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Comparative Efficacy of D-Cloprostenol and DL-Cloprostenol on Cervical Dilatation after Detorsion in Buffaloes

Gitesh Saini[1]*, Gyan Singh[2], Anand Kumar Pandey[1], Sandeep Kumar[1], Sukhbir Ravish[1]

[1]Department of Veterinary Gynaecology and Obstetrics, COVS, LUVAS, Hisar
[2]Department of Veterinary Clinical Complex, COVS, LUVAS, Hisar

ABSTRACT

This experiment deals with comparing efficacy of D-Cloprostenol and DL-Cloprostenol on cervical dilatation after detorsion in buffaloes. 12 buffaloes after successful detorsion were divided into 2 groups and subjected to 2 different protocols for cervical dilatation. Based on the finding of the study, it was concluded that buffaloes treated with D-Cloprostenol showed better and early cervical dilatation as compared to buffaloes administered with DL-Cloprostenol.
Key words: Buffalo, Cervical dilatation, D- Cloprostenol, DL- Cloprostenol, Uterine torsion.

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INTRODUCTION

Uterine torsion is one of the major causes for complicated cases of maternal dystocia and it not treated timely, and then may result in the death of both the fetus and dam. Incidence of uterine torsion is higher in buffaloes as compared to cattle. Uterine torsion affected buffaloes can be successfully detorted in most of the cases with modified Schaffer's method. But after detorsion, it is difficult to achieve complete cervical dilation in most of the cases which is pre-requisite for per-vaginal delivery.

Dilatation of cervix depends on the resistance caused by visco-elastic properties of cervix and the force induced by uterine contractions (Breeveld-Dwarkasing *et al.,* 2003). In uterine torsion cases, former may be disturbed due to cervical ischemia and the later may be absent in cases particularly where fetus is dead thus hampering cervical dilatation. Incomplete cervical dilatation is an important cause of maternal dystocia among farm animal species. In cows and buffaloes, the cervix is relatively more cartilaginous than the other farm animal species and severe dystocia can result if it is not dilated properly at the time of parturition (Sloss and Duftly, 1980).

Luteolysis is a key event in process of parturition and it is well known that prostaglandin $F_{2\alpha}$ regulates luteolysis and has been described as a powerful stimulant for contractility of uterus. Also, upon luteolysis circulating levels of estradiol increase which is responsible for

*Corresponding author.
E-mail address: sainihony9@gmail.com (Gitesh Saini)
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Table 1: Treatment protocols used for cervical dilatation after successful detorsion in buffaloes.

Group (n=no. of animals)	Treatment protocol used
I (n=6)	DL-Cloprostenol (500µg i.m.) – Mifex (450 ml slow i.v.)- Dexamethasone (40mg i.m.) - Valethamate bromide (80mg i.m.)- Estradiol benzoate (2mg i.m.)
II (n=6)	D-Cloprostenol (150 µg i.m.) – Mifex (450 ml slow i.v.)- Dexamethasone (40mg i.m.) - Valethamate bromide (80mg i.m.)- Estradiol benzoate (2mg i.m.)

Table 2: Effect of DL-Cloprostenol and D-Cloprostenol on cervical dilatation

Observation	Group-I (n=6)	Group-II (n=6)	p- value
Number of buffaloes with successful cervical dilatation	4	6	-
Time interval between treatment and complete cervical dilatation	12± 0.6 hours	8± 0.2 hours	<0.05
Number of fetus delivered without traction	-	3	-

cervical ripening thus, facilitating cervical dilatation (Lindell *et al*., 1982). $PGF_{2\alpha}$ and its synthetic analogues are been widely used in addition with drugs affecting visco-elastic property of cervix for fastening the process of cervical dilatation after detorsion in torsion affected buffaloes. Cloprostenol sodium is the most widely used synthetic analogue of $PGF_{2\alpha}$ (Dukes *et al*., 1974). Cloprostenol has optic isometry, that is, that they are compounds with the same molecular formula, but different structure form, and therefore, different properties, D and L of these compounds. Isomer D is four times more powerful than the isomer L, because it has a higher affinity by the receptor, this allows to use lower doses, achieving a higher efficiency and a better tolerance. Therefore, the D-Cloprostenol acts as a luteolytic agent, which causes functional and structural regression of the corpus luteum, followed by the manifestation of estrum (McCracken *et al*., 2012). Levorotatory isomer not only has no luteolytic effect, but also creates an esteric impediment in the receptors, impeding the action of the dextrorotatory isomer resulting on higher dosage when using DL-Cloprostenol and leading to more collateral effects because of its action on other tissues (intestines, vascular system etc.) (Montaser and El-Desouky, 2016).

Thus, objective of current study was to determine effect of D-Cloprostenol on cervical dilatation after detorsion in buffaloes in comparison to DL-Cloprostenol.

MATERIALS AND METHODS

The present study was conducted on 12 buffaloes suffering from uterine torsion reported to VCC, LUVAS, Hisar. Detorsion of uterine torsion was done by using Modified Schaffer's Method and per-rectal and per-vaginal examination was done to determine the consistency of cervix. Buffaloes having hard lobulated cervix were not included in study. Buffaloes were divided into two groups and were subjected to two different treatment protocols (Table 1).

Extent of cervical dilatation was assessed per-vaginally through digital measurement with help of fingers after every two hours. Time when vaginal cavity and cervical cavity become confluent was considered as time of complete cervical dilatation and time duration between treatment and complete cervical dilatation was noted. Statistical analysis was done by using SPSS software version 20**.**

RESULTS AND DISCUSSION

In present study, only four out of six animals in group-I had complete cervical dilatation and needed cesarean section for delivery of fetus. While in group-II all buffaloes had exhibited complete cervical dilatation. Additionally, time interval between treatment and complete cervical dilatation in group-II was significantly lesser ($p<0.05$) (8±0.2 vs 12±0.6h) when compared with group-I. Three buffaloes with complete cervical dilatation in groups II, delivered fetus without traction while mutation followed with traction was used for delivery of fetus in rest three animals of group-II and 4 animals of group-I. In two animals of group-I in which cervical dilatation was not proper even after 36 hours of treatment, cesarean section was performed for delivery of fetus. Luteolysis is prerequisite for proper cervical dilatation in parturient buffaloes and various analogues of $PGF_{2\alpha}$ are been used for luteolysis (Colak *et al*., 2008). Out of all analogues Cloprostenol remained the most widely used and is consisting of two (D and L) isomers in equal proportion. Previous studies have shown that the L- isomer has no luteolytic

activity and even inhibits action of D- isomer on receptors (McCracken *et al*., 2012). Additionally, D-Cloprostenol when administered alone in cases to induce abortion in cattle, exhibited 100% efficacy (Colak *et al*., 2008).Similar results were obtained in present study with all buffaloes in D-Cloprostenol group showing complete cervical dilatation. It is a well-established fact that luteolysis facilitates cervical ripening as upon regression of CL, circulating levels of estradiol increase which is responsible for cervical ripening and leads to cervical dilatation (Lindell *et al*., 1982). Thus, complete cervical dilatation in all treated buffaloes from D-Cloprostenol group of present study could be attributed to complete luteolysis induced by D-isomer. Additionally, spontaneous expulsion of fetus without traction in three buffaloes of D-Cloprostenol group further strengthen the fact that D-isomer has more potent action on uterus and uterine contractility as compared with L-isomer.

CONCLUSIONS

Thus, from present study it can be concluded that inclusion of only D-isomer in cervical dilatation regimen can greatly increase the efficacy of treatment in terms of better cervical dilation. But, further studies involving large number of animals and elucidating effect of D-and L- isomer on different body functions when used as cervical dilatation agent are imperative.

CONFLICT OF INTEREST

None.

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