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Hydroallantois in buffaloes: Effect of transcervical or transabdominal paracentesis on survival of buffaloes (*Bubalus bubalis*) induced to parturition

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Abstract

The aim of present study was to analyze the medical termination of pregnancy in buffaloes with hydroallantois with or without paracentesis. Eleven buffaloes were randomly divided in two groups (G1 and G2). G1 (n=6) buffaloes were induced to parturate along with paracentesis of uterus following two different approaches while G2 (n=5) buffaloes were induced to parturate without paracentesis. Statistical analysis of Hemato-biochemical parameters of both groups (G1 and G2) revealed total leukocyte count and glucose values differ significantly in both groups as compared to control. 40% mortality was recorded in G2 buffaloes during first 30 hours post calving while all buffaloes of G1 survived and recovered well. 80% of G2 buffaloes retained the fetal membranes while only 33% of G1 buffaloes retained fetal membranes. Low milk production by G2 buffaloes were recorded compared to G1 buffaloes. Hence, it was concluded that paracentesis may reduce the clinical effects of sudden fluid loss in buffaloes affected with hydroallantois induced to parturition. For paracentesis either technique: transcervical or paracentesis of uterus via abdomen can be implemented effectively to drain the allantoic fluid without any ill effects on animal health.

Keywords: Hydroallantois, buffaloes, transcervical, transabdominal paracentesis, *Bubalus bubalis*

Introduction

Hydroallantois is dropsy of fetal membranes characterized by rapid accumulation (within 5-20 days) of allantoic fluid during last trimester of gestation (Purohit, 2012; Manokaran *et al.*, 2016) [17-18]. This condition is seen sporadically in buffaloes (Srinivas and Sreenu, 2006) [27]. The condition is usually associated with a diseased uterus in which most of the caruncles in one horn are not functional and the rest of the placentomes are greatly enlarged and possibly diseased (Kapadiya *et al.*, 2018) [6]. The condition may be observed in cows carrying twin fetuses. More recently it has been shown that hydropic conditions are common in cloned pregnancies (Constant *et al.*, 2006). The abnormality is probably caused due to structural or functional changes in the allantois chorion including its vessels and transudation and collection of fluid resembling plasma. Fetuses may be slightly smaller and show some edema. Nutritional deficiencies have been described to cause the condition (Drost, 2007) [4], however the exact etiology continues to be poorly understood. When the condition is diagnosed early, parturition must be induced using prostaglandins and corticosteroids (Kumar *et al.*, 2012; Kumar *et al.*, 2016) [8-9]. However, care must be taken to supplement sufficient fluid replacements to avoid death of the animal due to shock (Purohit, 2012; Purohit, 2013) [17-18]. Gradual drainage of the fluid by repeated trocharization is possible with concurrent fluid therapy; however, the allantoic fluid readily re-accumulates (Drost, 2007) [4]. The prognosis for survivability and future fertility is generally poor. In the present case evaluations we analyzed the medical termination of pregnancy in eleven buffaloes with hydroallantois with or without paracentesis.

Case history

A total of eleven, eight month pregnant Murrah buffaloes (9 pluriparous and 2 heifers) presented to Regional research centre, LUVAS, Uchani with the history of anorexia, sudden abdominal enlargement, respiratory distress, and difficulty in walking. They all were included in the present study to observe the comparative efficacy of medical termination of pregnancy in buffaloes with Hydroallantois with or without paracentesis of uterus.

Clinical observations and diagnosis

All buffaloes (n=11) presented were having the history of sudden bilateral abdomen enlargement from the last ten days. On general examination all buffaloes showed the signs of dehydration (sunken eyes, dry muzzle), progressive anorexia, problem in walking, constipation and respiratory distress. Trans-rectal examination revealed tense and fluid filled uterus occupying most of the pelvic cavity in all presented cases. Neither fetus nor placentomes could be palpated. On per vaginal examination, cervix was closed and stretched due to pressure exerted by the large amount of fluid in the uterus. On the basis of history, clinical signs, rectal and vaginal examinations condition were diagnosed as hydroallantois in all cases (Fig. 1).



Fig 1: (Buffalo suffering from hydroallantois)

Therapeutic approaches

Parturition was induced in all affected buffaloes by administration of prostaglandins (cloprostenol, 500 µg IM once) and corticosteroids (dexamethasone 40 mg IM once). In nearly half of the buffaloes (n=6, G1) trans-cervical (G1a) or trans-abdominal paracentesis (G1b) was performed in an attempt to prevent shock due to sudden fluid loss subsequent to parturition induction. In the rest of buffaloes (n=5, G2) no paracentesis was performed. Supportive fluid replacement (Normal Saline 5 litres along with Ringers lactate 5 litres and plasma volume expander (Haemacel, [AHPL, India] 500 mL IV) was administered daily for 3 days along with other supportive therapy as required. Blood was collected from all treated buffaloes before the initiation of therapy for evaluation of hemoglobin, packed cell volume, total erythrocyte count, total leucocyte count, serum calcium, phosphorous and blood glucose as per methods described previously (Singh *et al.*, 2013) [26] using fully automatic blood analyzer (Erba, Transasia biomedical, Ltd). Blood was also collected from five healthy buffaloes (pluriparous, eight month pregnant) from village Uchani, Karnal to compare the values with affected buffaloes.

Paracentesis procedures

Fluid from the uterus of treated buffaloes was withdrawn by either abdominal or transcervical paracentesis. In transcervical allantoicentesis (G1a); A 18 G catheter was fixed temporarily in the cervix till calving (Fig. 2) while in buffaloes of G1b group allantoic fluid was drained by paracentesis of uterus via abdomen; a sterile rumen trochar was used for paracentesis of uterus and a 18 G catheter was fixed temporarily in uterus till calving (Fig. 3). Owners were advised to observe any sign of calving for 72 hours.



Fig 2: (Trans cervical paracentesis of uterus)

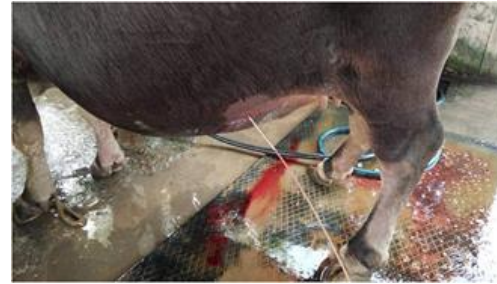


Fig 3: (Abdominal paracentesis of uterus)

Result and Discussion

In the present study all affected buffaloes (N=11) were eight month pregnant out of which 82% buffaloes were pluriparous while only 18% were heifers. Statistical analysis of hemato-biochemical parameters of both groups (G1 and G2) before initiation of treatment (Table No. 1) revealed that in both groups G1 and G2; total leukocyte count was significantly higher as compared to control group while a non-significant variation for Hb, PCV and TEC were observed in both groups. Among various biochemical parameters Ca and P differed non significantly while glucose values differed significantly in both groups as compared to control. A 40% mortality was recorded in G2 buffaloes during first 30 hours post calving due to development of hypovolemic shock and remaining buffaloes were dull, recumbent and anorectic with suspended rumination even after 5 days of treatment while all buffaloes of G1 survived and recovered well after 5 days of calving, they restored appetite, had regular rumination, and were bright and active. Post partum complications like retention of fetal membranes were observed more frequently in G2 buffaloes, 80% of G2 buffaloes retained the fetal membranes while only 33% of G1 buffaloes retained fetal membranes, all buffaloes with retained fetal membranes were treated as suggested by Amin *et al.*, 2013 [1], all buffaloes recovered well and subsequent development of metritis was not observed in any case. Owners of G2 buffaloes suffered great economic loss due to low production of survived buffaloes during the whole lactation period while G1 buffaloes resumed to normal lactation within 20 days post treatment.

In the present investigation out of all affected buffaloes, 82% buffaloes were pluriparous while only 18% were heifers, this is in accordance with previous studies (Noakes *et al.*, 2009) [14]. The most prevalent clinical signs observed in all presented cases were respiratory distress which may be due to the pressure exerted on diaphragm by large amount of allantoic fluid (Bhattacharyya *et al.*, 2012) [2] and dehydration which is associated with the change in permeability of

allanto chorion causing movement of interstitial fluid to allantoic cavity (Satish *et al.*, 2019). The proposed treatment of hydroallantois is termination of pregnancy along with fluid therapy (Noakes *et al.*, 2009) [14]. Different protocols have been suggested in literature for pregnancy termination like combination of prostaglandins and corticosteroids (Manokaran *et al.*, 2011, Rabidas *et al.*, 2015) [10, 20] or by using estrogen derivatives (Kumar *et al.*, 2012) [8] and if animal does not respond to hormonal therapy then cesarean should be done (Rangasamy *et al.*, 2013) [21]. In accordance with previous literature all presented buffaloes of G1 were induced to parturate by use of Cloprostenol and dexamethasone while in G2 buffaloes along with the induction of parturition following the same protocol as of G1, an average of 110 litre of allantoic fluid was drained gradually over 24 hours to minimize the risk of hypovolemic shock in line up with Misri, 2001 and to relieve respiratory distress as suggested by Prabakaran *et al.*, 2018 [16]. In the present investigation two different approaches of draining allantoic fluid were studied. In G1a buffaloes Trans-cervical allantocentesis was done as reported earlier by Napoleon *et al.*, 2012 while in G1b buffaloes allantoic fluid was drained by abdominal paracentesis of uterus as advised by Zadnik, 2000 in case of difficult parturition. According to statistical analysis, in both groups G1 and G2; total leukocyte count was significantly higher as compared to control group which may be due to either infection or stress during pregnancy which is in agreement with Rogers, 2011 while a non-significant variation for Hb, PCV and TEC was observed in both groups. Among various biochemical parameters Ca and P differed non

significantly while glucose values differed significantly in both groups as compared to control, which may be associated with increased levels of cortisol in blood during stress leading to hyperglycemia, this has been reported earlier by Davis *et al.*, 2008. All buffaloes (G1 and G2) parturated within 72 hours of induction. In the present study 40% mortality was recorded in G2 buffaloes due to hypovolemic shock which may be associated with splanchnic pooling of blood leading to circulatory failure as in line up with Prabakaran *et al.*, 2018 [16]. In both groups G1 and G2 retention of fetal membranes were observed, this is in compliance with Roberts, 1971 who reported retained fetal membranes as common complication associated with hydroallantois. In the present study the incidence of placental retention was higher in G2 (80%) than G1 (33%). In cows with hydroallantois the placentomes are diseased with formation of adventitious placentomes (Drost, 2007) [4]. The slow release of fluids probably might have helped in the placentomes regaining normal function. Poor milk production of G2 buffaloes is due to higher percentage of post partum disorders in G2 as compared to G1, it has been studied that post partum disorders have negative impact on production (Purohit and Markandeya, 2015) [19].

Conclusion

It was concluded that paracentesis may reduce the clinical effects of sudden fluid loss in buffaloes affected with hydroallantois induced to parturition. For paracentesis either technique: trans-cervical or paracentesis of uterus via abdomen can be implemented effectively to drain the allantoic fluid without any ill effects on animal health.

Table 1: Hemato-biochemical profile of the buffaloes (G1 and G2 group) before treatment

Groups	Buffaloes with hydroallantois induced to parturition G1		Normal pregnant buffaloes
	Without paracentesis G2	With paracentesis G1	
Test	Mean±SE	Mean±SE	Mean±SE (Healthy buffalo)
Hb (gm/dl)	11.3±0.30	11.53±0.70	12.04±0.376
PCV (%)	32.8±1.01	33.16±1.62	34.2±0.86
Total Erythrocytic Count(10 ⁶)/µl	5.59±0.14	5.79±0.33	5.76±0.13
Total Leucocytic Count / µl	15.84±1.45*	17.33±0.87*	11.78±0.44
Ca (mg/dl)	10.64±0.46	9.85±0.44	10.08±0.38
P (mg/dl)	7.2±0.67	6.3±0.23	6.51±0.27
Glucose (mg/dl)	103.44±4.28*	109.63±2.72*	72±4.73

Hb= Hemoglobin, PCV= Packed Cell Volume, Ca=Calcium, P=Phosphorus.

Values with * differs significantly ($p < 0.05$)

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