

DIAGNOSIS OF EARLY FETAL DEATH USING ULTRASONOGRAPHY IN CROSSBRED CATTLE: A REPORT

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ABSTRACT

Early foetal or late embryonic death is one of the inevitable reasons of pregnancy loss in domestic species. Ultrasonography is a potential aid to identify this condition at the earliest possible, which otherwise go unnoticed and ending up increase in inter-calving interval. The present case report illustrates ultrasonographic visualization of late embryonic and early fetal death characterized by empty amniotic vesicle, change in echogenicity of fetal fluid, foetal membrane detachment in three *Vrindavani* cross bred cows at 45-75 days gestation.

Keywords: Cow, amniotic vesicle, fetal death, membrane detachment, ultrasonography

INTRODUCTION

Early Pregnancy diagnosis is an important aspect in any dairy management for segregation of non-pregnant from that of pregnant animals and treating the same in next breeding. Traditional practice of transrectal palpation usually carried out at day 35 to 45 with variable accuracy, often accompanied by false negative results. In addition, rectal palpation by a novice could cause deleterious effect on late embryo and foetal viability (Jaśkowski et al., 2019). In contrary, direct visualization of conceptus through ultrasonography is highly sensitive, safe mode of pregnancy diagnosis with potential advantage of determining growth and viability of developing foetus (Romano et al., 2006). Pregnancy failure in cattle occurs mostly due to loss of conceptus at the early embryonic stage. Luteolysis prior to maternal recognition of pregnancy ends up in returning to estrus. Embryonic mortality after maternal recognition of pregnancy is considered as late embryonic death (LED) where corpus luteum is maintained thereby returning to estrus is delayed (Humblot, 2001). Incidence of late embryonic death accounts for 7.2% and 6.1% in cows and heifers, respectively between day 28 and 84 of pregnancy (Silke et al., 2002). In another study, pregnancy losses reported with incidence varied from 6.3% between day 42 and 56 to 3.4% between day 56 and 98 (Santos et al., 2004). Late embryonic death has significant effect on economics of dairy enterprise in terms of reduction in conception rate, increase in the number of days open as many a times non-pregnant animals fails to express estrus (Roelofs et al., 2010).

Thus, early diagnosis of pregnancy loss at the first trimester has economic importance in any dairy

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enterprise. Present report described the sonographic attributes of early fetal death in crossbred dairy cows.

CASE HISTORY AND OBSERVATIONS:

In the present study, three cases of early fetal death were recorded in crossbred cows (*Vrindavani*) belonging to first, third and fourth parity using B mode real-time ultrasonography (EXAGO ECM™, France) during routine pregnancy diagnosis at cattle and buffalo farm, livestock production and management section, Indian Veterinary Research Institute, Izatnagar. None of the three animals had the history of repeated per rectal examination carried out on them. Per rectal examination revealed no palpable abnormalities with the presence of all the cardinal signs of pregnancy however, early fetal death was confirmed through transrectal ultrasonography using 7.5 MHz linear probe based on the visualization of developing conceptus. Upon observation of the amniotic vesicle which is usually hypo echoic in healthy pregnancy, has been identified as relative smaller in size with mixed echogenic opaque cloudy fluid accumulation (**Fig. 1A**). The diameter of amniotic vesicle was measured as 2.3 to 2.8 cm. The developing embryo showed various degree of degeneration and fragmentation. In all three cows embryo lost its classical L shaped structure (**Fig. 1B**). The allantoic fluid appeared to be echogenic with clear evidence of detachment of chorio-allantoic membranes from the endometrium (**Fig. 1C-D**). Amniotic membranes are found detached from the allantois. In addition, clear separation of chorio-allantois from the caruncles of gravid uterine horns, irregular amniotic membrane and caruncular tissue, floating echogenic particles from the foetal membrane found in the uterus (**Fig. 1E-F**)

TREATMENT

Animals are subjected to prostaglandin therapy for terminating the pregnancy and lysis of functional CL using Inj Cloprostenol (Estrumate™ – MSD Animal Health India)

– 2ml I/M. All the animals were followed up and re-bred in subsequent oestrous cycle.

DISCUSSION

The aetiology of embryonic death include genetic and non-genetic factors *viz.*, sub-luteal progesterone levels in the preceding oestrous cycle, lower peripheral progesterone concentration, post-partum energy balance and occurrence of periparturient diseases (Zeron et al., 2001; Lopez-Gatiu et al., 2002; Sangsritavong et al., 2002; Patton et al., 2007). These factors alter the LH pulse frequency, development of dominant follicle and oocyte maturation resulting in compromised early embryonic development following fertilization (Diskin and Moris, 2008). Nevertheless the exact mechanisms leading to early foetal or late embryonic death still remains to be elucidated. In addition, impact of season on embryo survival in the form of heat stress and loss of body

condition score during post calving period are considered as potential risk factors of LED (Silke et al., 2002; Santos et al., 2004; Grimmard et al., 2006). Besides, infectious causes like infectious *bovine rhinotracheitis* and *campylobacteriosis* often reported as potential causative agents in late embryonic and early fetal death. (Sahin et al., 2017). In present study, the definite aetiology was not established. The detached foetal membranes, embryo, and debris following embryonic death usually resorbed, often expelled out from the uterus through the cervix and goes unnoticed (Kastelic et al., 1988). Detection of early foetal membrane detachment and degenerating conceptus is subtle through trans-rectal palpation. Therefore, ultrasound incorporation as a part of routine diagnosis helps us to efficiently diagnose the late embryonic and early fetal loss in cows that contributes to augment overall herd reproductive efficiency.

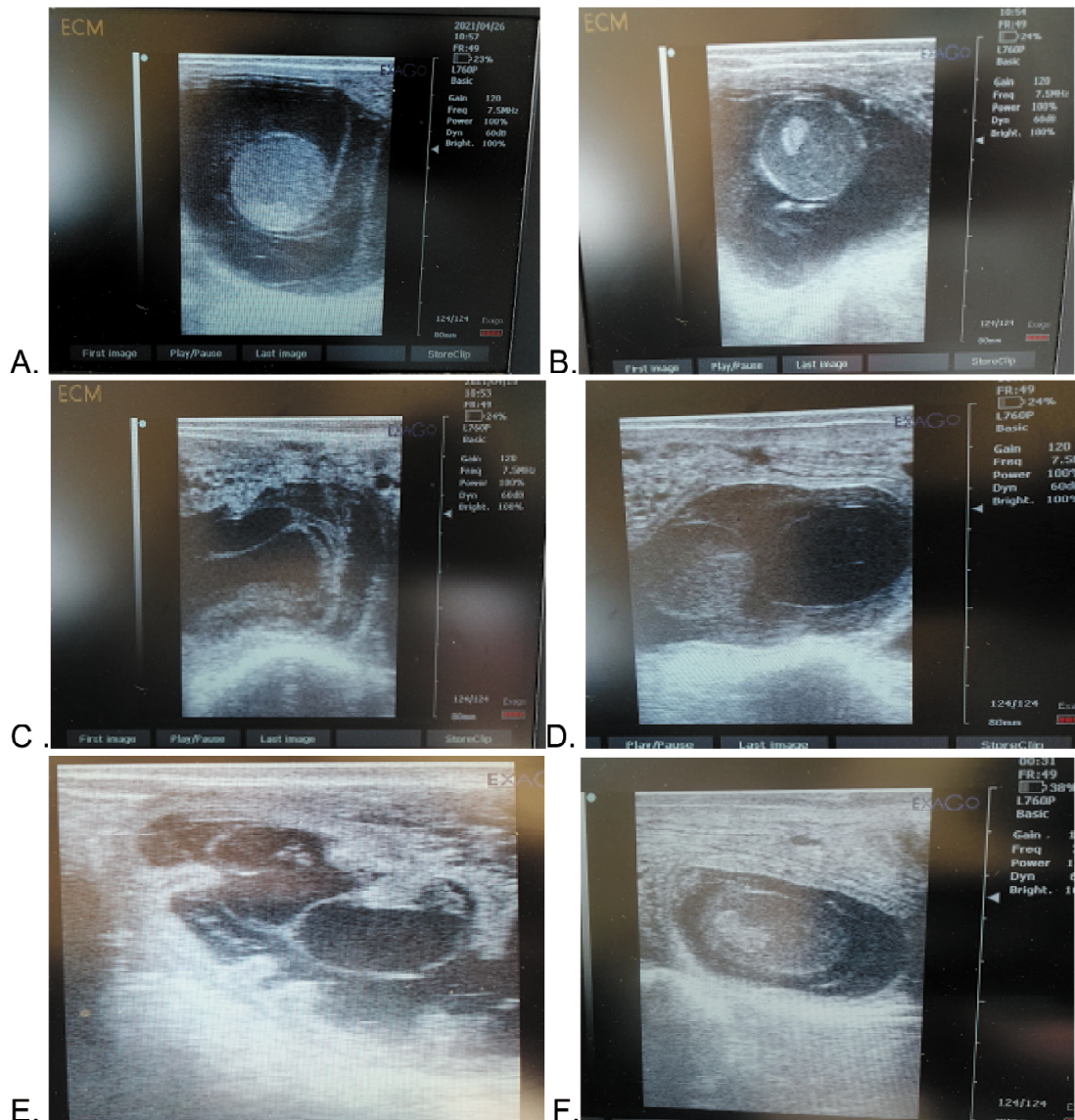


Fig.1A. Fetal death characterised by opaque amniotic vesicle with complete degeneration of developing foetus in a cow at 73- day post insemination. **B.** Degenerated early foetus which has lost its classical L shaped structure at 73 days post AI. **C-D.** Detachment of chorio-allantoic membrane at the site of developing placentome in absence of developing foetus in a cow. **E.** Detachment of chorio-allantois at placentome in 48days pregnant cow. **F.** Degenerated embryo in opaque amniotic vesicle at 58 days post AI in a cow.

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