

Factors affecting the different prophylactic treatments on incidence of retained placenta in Holstein Friesian crossbred cows

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Abstract

Context: The retained placenta (RP) is a significant cause of maternal mortality and morbidity throughout the developing country.

Objectives: The aim of the present study was determine the effect of some prophylactic drugs on retained placenta of 100 Holstein Friesian Crossbred Cows at late stage of pregnancy or just after parturition.

Materials and Methods: Cows were selected from 50 dairy farms in Bangladesh during June, 2010 to June 2011 that was nearly same housing, management. The cows included in this study aged between 3-7 years. The prophylactic measure applied with the history of delivery was treated according to the following schedule: Group I (n=20) Oxin® (oxitocin synth. 10 iu/ml) @ 5 ml/ cow (i.m.); Group II (n=20) Metherspan® (methyleargometrine melete .0200 mg/ml) @ 5 ml/ cow (i.m.); Group III (n=20) Dinoprost® (dinoprost as trometamol 5 mg/ml) @ 5 ml/ cow (i.m.); Group IV (n=20) Utoklin® (herbal patent drugs) @ 450 ml/ cow (orally); Group V (n=20) placenta expelled spontaneously within 6 to 12 hours (control). The computer package SPSS/PC+ program and logistic regression model used for analyzed the study.

Results: The highest and lowest incidence of RP recorded at >7years aged and 3years to <5 years aged cows, respectively. The average incidence of retained placenta was 18% and RP according to prophylactic treatment were 20%, 15%, 10%, 15% and 30% in oxin, metherspan, dinoprost, utoklin and control group, respectively. All the logistic regression coefficients among prophylactic measure were found to be positive and statistically insignificant except dinoprost (P<0.05) and metherspan (P<0.01). The odds ratios of oxitocin, metherspan, dinoprost and herbal patent drugs (utoklin) were 2.154, 3.051, 11.846 and 2.154, respectively where control group was the reference category.

Conclusion: Immediate therapeutic approach after delivery will reduce the chance of retained placenta.

Keywords: Retained placenta, Holstein Friesian Cross Bred Cows, Prophylactic treatment, and Age.

Introduction

Cattle are the main farm animal that is used for meat and milk production for human consumption, providing about 18% of protein intake and 9% of energy intake. Yet despite their obvious value in feeding for the human population, cattle farming systems are attacked by members of the public for creating possible health risks, for providing inadequate attention to animal welfare and for alleged adverse effects on the environment (Phillips, 2001). Livestock sector plays an important role in Bangladesh economy and is an important sub-sector of our Agriculture. Retained placenta is one of the most common conditions occurring in animals following delivery. The incidence of retained placenta was 13.4%, 2.7%, 4.6%, 3.6% and 2.5% over all, Local, Local-Sahiwal, Local-Friesian and Local-Sahiwal-Friesian cross bred cows (Islam *et al.*, 2013), Friesian-Holstein cattle was 9.2% (Majeed *et al.*, 2009). Retained placenta (RP) may result from a number of factors, such as abortion, forced labor, delayed gestation, early parturition, uterine atony, infections, and seasonal and hormonal disorders. The physiological delivery of the placenta after parturition requires adequate and regular uterine contractions. The deficiency in secretions of PGF₂α and oxytocin and serum Ca concentration, which maintain adequate contraction of the uterus, may cause RP, increase the risk of dystocia and delay the involution of the uterus. In the Veterinary Medicine, the common practice is manual removal (MR) of placenta after delivery that is an old idea and it may have various problem and

ultimately sterility of productive animal. Hormone therapies had been widely used in the treatment of retained placenta (Roberts, 1986). Various prophylactic and therapeutic approaches have been postulated by many workers ranging from no treatment to hormonal, chemotherapeutic and manual removal (Arthur, 1979; El-Azab *et al.*, 1988 and Majeed *et al.*, 1991). This study was designed to investigate the incidence of RP in Holstein Friesian Crossbred Cows at late stage of pregnancy with factors affecting the incidence and the effect of different hormonal treatment on the time of placental expulsion. Several prophylactic treatments had been employed in the prevention of retained placenta in the present study.

The objectives of the present study were

Investigation of the effect of prophylactic drugs at various age groups of dairy cows on retained placenta.

Identification of effective drugs that prevent retained placenta of Holstein Friesian crossbred dairy cows.

Materials and Methods

The study was conducted for the prophylactic treatment measure that reduces the Retained Placenta. Cows were selected from 50 dairy farms in Bangladesh during June 2010 to June 2011 that was nearly same housing and management. Total 100 Holstein-Friesian crossbred pregnant cows chosen from 50 dairy farms which aged between 3-10 years and calved 1-7 times. The prophylactic measure applied just after delivery of calf was treated according to the following schedule: Group I (n=20) Oxin® (oxitocin synth. 10 iu/ml) @ 5 ml/ cow (i.m.);

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Group II (n=20) Metherspan® (methyleargometrine melete .0200 mg/ml) @ 5 ml/ cow (i.m.); Group III (n=20) Dinoprost® (PGF₂α contain dinoprost as trometamol 5 mg/ml) @ 5 ml/ cow (i.m.); Group IV (n=20) Utoklin® (herbal patent drugs) @ 450 ml/ cow (orally); Group V (n=20) placenta expelled spontaneously within 6 to 12 hours (control). All information of importance was recorded carefully in special cards prepared for this purpose. Cows with RP were divided into subgroups based on age Group 1: < 3years aged, Group 2: 3years to <5 years, Group 3: 5years to <7 years, Group 4: >7years type.

Statistical analysis

The collected data were compiled and tabulated in proper form for statistical analysis. Calculation of incidence for each of parameter and Student's t test were done using computer package SPSS/PC+ program and logistic regression analysis for prophylactic treatment of Holstein Friesian crossbred dairy cows.

Results and Discussion

The incidence of the RP in the Holstein Friesian crossbred dairy cows was 30% (control). These finding lower than that reported by Majeed, 1979, Al-Myahi, 1992, Islam *et al.*, 2012 & 2013 and Majeed *et al.*, 1989. The prophylactic treatment that reduces the chance of retained placenta at 10%, 5%, 5% and 5% in respect to various treatments done was such as Uteoklin, Oxytocin, Metherspan and Dinoprost respectively shown in table 1. The results were agreement with Islam and Sarder, 2013 and partly in agreement with Majeed *et al.*, 2009. The prophylactic treatment observed closer results but when compared with time of expelled placenta exposed specific efficacy results (Table 3 and Figure 1). All the logistic regression coefficients were found to be positive and statistically insignificant except Dinoprost (P<0.05) and Metherspan (P<0.10). The odds ratios of Oxytocin, Metherspan, Dinoprost, Uteoklin are 2.154, 3.051(P<0.10), 4.846 (P<0.05) and 2.154, respectively which means recovery rate from retained placenta of dairy cows at the time of parturition was according to about 2, 3, 5 and 2 times better than the Control group. The third group PGF₂α (Dinoprost) showed the best results and 89% efficacy for the expulsion of RP among groups and 4.85 times more likely than control group. The effect of PGF₂α can be explained on the basis of the fact that PGF₂α increases uterine contractility (Watson, 1984) with dilatation of the cervix, both of which enhance placental expulsion. Similar finding reported by

Table 1. Effect of prophylactic treatments on the incidence of RP in Holstein Friesian crossbred dairy cows

Prophylactic treatment group	No. of RP	Incidence (%)
Control	6	30
Patent herbal drug (Utoklin)	2	10
Oxytocin	1	5
Ergometrine maleate (Metherspan)	1	5
PGF ₂ α (Dinoprost)	1	5

Table 2. Effect of age on the incidence of RP of Holstein Friesian crossbred dairy cows

Category	Aged group				Total
	<3 years	3years to <5 years	5years to <7 years	>7 years	
RP					
Number (N)	2	1	2	4	9
Percentage (%)	22.22	11.11	22.22	44.45	100

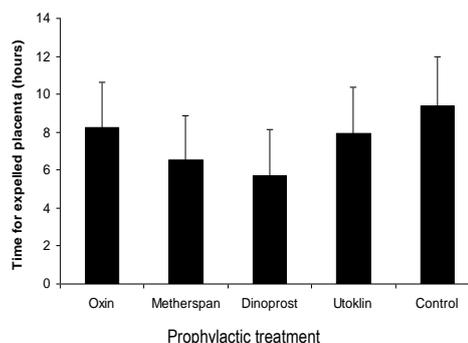


Figure 1. Time for expulsion of retained placenta after several prophylactic treatments of Holstein Friesian crossbred dairy cows

Table 3. The Logistic Regression analysis effect on different prophylactic treatment and Index of placental expulsion of Holstein Friesian crossbred dairy cows

Independent Variable	B (S.E.)	S.E	Exp(B)
Treatment Group			
Oxytocin	0.767	0.730	2.154
Metherspan	(0.730)	0.782	3.051**
Dinoprost	1.116	0.881	4.846*
Utoklin	1.578	0.730	2.154
Control ^(r)	0.767	-	1.000
Constant	-0.619	0.488	1.857
Chi-square (calculated)		11.647*	
-2 Log likelihood		89.361	
Df		4	
Cox & Snell R Square		0.234	
Chi-square (tabulated)		9.488	

r = Reference Category; B = Logistic Regression Coefficient; and Exp (B) = Odds Ratio

* = Significant at 5% level, ** = Significant at 10% level and SE = Standard Error

Majeed *et al.*, 1991, it could be concluded that using of PGF₂α was more effective for treatment of RP than other treatment regimen. The second group methyl ergometrine maleate (Metherspan) showed second highest (84%) response among groups and 3.051 times more likely than control group. Ergonomic or a similar drug developed from ergot may be more beneficial than oxytocin in cases of atonic myometrium because of its prolonged oxytocic effect (Roberts, 1986). The first group oxytocin (Oxin) and fourth group patent herbal drug (Utoklin) obtained similar result and an efficacy of 79%. It has been suggested that oxytocin plays a role in dropping of placenta; through a stimulation effect on phagocytosis by uterine leucocytes. Exogenous oxytocin used to prevent the occurrence of retained placenta immediately postpartum (Roberts, 1986; Azad, 2010 and Miller *et al.*, 1984). Uteoklin and Oxitocin showed 2.154 times more effects than control group. Beside this, the animal must also be compared as to only cows which calved normally at term with a healthy calf same as groups; same type of management and free from well known infection. Younger cows showed higher incidence of RP than older one (table 2). This might be due to shorter gestation periods (Noakes, 2003 and Youngquist, 2007). Cows aged more than 7 years showed a higher incidence (44.45%) of RP than others aged group of animals. This is in agreement with Islam *et al.*, 2012 & 2013 and Islam & Sarder, 2013 but disagreement with Majeed *et al.*, 1989 and Majeed, 1979.

Conclusions

Prostaglandin such as PGF₂α (Dinoprost) is best effect than Methyl ergometrine maleate (Metherspan) after that oxytocin (oxin) and patent herbal medicine (uteoklin) have similar effect when compared with control group of experimental cows. Higher incidence of RP was observed in > 7years than <3years than that of other aged group of cows. These incidences indicated the RP in Holstein Friesian crossbred cows is a significant characteristic that require further study to find out the proper solution to reasons.

Author's contribution

It was the MS thesis experiment of first author. Other authors contributed equally. All authors read and approved the final manuscript.

Ethical Implication

The study was no human subject will be analyzed directly, but animal blood will drawn by the permission of owner. We will always keeping in mind the Biosafety regulation in Bangladesh. We have got ethical permission from the ethical committee of Institute of Biological Sciences, University of Rajshahi before start of the research.

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References

- Al- Mayahi OMG. Retained placenta in Dairy cattle: A causative factors and comparison of some treatments. MSc. Thesis, College of Veterinary Medicine. Baghdad University, Iraq. 1992.
- Arthur GH. Retention of the after birth in cattle: A review and commentary. *Vet. Annual.* 1979; 19: 26- 36.
- Azad MA. Prevention of retained placenta by injecting various drugs immediately after parturition in cows. MS Thesis, Department of surgery and obstetrics, faculty of veterinary science, Bangladesh Agricultural University, Mymensingh. 2010; page no. 1- 48.
- Bolinder A, Seguin B, Kindahl H, Bouley D and Otterby D. Retained fetal membranes in cows: manual removal versus non removal and its effect on reproductive performance. *Theriogenology.* 1988; 30: 45- 56. [http://dx.doi.org/10.1016/0093-691X\(88\)90262-2](http://dx.doi.org/10.1016/0093-691X(88)90262-2).
- El- Azab EA, El- Azab MA, Sharawy SM and Labib FM. Evaluation of various uterotonic single treatments for prophylaxis of retained placenta in dairy cows. *Assiut. Vet. Med. J.* 1988; 19: 166- 172.
- Islam MH and Sarder MJU. Retained Placenta of Dairy Cows: Retained Placenta of Dairy Cows with Special Reference to Some Prophylactic Trials. LAP LAMBERT Academic Publishing (2013-06-08)- ISBN-13: 978-3-659-40055-1.
- Islam MH and Sarder MJU, Jahan SS, Rahman M, Zahan M, Kader MA and Hossain KM. Retained placenta of dairy cows associated with managerial factors in Rajshahi, Bangladesh. *Vet. World.* 2013; 6(4):180-184. <http://dx.doi.org/10.5455/vetworld.2013.180-184>.
- Islam MH, Sarder MJU, Rahman M, Kader MA and Islam MA. Incidence of Retained Placenta in Relation with Breed, Age, Parity and Body Condition Score of Dairy cows. *International J. of Natural Sci.* 2012 2(1): 24-31. <http://dx.doi.org/10.3329/ijns.v2i1.10878>.
- Majeed AF. Retained fetal membranes in cows, MSc. Thesis, Baghdad University, College Veterinary Medicine. 1979.
- Majeed AF, Aboud QM, Hassan MS and Muhammad AY. Retained fetal membranes in Friesian-Holstein cows and effect of some treatment methods. *Iraqi J. Vet. Sci.* 2009; 23: 5-8.
- Majeed AF, Taha MB and Azawi OI. Hormonal treatment of retained placenta in local breed of cattle. *Iraqi J. Vet. Sci.* 1991; 4 (1): 61- 72.
- Majeed AF, Taha MB and Qassim MY. Retained placenta in local breed cattle. *Mesopotamia J. of Agric.* 1989; 21 (1): 97- 104.
- Miller BJ and Lodge JR. Postpartum oxytocin treatment prevention of retained placentas. *Theriogenology.* 1984; 22: 385-38. [http://dx.doi.org/10.1016/0093-691X\(84\)90458-8](http://dx.doi.org/10.1016/0093-691X(84)90458-8).
- Noakes DA, Parkinson TJ & England CCW. *Arthur's Veterinary Reproduction and Obstetrics*, 8th Ed., Saunders Co. 2003.
- Phillips CJC. *Principal of Cattle production*. CAB International, Wallingford, New York, NY 10016, USA 1-287. 2001.
- Roberts SJ. Retention of placenta. In: *Veterinary Obstetrics and Genital Diseases (Theriogenology)*, Woodstock, Vermont, USA. 1986; pp. 373-388.
- SPSS/PC, Windows for version-10.0. Release on 27.10.199 (Microsoft Corp). Trends. SPSS Inc., Michigan Avenue. Chicago. IL.pp:19-182.
- Youngquist, RS & Threlfall, WR. *Current Therapy in large Animal Theriogenology*, 2nd ed., Saunders, ans imprint of Elsevier Inc., U.S.A. 2007.