FACTORS AFFECTING THE OUTCOME OF UTERINE TORSION
IN BUFFALOES: A RETROSPECTIVE STUDY

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ABSTRACT

Out of the 290 uterine torsion affected buffaloes presented to the Teaching Veterinary Clinical Complex Hospital, GADVASU, Ludhiana, gestation period was complete in 88.6% buffaloes and its most (66.2%) frequent occurrence was observed second to fourth parity. Most of the uterine torsion were post cervical (95.1%), on right side (93.4%), of >180° (82%) and presented within 36 h from the occurrence of uterine torsion. Sharma's modified Schaffer's method was attempted to detort 87.9% uterine torsion affected buffaloes. There were no significant (P>0.05) association of successful detorsion with gestation period, parity, side of torsion, position of torsion and degree of torsion. However, the duration of torsion were significantly (P<0.05) associated with successful detorsions. The overall survival rate of uterine torsion affected buffaloes presented at TVCC hospital was 63.4%, whereas the survival rate among the successfully detorted buffaloes was about 91%. The survival rate of the calves delivered was 18.96% and most (59.9%) of calves delivered were male. Calf survival and dam survival rate decreased with increase in duration of occurrence. The future fertility decreased with increase in duration of torsion. It is concluded that the increased duration from the occurrence of uterine torsion to its treatment decreases the chances of successful detorsion, dam survival and calf survival.

Keywords: Bubalus bubalis, buffaloes, uterine torsion, degree, duration, calf survival, dam survival, future fertility

INTRODUCTION

Uterine torsion is the rotation of gravid uterus along its longitudinal axis. It has been reported as a common cause of dystocia among dairy buffaloes (Ahmed et al., 1980). The incidence of uterine torsion as well as the time of its occurrence in buffaloes emphasizes its impact on dam’s health, fetal survivability, future fertility and thus the dairy herd profitability (Ghuman, 2010; Uttam et al., 2015). Although some of the

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predisposing factors (parity, stage of gestation, fetal gender) along with clinical observations have been pointed out in previous studies (Ghuman, 2010; Jeenger et al., 2015). So keeping in view the importance and severity of outcomes a lot more contribution is required in the direction of predisposing factors leading to torsion and their effects on outcome. So that ameliorative measures can be implemented to put down the incidences and improvement in outcome of uterine torsion. So the present study deals with the relation of various factors with the outcome of uterine torsion affected buffaloes.

**MATERIALS AND METHODS**

A retrospective analysis was conducted on 290 uterine torsion affected buffaloes that were presented to teaching veterinary clinical complex, GADVASU, Ludhiana during January 2013 to December 2015. Impact of various parameters (parity, gestation period, duration from occurrence of uterine torsion, degree of torsion, position of torsion and side of torsion, number of rolls given) on success of achieving detorsion was evaluated. Furthermore, the outcomes of uterine torsion affected buffaloes viz. dam survival, calf survival, calf sex and future conception after treatment were evaluated. The data of future conception of the buffaloes treated was collected on available phone numbers.

**Statistical analysis**

Data were analysed by using MINITAB statistical software (release 14.2). Descriptive statistics were calculated to establish frequencies and percentage distribution of various parameters included in the study. Data were first analysed by Chisquare test ($\chi^2$) to determine the significance of associations between independent variable and outcome variable. P-values were given. All variables with P<0.05 in the initial univariable analysis were considered in a logistic regression analysis. Successful detorsion were considered as outcome variable. Standard error coefficients, z values, and 95% confidence limits were mentioned, and significance of results was declared at P<0.05.

**RESULTS AND DISCUSSION**

Out of 290 uterine torsion affected buffaloes presented, most (88.6%) of the buffaloes had completed their gestation period, as reported earlier (Jeengar et al., 2015; Karthick et al., 2015). However, gestation period had no association with success of achieving detorsion (P>0.05, Figure 1). In fact, at the end of gestation, the vigorous fetal movements increase instability of the uterus (Arthur et al., 1966), thus predisposing the animal to uterine torsion (Ghuman, 2010). It was revealed that the most frequent occurrence (66.2%) of uterine torsion was observed in the buffaloes between second to fourth parity (Table 1). Similarly, the previous studies also claimed that pleuriparous buffaloes were prone to uterine torsion (Matharu and Prabhakar, 2001; Karthick et al., 2015), with maximum frequency during second and third parity (Nanda et al., 1991). However, parity of buffaloes had no association with success of achieving detorsion (P>0.05, Figure 1). About 55.86% buffalo presented at TVCC hospital were within 36 h of occurrence of torsion for the treatment of uterine torsion (Table 1). The lack of awareness among farmers or lack of appropriate services at local level could be the reasons for delay in presentation of remaining buffalo after 36 h of the occurrence of torsion.
uterine torsion. Similar observation was reported earlier (Prabhakar et al., 1995). The success rate for achieving uterine detorsion was higher when the buffalo was presented <36 h, whereas the success rate decreased following detorsion of buffalo presented >36 h after the occurrence of uterine torsion (Table 2). As the duration of occurrence of uterine torsion increases beyond 72 h, most of the attempts to achieve detorsion of the uterus were unsuccessful (Figure 1). This could be due to development of adhesions between the uterus and the adjoining abdominal organs (Dhaliwal et al., 1991).

Calf survival rate was 43.62%, 14.71%, 4.17% and 0% at 0 to 12 h, 12 to 36 h, 36 to 72 h and >72 h, respectively from the time of visible signs of uterine torsion (Figure 2). The chances of calf survival was higher (P<0.05) when the buffalo was detorted within 12 h from the occurrence of uterine torsion (Table 3). In previous studies, higher calf survival rate (44 to 58%) was observed in buffaloes where timely diagnosis and correction of torsion was done (Sloss and Dufty, 1980; Manning et al., 1982). Once uterine torsion is corrected, the delay in achieving complete cervical dilation may further compromise calf viability (Sloss and Dufty, 1980).

The position of uterine torsion was postcervical in 95.1% buffaloes presented at TVCC hospital (Table 1). The postcervical uterine torsions of similar range (80 to 98%) were reported earlier (Ali et al., 2011; Jeengar et al., 2015; Kumar et al., 2015; Karthick et al., 2015). The reason for higher incidence of post-cervical uterine torsion was suggested as the absence of muscles in cervical area of broad ligaments. Moreover, the anterior vagina is the weaker point of the bovine genital tract (Singh, 1991). However, position of torsion had no association (P>0.05) with success of achieving detorsion (Figure 1). The rotation of uterus was towards right side in 93.4% uterine torsion affected buffaloes (Table 1). This was in concurrence with previous studies (Jeenger et al., 2015; Karthick et al., 2015; Zaher et al., 2017). An increased possibility of right side uterine torsion in buffaloes could be the presence of rumen on left side and the absence of muscular fold on right broad ligament (Frazer et al., 1996; Brar et al., 2008). However, side of uterine torsion had no association (P>0.05) with success of achieving detorsion (Figure 1).

The degree of uterine torsion was >180° in 82% buffaloes (Table 1), as reported earlier in uterine torsion affected buffaloes presented at referral hospitals (Jeengar et al., 2015; Zaheer et al., 2017). On the contrary, others suggested that uterine torsions of <180° (Pascale et al., 2008; Karthick et al., 2015). Furthermore, detorsion of lesser degree uterine torsion in buffaloes was more (P<0.05) successful as compared to their counterparts having more degree of torsion (Figure 1). In previous studies, decreased vaginal delivery was observed in buffaloes with higher degree uterine torsions (Amer and Hashem, 2008). Calf survival rate was higher (P<0.05) in buffaloes with lesser degree of uterine torsion (Figure 2) as compared to their counterparts. However, in MLR analysis, there was no significant impact of degree on success of achieving detorsion and calf survival (Table 3). Increasing degree of torsion has impact on uterine vascular compromise and hence calf survival (Amer and Hashem, 2008).

Sharma’s modified Schaffer’s method was attempted to detort uterine torsion affected buffaloes in 87.9% case presented at TVCC hospital, whereas rest was directly subjected to cesarean section due to presence of uterine adhesions (Table 1). In fact, successful detortion was achieved...
in 77.3% buffaloes was either one (36.7%), two (49.7%) or > two rolls (14.6%, Table 1). According to a previous study, the number of rolls required for achieving detorsion were associated with the degree of uterine torsion in buffaloes (Amer and Hashem, 2008).

The survival rate of the calves delivered in the present study was 18.96% (Table 1). A wide was variation (4 to 56%) was reported in the survival rate of calves delivered from bovines with uterine torsion presented at the referral hospitals (Ali et al., 2011; Purohit et al., 2011; Kumar et al., 2015; Jeengar et al., 2015). An increasing degree of torsion had impact on uterine vascular compromise and hence calf survival (Ghuman, 2010). In the present study, a higher percentage (59.9%) of male calves (59.89%) were delivered after successful detorsion of uterine torsion affected buffaloes (Table 1), as reported (Jeenger et al., 2015; Karthick et al., 2015; Tripathi and Mehta, 2015). The difference might be related to hormonal changes that occurred during the last stage of labor and vigorous movement of the male relative to female fetus (Tripathi and Mehta, 2015).

The overall survival rate of uterine torsion affected buffaloes presented at TVCC hospital was 63.4%, whereas the survival rate among the successfully detorted buffaloes was about 91% (Table 1). Most of the buffaloes with unsuccessful and unattempted uterine detorsions were sent to slaughter house by the owners and only in 9% cases, cesarean section was performed. When durations of occurrence of torsion was 0 to 12, 12 to 36, 36 to 72 and >72, the rate of dam survival was 93.6%, 92.6%, 57.1% and 6.3%, respectively (Table 4).

A similar decline in survival rate from 96 to 35% with an increase in duration of torsion was reported earlier (Prabhakar et al., 1995; Srinivas et al., 2007). The higher duration of uterine torsion may lead to uterine adhesions, uterine necrosis, fetal putrefaction, maternal toxemia, dehydration, shock and peritonitis (Dhalival et al., 1991; Matharu and Prabhakar, 2001; Noakes et al., 2001). The data of future fertility of 99 out of 180 successfully detorted survived buffaloes was available in the present study. Among buffaloes presented till 12 h of occurrence of uterine torsion, 91.8% buffaloes conceived successfully whereas conception rate was 90.6% in buffaloes presented between 12 to 36 h. None of the buffaloes conceived which were treated for uterine torsion after >36 h of occurrence of uterine torsion (Figure 3). The degree of uterine torsion had no impact on future fertility of buffaloes. In previous studies, delay in diagnosis of uterine torsion decreased the conception rate and subsequent fertility was negatively correlated with both the degree and duration of torsion (Schönfelder et al., 2005a; Ghuman, 2010; Purohit and Gaur, 2014). The congestion of uterus resulting from long standing torsion of uterine vessels causes fetal death and subsequent autolytic and bacterial changes in fetus which lead to a bulged, tense, inelastic and fragile uterine wall with an immovable uterus (Schönfelder et al., 2005).

It is concluded that the increased duration from the occurrence of uterine torsion to its treatment decreases the chances of successful detorsion, dam survival, calf survival and future fertility.

REFERENCES


Table 1. History, clinical observations and outcome of various parameters in uterine torsion affected buffaloes (n=290) at Teaching Veterinary Clinical Complex, GADVASU, Ludhiana.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Duration of torsion (n=290)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - 12 h</td>
<td>94</td>
<td>32.41</td>
</tr>
<tr>
<td>12 - 36 h</td>
<td>68</td>
<td>23.45</td>
</tr>
<tr>
<td>36 - 72 h</td>
<td>49</td>
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</tr>
<tr>
<td>&gt;72</td>
<td>79</td>
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<td><strong>Rolls attempted for detorsion (n=290)</strong></td>
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<tr>
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<td>11.72</td>
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<tr>
<td>1</td>
<td>94</td>
<td>32.41</td>
</tr>
<tr>
<td>2</td>
<td>126</td>
<td>43.45</td>
</tr>
<tr>
<td>3 above</td>
<td>36</td>
<td>12.42</td>
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<tr>
<td><strong>Detorsion outcome (n=256)</strong></td>
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<tr>
<td>Successful</td>
<td>198</td>
<td>77.34</td>
</tr>
<tr>
<td>Unsuccessful</td>
<td>58</td>
<td>22.66</td>
</tr>
<tr>
<td><strong>Dam fate (n=290)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dead</td>
<td>106</td>
<td>36.55</td>
</tr>
<tr>
<td>Alive</td>
<td>184</td>
<td>63.45</td>
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<tr>
<td><strong>Calf fate(n=290)</strong></td>
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<tr>
<td>Dead</td>
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<td>81.03</td>
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<td>18.96</td>
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<td><strong>Calf sex (n=187)</strong></td>
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<tr>
<td>Male</td>
<td>112</td>
<td>59.89</td>
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<tr>
<td>Female</td>
<td>75</td>
<td>40.01</td>
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Table 2. Multivariate logistic regression results with respect to the success rate of uterine detorsion in buffaloes (n=290).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coef.</th>
<th>SE Coef.</th>
<th>95% CI Lower</th>
<th>95% CI Upper</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of torsion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;180</td>
<td></td>
<td>Reference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;180</td>
<td>-1.401</td>
<td>-3.245</td>
<td>-3.350</td>
<td>0.443</td>
<td>0.136</td>
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<td>Duration of torsion</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - 12 h</td>
<td></td>
<td>Reference</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>12 - 36 h</td>
<td>-0.468</td>
<td>0.782</td>
<td>-2.000</td>
<td>1.064</td>
<td>0.550</td>
</tr>
<tr>
<td>36 - 72 h</td>
<td>-1.550</td>
<td>0.702</td>
<td>-2.926</td>
<td>-0.174</td>
<td>0.027</td>
</tr>
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<td>72 and above</td>
<td>-5.641</td>
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<td>-7.279</td>
<td>-4.002</td>
<td>0.000</td>
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Table 3. Multivariate logistic regression results with respect to the livability of calf in uterine torsion affected buffaloes (n=210).

<table>
<thead>
<tr>
<th>Variables</th>
<th>Coef.</th>
<th>SE Coef. Lower</th>
<th>95% CI Upper</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of torsion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - 12 h</td>
<td></td>
<td>Reference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 - 36 h</td>
<td>-1.468</td>
<td>0.410</td>
<td>-2.272</td>
<td>-0.664</td>
</tr>
<tr>
<td>36 - 72 h</td>
<td>-2.859</td>
<td>0.763</td>
<td>-4.355</td>
<td>-1.364</td>
</tr>
<tr>
<td>12 - 36 h</td>
<td></td>
<td>Reference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0 - 12 h</td>
<td>1.468</td>
<td>0.410</td>
<td>0.664</td>
<td>2.272</td>
</tr>
<tr>
<td>36 - 72 h</td>
<td>-1.391</td>
<td>0.804</td>
<td>-2.966</td>
<td>0.184</td>
</tr>
<tr>
<td>Degree of torsion</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>&lt;180</td>
<td></td>
<td>Reference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;180</td>
<td>-0.752</td>
<td>0.407</td>
<td>-1.551</td>
<td>0.046</td>
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Table 4. Survival rate of uterine torsion affected buffaloes in relation to the duration of torsion.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Buffalo survived (%)</th>
</tr>
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<tbody>
<tr>
<td>Duration</td>
<td></td>
</tr>
<tr>
<td>0 - 12 h</td>
<td>93.6</td>
</tr>
<tr>
<td>12 - 36 h</td>
<td>92.64</td>
</tr>
<tr>
<td>36 - 72 h</td>
<td>57.1</td>
</tr>
<tr>
<td>&gt;72 h</td>
<td>6.3</td>
</tr>
</tbody>
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Figure 1. The association of various management factors with successful detorsion of uterine torsion affected buffaloes (n=290). P<0.05 (Chi-square analysis).
Figure 2. The effect of degree and duration of uterine torsion affected buffalo (n=210) on the survivability of calf.

Figure 3. Future fertility rate of uterine torsion affected buffaloes in relation to the duration degree of torsion.


