

## Factors affecting retained fetal membrane and its therapeutic management in dairy cows

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[Received: July 03, 2015; Accepted: July 27, 2015]

### ABSTRACT

Retention of fetal membrane (RFM) in dairy cows is a common complication after parturition due to failure of the separation of villi of fetal cotyledon from crypts of maternal caruncles and affects on reproductive cycle. The present study was conducted in 594 cows of 15 different dairy farms of Sylhet district. The data was collected by direct interviewing of the farmers in a prescribed questionnaires data sheet and data record from the register of the contracted farms. The overall incidence of retained placenta was 17.51 %. The cross bred dairy cows had higher incidence (14.14%) of RFM compared to local one (3.04%) and differ significantly ( $p < 0.05$ ). The parity and age of the animals had substantial effect on retention of fetal membrane in dairy cows. The incidence of RFM had notably increased from 1<sup>st</sup> parity (10.04 %) to 7<sup>th</sup> parity (57.14 %) and the highest observation was found at more than 7 years and lowest at the age below 3 years of age. The season, sex of calves, body condition of the animals and level of vitamin AD<sub>3</sub>E before parturition had significant effect on incidence of RFM in dairy cows. The RFM affected cows were treated either with intra muscular injection of oxytocin or herbal drug Eutoklin and manually removing the retained membrane. RFM affected post partum first estrus, service per conception, day's open and calving interval significantly on parturated cows compared to normal delivered cows. Younger healthy cows, supply of balanced diet, sufficient daily exercise; comfortable calving areas should be maintained to reduce the incidence of RFM.

**Key words:** Retention of fetal membrane, incidence, parity, age, body condition, reproductive traits

### INTRODUCTION

Retention of fetal membrane (RFM) in dairy cows is a common complication after parturition. The placenta is normally expelled within 8-12 hours following parturition in cows [1-3]. When this physiological episode fails to take place within the said period of time, then the condition is considered pathological. The retained fetal membrane is occurred due to failure of the separation of villi of fetal cotyledon from crypts of maternal caruncles. The incidence RFM varies from 4.0% -16.1 % [2,4] and there are several factors influencing the case of RFM which includes gestation length, nutrition, dystocia, age of the animals, abortion, and season of the year [5-6]. In most of the cases, RFM usually causes metritis and delayed involution of uterus [7-8] and consequently affects the reproductive performance rigorously [9]. Thus a RFM case usually prolongs the resumption of ovarian cyclicity post partum and having increase time from calving to conception of next calf [10]. Until now several numbers of therapeutic approaches like manual removal of placenta, administration of intra-uterine and/or systemic antibiotics, injection of oxytocin, PGF<sub>2</sub> $\alpha$  and  $\beta$ 2-receptor blockers [11-12] and other different protocol have been implicated for removal of the retained fetal membrane but none of them are proved to be fully successful for treatment of RFM. Sylhet is situated in the north east hilly region of Bangladesh and the dairy industry is developing gradually. The weather in this region is more humid

during summer and cold during winter. RFM is one the important constraints here for efficient reproductive performance in dairy cows. Till date, a very few study has been conducted to analyze the factors of RFM and their therapeutic management. Therefore, the present study was conducted to find out the factors responsible for RFM and their therapeutic management in local and cross bred dairy cows of Sylhet region.

### MATERIALS AND METHODS

**Study area and data collection:** The present study was conducted in 594 cows of 15 different dairy farms of Sylhet district. The data was collected by direct interviewing of the farmers in a prescribed questionnaires data sheet and data record from the register of the contracted farms. The ages of the cows were range from below 3 years to 7 years above, the parity were from 1 to 8 and the body condition score were below 2.5 to above 3.5 in 1 to 5 scale. The breed of cows, season of birth and sex of calves were also considered. The cows whose fetal membranes were not expelled within 12 hours after parturition were considered to have RFM.

Reproductive traits like post partum first estrus interval, service per conception, days open and calving interval were evaluated. Oxytocin 20 IU/animal or with herbal drug Eutoklin therapy were prescribed within 12- 24 hours of placental retention. The cows whose placentas were not removed after 24 hours of parturition, were manually removed with

insertion of 2gm oxytetracycline bolus and metronidazole intra uterine.

**Feeding and management of the cows:** The cows were housed in intensive yards, supplied water once daily and generally fed a mixed ration consisting of agricultural by-products like wheat bran, rice polish, and oil cakes, rice straws and green fodders. Cows were artificially inseminated within 10-12 hours after onset of estrus until conceived.

**Statistical analysis:** The obtained data were compiled and statistically analyzed by SPSS Windows version 10.0 programs to evaluate the incidence and chi-square method used for interpretation of the findings.

### RESULTS AND DISCUSSION

The overall incidence of retained placenta was 17.51%. The cross bred dairy cows had higher incidence (14.14%) of RFM compared to local one (3.04%) and differ significantly (Table 1). The result was

Kaikini et al.<sup>15]</sup> had found relatively lower result than that of present study. It might be due to location of study or due to poor management of the farms. The cross bred dairy cows suffered (14.48 %) significantly in contrast to local cows (3.03 %).

The parity had substantial effect on retention of fetal membrane in dairy cows. Table 2 showed that the incidence of RFM had notably increased from 1<sup>st</sup> parity (10.04 %) to 7<sup>th</sup> parity (57.14 %). The results was in agreement with the findings of others<sup>[16]</sup>. It could be the effect of activity of uterine muscles on parity of cows. The incidence of RFM increased as the parity advanced and it was significant above 5th parity.

The incidence of retention of fetal membrane (Table 3 in < 3 years, 3 years to < 5 years, 5 years to < 7 years and >7 years were 3.25 %, 20.47 %, 31.11 % and 43.19 % respectively. The highest observation was found at more than 7 years and lowest at the age

Table 1: Overall incidence of retention of fetal membrane among local and cross bred cows

Placental Condition	Local	Cross bred	Total	Chi square calculated value(p <0 .05)
Retained	18(3.03%)	86(14.48%)	104(17.51%)	
Normally expelled	188(31.64%)	302(50.84%)	490(82.49%)	16.7965
Total	206(34.68%)	388(65.32%)	594(100%)	

Table 2: Effect of parity of cows on incidence of Retained fetal membrane(RFM)

No. of parity	No. of records	Retained placenta	
		N	% of incidence
1	219	22	10.04%
2	181	21	11.60%
3	73	10	13.69%
4	50	18	36.00%
5	32	13	40.62%
6	25	12	48.00%
7	14	8	57.14%
Total	594	104	17.51%

Table 3: Effect of ages of dairy cows on percentages of incidence of retention of fetal membrane RFM).

Placental Condition	Age group				Chi square calculated value(p<0 .05)
	< 3 years	3 yrs to < 5 yrs	5 yrs to < 7 yrs	>7 yrs	
Retained	8 (3.25 %)	35 (20.47 %)	42 (31.11%)	19 (43.19 %)	
Normally expelled	236 (96.75 %)	136 (79.53 %)	93 (68.89 %)	25 (56.81 %)	72.6201
Total	244 (100 %)	171 (100 %)	135 (100 %)	44 (100 %)	

closer to the findings of Islam et al.<sup>13]</sup> where the overall incidence was 13.4% but Grunert <sup>[14]</sup> and

below 3 years. The younger cows might have more energy to expel the fetal membrane, so lowest

number of observation was found and vice versa at the older age.

present study showed that cows which had injected vitamin AD3E three weeks before delivery had lower

Table 4: Effect of season and calf sex on the incidence of RFM

Variables	No. of records	Retained placenta	
		N	% of incidence
Season of delivery			
Spring	201	40	19.90%
Summer	102	22	21.57%
Rainy	93	14	15.05%
Winter	198	28	14.14%
Sex of calves			
Male	268	38	14.18%
Female	226	66	29.20%

Table 5: Effect of body condition score on the incidence of retention of placenta in dairy cows.

Variables	Body condition score			Chi square calculated value (p < 0 .05)
	< 2.5(poor)	2.5-3.0(Fair)	>3.0(Good)	
Retained	14 (17.95 %)	30 (9.49 %)	60 (29.71 %)	34.9541
Normally expelled	64 (82.05 %)	286 (90.51 %)	142 (70.29 %)	
Total	78 (100 %)	316 (100 %)	202 (100 %)	

Table 6: Effect of intramuscular injection vitamin AD3E three weeks before parturition on incidence of RFM in dairy cows.

Variables	Total no. cows delivered	Placenta retained	% incidence	Chi square calculated vaue (p < 0.05)
Inj. AD3E	295	29	9.15%	16.878
Without Inj. AD3E	299	75	25.08%	
Total	594	102	17.51 %	

The present findings were in agreement with the findings of Bhattacharyya et al. [18] but differ from Gafaar et al. [16]. Gestation length of the cows might affect the result.

The body condition had significant effect on incidence of RFM in dairy cows. The highest incidence of RFM was found in dairy cows with BCS more than 3.0 (29.71 %) followed by RFM with BCS less than 2.5(17.95 %) and with BCS 2.5 to 3.0(9.29 %).The results were similar to the observation of Sarder et al. [19] where they found highest incidence in good body condition scored dairy cows. It may differ be due to effect of uterine contacting ability and last calving type.

Vitamin AD<sub>3</sub>E have important role in preventing oxidative damage to maintain the sensitive membrane integrity and help in easier expulsion of the fetal membrane during parturition. In Table 6, the

incidence of RFM (9.15%) than those who were parturated (25.08 %) without injection of these vitamin. These findings were in agreement with the study of Campbell and Miller [20] and Javonic et al. [21].

In normal delivered cows the fetal membrane usually expelled within 8-12 hrs after parturition. The cows who did not release their fetal membrane 12-24 hours after parturition were treated with either injection oxytocin intramuscularly or with herbal drug Eutoklin and rest of the cows fetal membrane were removed manually with intra uterine insertion of oxytetracycline and metronidazole tablet whose fetal membrane were not expelled within 24 hours of parturition. The cows that were treated with either injection oxytocin or herbal drug Eutoklin within 12-18 hours after parturition showed hundred percent (100 %) efficacy.

Table 7: Treatment protocol of RFM cases in different indicated time and its efficacy rate in dairy cows.

Treatment	Number of animals	Cows passed their fetal membranes	
		No of response	% efficacy
Inj. Oxytocin 20 IU within 12-18 hrs	30	30	100 %
Inj. Oxytocin 20 IU within 18 to 24 hrs	20	14	70 %
Herbal drug within 12-18 hrs	17	15	100 %
Herbal drug within 18 to 24 hrs	15	10	66.66 %
Manual removal + intra uterine oxytetracycline and metronidazole bolus	12	12	100 %

Table 8: Effect of RFM on reproductive performance of dairy cows in subsequent fertility

Reproductive traits	Cows normally delivered Mean $\pm$ SD	Cows with RFM Mean $\pm$ SD
Post partum to first estrus interval(days)	47.226 $\pm$ 6.89	61.46 $\pm$ 6.51
Service per conception	1.19 $\pm$ 0.39	2.89 $\pm$ 0.78
Days open(n)	94.35 $\pm$ 7.89	108.45 $\pm$ 9.34
Calving interval(days)	383.77 $\pm$ 9.87	415.67 $\pm$ 11.57

The cows treated with same type of drugs 18-24 hrs after parturition showed 70.00 % and 66.66% efficacy rate respectively. These findings may be differing from each other due to reduction of receptor estrogen in uterus for activity of oxytocin or Eutoklin to release the fetal membranes. Manual removal with intra uterine insertion of oxytetracycline and metronidazole bolus was done in those cows that placentas were not removed even 24 hours of parturition.

Effect of retained fetal membrane (RFM) on reproductive traits of dairy cows was showed in table 8. RFM affected post partum first estrus (61.46 $\pm$ 6.51 days), service per conception (2.89 $\pm$ 0.78), days open (108.45 $\pm$ 9.34 days) and calving interval (415.67 $\pm$ 11.57) significantly on parturated cows compared to normal delivered cows.

These results indicated that retained fetal membrane caused uterine infection and delayed involution of uterus and affected reproductive performance. These results were in accordance with those obtained by Shiferaw et al.,<sup>[22]</sup> and Han and Kim<sup>[10]</sup>.

## CONCLUSION

This study indicated that breed of cows, number of parity, age sex and season of calving, body condition of animal and vitamin AD3E had pronounced effects on incidence of retained placenta and it also

adversely effects on reproductive performance in dairy cows. Younger healthy, contented and active cows and supply of balanced diet, sufficient daily exercise; sufficiently large, clean and comfortable calving areas (preferably on pasture) and proper sanitary prior to, during and after parturition should be maintained to reduce the incidence of RFM.

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