Phytobioactives as An Alternate Approach to Prevent Retention of Fetal Membrane

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ABSTRACT

Background: Postparturient apathy has always been a matter of concern for livestock owners keeping in view the associated problems and its consequential effects on production. In the present study, the efficacy of a polyherbal preparation on timely expulsion of fetal membranes was attempted in periparturient cows.

Methods: The dairy animals were divided into 3 groups; first group of animals received herbal preparation once a day for 5 days as a prophylactic measure. The second group of animals was given herbal tonic as a therapy/treatment in cases where expulsion of fetal membranes was delayed. The third group served as control. Blood was collected at regular interval to assess innate immune response.

Result: The herbal formulation succeeded in complete expulsion of fetal membranes within 3hrs and emerged as a promising prophylactic tool in preventing retention of placenta, with added effect in enhancing innate immunity as monitored by evident rise in leucocytic population. The animals in which the herbal formulation was given as therapy responded with expulsion of fetal membranes within 7-8 hours post treatment while in the control group complications were evident and required technical assistance in many cases. Administration of herbal liquid reduced the cases of ROP, enhanced local immune response as well as brought about an upgrade in the general health condition of the animals.

Key words: Ecbolic, Herbal liquid, Parturition, Retention of placenta, Utromilk TC.

INTRODUCTION

Retention of the fetal membranes (RFM) or Retention of Placenta (ROP), is a very common condition in post parturient dairy animals where the fetal membrane is not expelled within 12 hours of parturition. In certain cases, it is followed by delayed involution of the uterus, drop in milk production and infertility resulting in huge economic losses (Lalrintluanga and Lahnuntluangi, 2010). Etiology behind ROP has been associated with several factors such as abortion, forced labor, delayed gestation, early parturition, uterine atony, infections and seasonal as well as hormonal disorders. In addition, deficiencies of some vitamins and minerals also induce or predispose animals to ROP.

Retention of placenta may be categorized into a primary and secondary phase. Primary retention of fetal membrane results from a lack of maternal detachment. Secondary retention is related to a mechanical difficulty or absence of ample expulsive force during uterine contractions in expelling the detached fetal membrane such as in the case of uterine atony (Eller et al., 2007). Collagenase secreted by the placenta during parturition leads to weakening of the mechanical link and subsequent detachment of the placenta from the uterus. The mechanical actions of uterine contraction stimulate compression of the placentomes and initiate the separation of the fetal cotyledons and maternal caruncle, while further contraction results in placenta expulsion from the uterus (Rohidas et al., 2018; Hafez and Hafez, 2006). These mechanisms require some time. Therefore, placenta is not said to be retained in cattle until 12 hours after parturition (Jackson, 2004). Considering the significance of ROP in livestock production, the present study was undertaken to assess the role of plant bioactives and their possible phyto-estrogenic role in avoiding such complications as well as avoiding drug abuse.

MATERIALS AND METHODS

A field trial was conducted in two local dairy farms following similar management and feeding practices in rural parts of western Uttar Pradesh (Muzzafarnagar and Meerut), India from October 2019 to May 2020. Thirty crossbred cows in late gestation of second to fourth lactation were randomly selected and allocated into three group of 10 each, for the purpose of this study.

Polyherbal uterine tonic (Utromilk TC, Nutricare life sciences, Dehradun, India) was given as a prophylactic agent to first 10 crossbred cows at a dose rate of 200 ml/ cow once orally within 1 hour of calving, followed by 100 ml from 2nd to 5th postpartum days (U-1). In the next 10 cows of the second group (U-2), Uterine tonic was given to all the diagnosed cases of retention of placenta (therapeutic agent),
where placenta had not been expelled for 8-10 hours post-parturition. A therapeutic dose of 500 ml was drenched, followed by a repeated dose of 100 ml within 1-2 hours of the first dose. Rest of the cows served as control (C) and was neither given prophylactic, nor therapeutic dose of the herbal tonic.

The efficacy of the poly-herbal ecbolic in facilitating expulsion of placenta and the time interval between calving and expulsion of fetal membrane was recorded in all the groups. To assess the immune response, samples of whole blood were collected before administration of test drug (day 0) and on seventh, fifteenth and twenty first day postpartum and sent to a vetlab (Meerut) to assess non-specific immunity parameters viz., total leucocyte count (TLC).

RESULTS AND DISCUSSION
About 80% of the cases had expulsion of placenta within 2 hours of calving and 20% expulsion of fetal membrane in 3-5 hours of calving without any complication in group (U-I). The herbal tonic enhanced the innate defense system of experimental animals. The results in the prophylactic group (U-I) were much more appreciable, as compared to the therapeutic treatment group (U-II) and the non-supplemented group. Supplementation of Utromilk TC within 1 hour of calving brought about intensive uterine contractions and expulsion of placenta without any uterine damage, hemorrhage or associated stress. The polyherbal formulation consisting of bioactives of more than 10 herbs (*Plumbago zeylanica*, *Adhatoda vasica*, *Augusta abroma*, *Gossipium indicum*, *Gloriosa superb*, *Saraca asoka*, *Terminalia chibula*, *Claviceps purpurea*, *Aristolochia indica*, *Cleorodandrum phlomidis*, *Trigonella foenumgraecum*, *Leptadenia reticulate*, *Sida cordifolia*) seemed to have acted synergistically in contracting uterine muscles, expulsion of placenta and boosting up the innate immunological response.

Expulsion of placenta
In our study 80% of the cases had expulsion of placenta within 2 hours of calving and 20% expulsion of fetal membrane in 3-5 hours of calving in cows of group U-1. No further complication was noted in this group (U-I). The therapeutic treatment group, U-II, slight deterioration was seen in general condition of the animals. In 40% of cases, a 100 ml dose of the herbal tonic had to be repeated. Rest 60% responded well to the first dose of herbal tonic and expulsion of fetal membranes occurred within 45-70 minutes of supplementation of the second dose.

The control group (C-as defined in material and methods) showed varied results with 40% expulsion in the first 9-10 hours, 30% in 12 hours of calving, 30% within 15-20 hours, out of which 30% cases also required manual removal of placenta (Table 1, Fig 1).

The polyherbal uterine tonic seems to have enhanced the uterine contractions and facilitated the expulsion of placenta. This may be correlated to the actives and phytoestrogens present in the herbal tonic. Various studies have documented the use of phytoactives to facilitate the contractility of uterus and removal of placenta (Parasher, 2018; Pankaj et al., 2016; Jagadeeswary et al., 2014; Verma, 2010;...
Table 2: TLC (1000/µ) in different groups.

| Groups | Day 0       | Day 7       | Day 15      | Day 21      |
|--------|-------------|-------------|-------------|-------------|
| C      | 9.3±1.03    | 10.62±0.87  | 9.27±1.39   | 9.01±1.22   |
| U₁     | 9.21±0.97   | 9.94±1.71   | 11.3±2.01   | 11.8±1.04   |
| U₂     | 9.4±1.8     | 9.6±1.92    | 10.8±1.41   | 12.01±1.6   |

Singhal, 1996). Phytobioactives have also been known to increase uterine contraction by decreasing progesterone concentration leading to removal of retained placenta (Tagesu, 2018; Rahmatullah et al., 2010; Yeap et al., 2010). Contraction of uterus causes vasoconstriction of small blood vessels and villi and the fetal caruncle detaches from cotyledon of maternal, resulted into, expulsion of placenta takes place (Manspeaker, 2007). Dongan et al., (2016) in yet another study also revealed the great potential of herbal powder in the management of retained placenta in dairy cows. Hence, It may be asserted that the orally drenched herbal uterine tonic brought about expulsion of placenta owing to effective sequence of events that followed due to phytobioactives, with minimal tissue damage and blood loss.

**CONCLUSION**

Phytobioactives and phytoestrogenic properties of herbal liquid facilitated effortless expulsion of fetal membranes, prevented postpartum complications and also enhanced the immune status. Prophylactic use of herbal ecbolics may therefore be recommended for avoiding cases of ROP and associated stress.

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