic of fetal maceration is that it experiences crepitus, decay occurs by bacterial infection, causing a foul-smelling purulent exudate from the vulva. Treatment that can be done is taking the bone pieces manually prevaginally, and a cesarean section can be performed (Duttet *al*, 2018).

Uterine Torsion

Uterine torsion is a condition where the uterus experiences rotation or rotation of its axis exceeding 450. In cases of torsion with a rotation of 45-900 it usually often recovers.

without intervention, but when the degree of torsion exceeds 1800, uterine blood flow becomes increasingly disturbed and this is followed by edema in the uterus and placenta which causes fetal death if not treated quickly, this can be caused by excessive fetal movement at the end of pregnancy, trauma. The treatment is that you must first know the direction of the torque, then roll it in the opposite direction (Noakes *et al*, 2019).

Handling cases that require surgery requires paying attention to many aspects such as preparation for surgery, selection *fluid therapy*, anesthesia, post-operative care, and knowing the wound healing process so that the operation provides maximum results.

Operation Preparation

Operation preparation includes room preparation, operator preparation, tool and material preparation, and animal preparation.

a) Room preparation

The room used for surgery must be bright, have clean walls and ceilings, good air circulation, and windows that are always closed (Hartiningsih, 2016).

b) Operator preparation

The operator wears a cap and mask, cleans his hands, wears a surgical gown and wears a sarong (Hartiningsih, 2016).

c) Preparation of material tools

Tools must be sterile, arranged on the operating table in the order and quantity as needed. The surgical tools required include: Blade that has been installed in the scalpel handle, scissors, needle holder, anatomical tweezers, chirurgical tweezers, Mosquito forceps, Allis forceps, Hemostatic forceps, Duk clamps, Duk, tampons, needles and threads (Hartiningsih, 2016).

d) Animal preparation

Animals are fasted from eating and drinking 6 hours before surgery, are restrained, hair is shaved, the bladder is emptied, premedication and anesthesia are given, and the animal is fixed on the operating table (Hartiningsih, 2016).

Fluid Therapy

a) Hypotonic fluid

Its osmolarity is lower than serum (the concentration of Na⁺ ions is lower than serum), so it dissolves in serum, and reduces serum osmolarity. Then fluid is "pulled" from the blood vessels out into the surrounding tissue (principle fluid moves from low osmolarity to high osmolarity), until it finally fills the target cells. Examples are 45% NaCl and 2.5% Dextrose (Fossum, 2002)

b) Isotonic fluids

The osmolarity (level of density) of the fluid is close to serum (the liquid part of the blood component), so it remains in the blood vessels. Examples are Ringer's Lactate (RL) fluid, and normal saline/physiological salt solution (NaCl 0.9%) (Fossum, 2002)

c) Hypertonic fluid

Its osmolarity is higher than serum, so it "draws" fluid and electrolytes from tissues and cells into the blood vessels. For example Dextrose 5%, NaCl 45% hypertonic, Dextrose 5%+Ringer-Lactate, Dextrose 5%+NaCl 0.9%, blood products (blood), and albumin (Fossum, 2002).

Anesthesia

The administration of anesthesia must take into account several factors, including: the condition of the animal, location of surgery, duration of surgery, body size/type of animal, sensitivity of the animal to anesthetic drugs, and diseases suffered by the animal. Several types of anesthesia: a) General anesthesia is an anesthesia that causes total loss of consciousness b) Local anesthesia is an anesthesia that causes loss of feeling in a certain desired area c) Regional anesthesia is an anesthesia that causes loss of sensation in a wider part of the body by selective blockade of spinal tissue or conditions related to it.

Postoperative Care

Postoperative primary care includes cleaning the surgical wound using antiseptics, intramuscular injection of oxytocin (20 – 40 IU) to stimulate uterine involution, intravenous injection of calcium borogluconas to prevent hypocalcemia and facilitate uterine involution. An examination is carried out 24 – 48 hours after surgery by looking at body temperature, signs of pain, appetite, stool consistency. The stitches on the skin can only be opened when they are dry and completely closed more than 3 weeks after surgery (Vermunt, 2008).

Wound Healing Process

The Hemostasis phase

The wound healing process starts from the damaged tissue and then blood comes out from the damaged blood vessels. The platelets that come out will come into contact with collagen and other elements of the extracellular matrix. This contact will cause platelets to produce blood clotting factors, *growth factor* among others *platelet derived growth factor* (PDGF) and *transforming growth factor β* (TGF β). Neutrophils will enter the wound to phagocytose foreign material, bacteria and dead tissue in the wound (Adji, 2018)

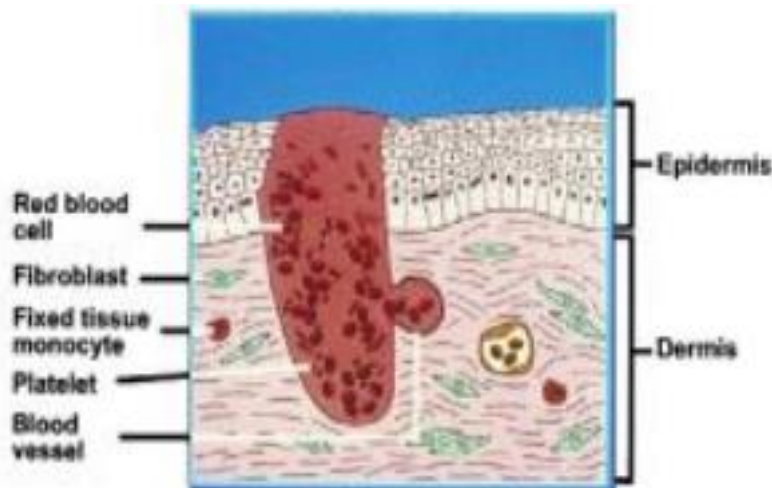


Figure 1. Hemostasis phase, blood pools in the wound

(Diegelmann and Evans, 2004)

b. Inflammatory phase

Macrophages appear to continue the phagocytosis process such as the production of PDGF and TGF β which also continues. The phagocytosis process continues until the wound is completely clean. Next, fibroblasts will migrate to start the proliferation process and collect new extracellular matrix (Adji, 2018).

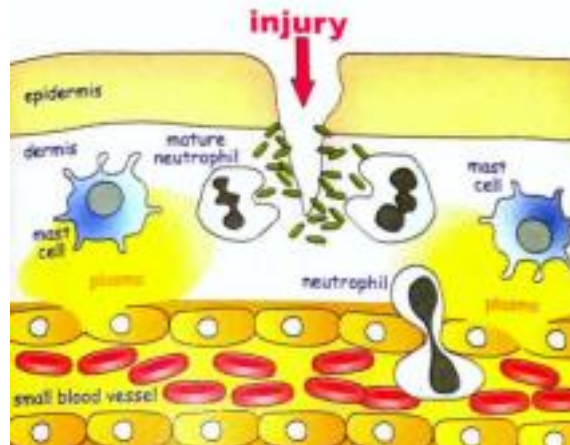


Figure 2. Inflammatory phase, various cells are involved in the inflammatory process (Adji, 2018)

c. Proliferation Phase

This phase begins on the third day and almost coincides with the final phase of inflammation. The new collagen matrix then forms a network and coordinates continuously throughout the remodeling process, to control the repair process. Fibroblasts function in the angiogenesis process by stimulating macrophages to produce various types *growth factor*. The process of angiogenesis plays a role in formation of new blood vessels in the formation of granulation tissue. After the tissue is filled with new granulation tissue, angiogenesis is stopped by the process of apoptosis. This phase lasts 2-4 weeks after the injury occurs (Adji, 2018).

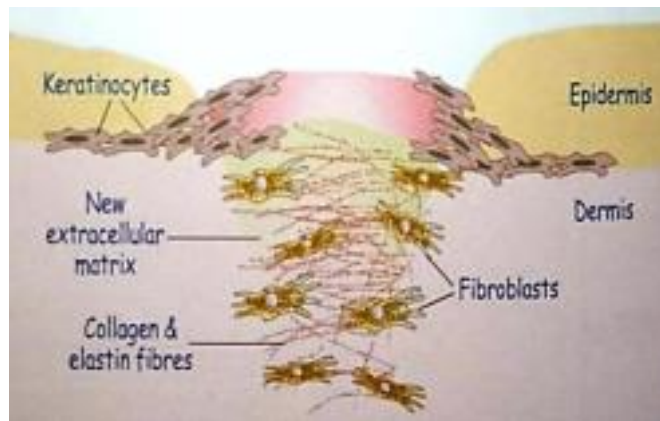


Figure 3. Proliferation phase (Adji, 2018).

d. phase *remodelling/maturation phase*

This phase is the longest phase, it can last for 2 years. In this phase, the wound will contract, where the skin around the wound will be pulled towards the wound area, the size of the wound will decrease. Fibroblasts will turn into myofibroblasts which will express α -smooth muscle actin which will interact with myosin to increase the tensile strength of the wound. Myofibroblasts will produce type-1 collagen. Type-3 collagen produced in the proliferation process will be replaced with type-1 collagen, so that the wound's tensile strength becomes stronger. Collagen fibers will become thicker over time and together with myofibroblasts will occupy the wound base in parallel so that scar tissue will form. After this process, myofibroblasts will no longer be active and excess cells will undergo apoptosis. Tissue that is rich in granulated cells will turn into scar tissue that contains a lot of extracellular matrix. The density of blood vessels will decrease so that the injured area will be paler in color. The stretchability of scar tissue only reaches 70-80% of normal, dermis structures such as hair follicles, sweat glands and sebaceous glands that are lost or damaged during injury will not regenerate.

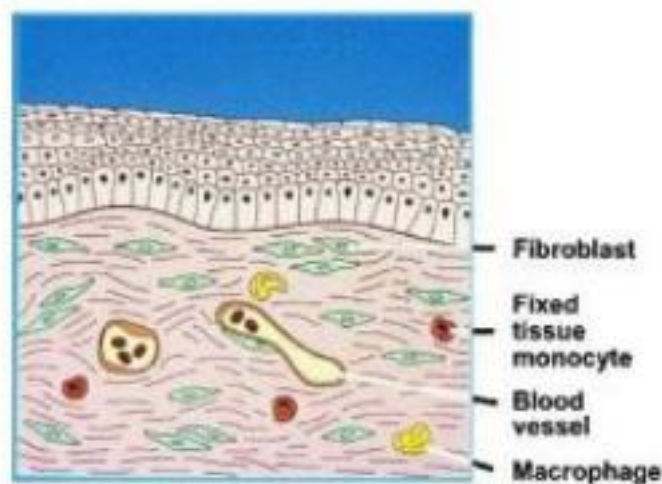


Figure 4. Remodeling phase/maturation phase (Diegelmann and Evans, 2004)

MATERIALS AND METHODS

Material

Confirmation of the diagnosis of fetal mummification can be done using ultrasound. The therapy given can be hormone therapy and surgery.

Method

Caesarean section was performed through the left flank in a standing position using a combination of epidural and L-block anesthesia. After incision of the skin, muscle and peritoneum, the left uterine cornua containing the fetus is wrapped with gauze soaked in antibiotics. Next, the uterus is incised and the fetus is removed. The uterine mucosa is then cleaned of residual fetal fluid and the attached cotyledons are removed. The uterus and skin are then sutured. After surgery the cow is injected with antibiotics, vitamins and analgesics. Antibiotic and vitamin injections were repeated after 2 days. The wound was cleaned with 3% povidone iodine and sprayed with antiseptic and antilarvae. The skin wound appeared to improve on the 10th day and stitches were removed.

RESULTS AND DISCUSSION

Fetal mummification is an event where a dead fetus is still retained in the uterus without being contaminated by microbes, the amniotic fluid is absorbed by the body so that the fetus becomes dry. Mummification is caused by non-infectious agents because it is not mixed with microbes, mummification can occur due to dry environmental factors making it more difficult for the mother to adapt, trauma, mechanical factors, even genetic anomalies, hormonal and chromosomal imbalances can also be the cause of fetal mummification. When the fetus dies, fetal fluids will be absorbed and the fetal membranes begin to attach to the fetus which experiences dehydration and is followed by the formation of dark brown viscous in the fetus. The result is a hard, bony mass with a closed cervix without cotyledons, fremitus and fetal fluid remaining in the uterus which can be identified through rectal examination by an experienced practitioner. Mummification associated with persistent corpus luteum is found mainly in cattle and rarely in dogs. Because the maintenance of gravidity in these two species is carried out by progesterone produced by the corpus luteum, in other species progesterone is produced by the fetal placenta after mid-gestation and the corpus luteum has involuted. Common symptoms in animals experiencing fetal mummification are reduced appetite, difficulty defecating, hard feces, no change and development of the udder in the final trimester, the mother experiences pain and when standing she always looks back with straining, the fetus feels hard.

Therapy

Mummification therapy can be carried out by administering PGF 2α , stilbestrol, estradiol, repositol diethylstilbestrol, or by removing the corpus luteum.

- Administration of low doses of estradiol in combination with prostaglandins
- Administration of prostaglandin F 2α and hysterotomy can also be applied
- Injection of stilbestrol secara intramuscular with a dose of 50-80 mg

Surgical intervention procedures *colpotomy or hysterectomy/caesar* can be carried out if the fetal mummification therapy procedure cannot be carried out (Arifianto et al, 2021). In the case of bovine fetal mummification, the anesthesia used is paravertebral anesthesia or L Block or infiltration anesthesia. According to Vermunt (2008) for flank incisions, paravertebral anesthesia in the transverse processes of T13, L1, L2, and L3 is highly recommended as an anesthesia method for cow caesarean sections. The advantage of this anesthesia is that the entire flank including the peritoneum will be maximally anesthetized. However, the disadvantage of this type of anesthesia is that it is difficult and requires a lot of experience. The best alternative that can be used is local anesthesia *line block or inverted L block*. Lignocaine hydrochloride 2% was injected at several points. The number of injection points depends on the length of the incision plane with the direction of anesthetic injection following the direction of the muscle fibers. (Vermunt, 2008).

CONCLUSION

Fetal mummification is the death of a fetus due to a non-infectious agent, the diagnosis can be confirmed by ultrasound, hormone therapy or surgery can be given.

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