

# FETAL MUMMIFICATION IN CATTLE: CURRENT APPROACH ON ITS MANAGEMENT – A REVIEW

**Abstract:** Fetal mummification is a rare occurrence in most animals. However it is commonly seen in polytocous species like swine. Exact etiology of fetal mummification is unclear and because late embryonic death is influenced by several factors that governs physiological mechanism essential for maintenance of pregnancy. This article aims at etiology, clinical sign and approach towards successful delivery of mummified fetus as well as restoring normalcy of uterine environment so that animal can conceive again and herd fertility remains normal.

## INTRODUCTION

Sequae embryonic death can be classified into two stages for ease of understanding i.e. early embryonic death (EED) and late embryonic death (LED). In early embryonic death, embryo dies before maternal recognition of pregnancy (MRP) therefore extension of lifespan of corpus luteum does not commence however in LED death of fetus occurs after MRP thus leading to prolongation of luteal phase. Mummification is important Sequae to LED. (Noakes *et al.*, 2009).

Fetal mummification is reported in ruminants i.e. cattle (Barth, 1986; Kumar *et al.*, 2017), Buffalo (Shivhare *et al.*, 2016), sheep (Hailat, 1997), goat (Tutt, 1997). In domestic animals swine has highest prevalence. (Kennedy and miller, 1993). Etiology of mummification is both infectious as well as noninfectious. Numerous other environmental factors like drought, extreme weather and hypoxia may also contribute to this pathological condition.

## Patho-physiology

Sequae of a dead fetus is purification due to autolytic changes in body tissue which involve release of digestive enzymes from digestive track and liver of the fetus followed by putrefaction by microbes. However in process of mummification these autolytic changes ceases as fetus tending to mummification dehydrates very quickly rendering inhibition of bacterial decomposition. Janaway *et al.* (2008) reported that in mummified fetus tissue hydration level drops below critical threshold, essential for bacterial purification.

There are number of pre- requisite for mummification process which includes. 1) death of fetus post ossification. 2). Rapid dehydration of uterine environment. 3) anaerobic environment of uterus. 4) Sterile uterine environment by means of closed cervix and intact endometrium, as closed cervix blocks entry of pathogen and vascular supply of intact endometrium neutralizes pathogens already present. (Drost, 2007).

Dried fetal mass after completion of mummification process (which generally takes few weeks to complete) attaches with uterus and appears as solid mass. On basis of appearance mummification can be classified as papraceous type where fetal skin appears like parchment paper without any exudate, which is reported in non ruminants (Christianson,

1992), whereas fetal skin surrounded by viscous chocolate coloured adhesive material termed as hematic or chocolate mummification reported in cattle and buffaloes (Tutt, 1997).

### **Occurrence**

Mummification of fetus is a rare gestational accident occurs in cattle with incident rate of 0.13-1.8% (Barth, 1986). It occurs to both indigenous as well as exotic breeds (Jana and Ghosh, 2014). However cattle suffered with similar pathology in its previous gestation carries a higher prevalence rate ranging around 30% (Roberts, 1973). In cattle, fetal mummification occurs after formation of the placenta and fetal ossification (70 d gestation) preferably between the 3rd to 8th months of gestation, without concomitant lysis of corpus luteum and cervical opening (Lefebvre, 2015). In fetal mummification pregnancy remains undisturbed as the fetal signal for induction of parturition remains absent (Kumar *et al.*, 2017).

### **Etiology**

Fetal mummification in bovines includes infectious and non-infectious causes, in which former includes: leptospirosis, bovine viral diarrhea (BVD), and *neospora caninum*. (Roberts, 1962; Ghanem *et al.*, 2009). Non infectious cause include: disturbed hormone level and chromosomal abnormality (Roberts, 1973), twisting of umbilical cord (Mahajan and Sharma, 2002), uterine torsion (Moore and Richardson, 1995), defective placentation (Irons, 1999), moreover genetic disturbance as one of the major contributor for the occurrence of mummification can be assessed with the fact that deoxyribonucleic acid (DNA) extract from

mummified fetuses revealed 20% cases carries uridine monophosphate synthase (DUMPS) deficiency that contributes in fetal mortality in cattle which intern occurs due to autosomal-recessive gene (Ghanem *et al.*, 2006).

### **Clinical presentation and diagnosis**

Majority of cases complains about prolong gestation period without sign of parturition. Per rectal palpation as well as Ultrasonographic examination reveals compact, firm and immobile mass without fetal fluid and placentomes. Per vaginal examination ends with closed cervix. Animal appears normal but may sometime show weight loss along with reduced feed intake and milk yield.

### **Prophylaxis**

#### **a) Treatment**

The treatment of choice in cases of fetal mummification is luteolysis by injection of PGF<sub>2</sub> $\alpha$ , however, a certain percentage of animals do not expel the dead fetus. Vandeplassche *et al.* (1974) reported a spontaneous parturition rate of 60% for cows carrying mummified fetuses with PGF<sub>2</sub> $\alpha$  alone however Roberts (1971) observed that Estrogens provokes regression of the CL and inducing myometrial contraction, relaxation of cervix and expulsion of the mummified fetus in the cow. Few other workers reported that a combination therapy of estradiol with PGF<sub>2</sub> $\alpha$  gives better result.

Surgical approach can be used in cases where medicinal treatment remains in vein therefore hysterectomy via colostomy (Hopper *et al.*, 2006) and caesarian operation using caudal flank laprotomy should be opted. A recent study carried out by Boileau *et al* (2001), suggests use of tocolytic agents which causes relaxation of uterus thus provides easy access to fetus as in both surgical approaches it is very difficult to access gravid uterine horn. In colpotomy limited vaginal space hinders reach up to uterine horn, in the same way caudal left flank laprotomy, distance between abdomen and gravid horn restricts obstetricians reach up to fetus.

#### **b) Preventive measures**

Mummification caused by pathogens can be successfully prevented by proper vaccination and in same way hormonal imbalances can be checked by regular hormone profiling. Maintenance of hygiene and sanitation always remains essential.