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Case Report

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Risk Factors Associated With Incidence of Dystocia in Cross Bred Cows: A Case Report

Viswanath S.[1*], Ranjith D.[2], Rudresh G. N.[1] and Sandeepa H.[1]

[1]Department of Veterinary Gynaecology and Obstetrics, Veterinary College, Bangalore

[2]Dept. of Veterinary Pharmacology and Toxicology, CVAS, Pookode, Wayanad, Kerala

*Corresponding Author E-mail: drvishivet@gmail.com

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ABSTRACT

The study was conducted to know the factors affecting the incidence of dystocia in crossbred cows presented to the Department of Gynaecology and Obstetrics, Veterinary College, Bangalore from April 2015 to May 2016. The contributing factors for the occurrence of dystocia surveyed includes; parity, age, sex, season and gestation length. The study reveals incidence of dystocia was highest in cows aged from 2-4 yrs and lowest in cows above eight years. The incidence of dystocia was highest among first lactation, while the respective incidence in second, third and four or more parity cows was 37.50, 15.00 and 5.00 per cent. The incidence of dystocia was highest during cold season, while corresponding incidence during hot, south-west and north-east monsoon seasons were less respectively. Significantly higher (61.54%) number of dystocia was observed in dams carrying male fetuses than female.

Key words: *Dystocia, Parity, Sex, Gestation length, Incidence, Male and Female*

INTRODUCTION

Dystocia (prolonged or difficult parturition) in dairy cattle has received major research interest in the past few years. Researchers have been able to define genetic and nongenetic factors which affect dystocia and to estimate population parameters for dystocia. In cattle and buffalo, the incidence of dystocia is maximum compared to other farm animals[1]. Buffaloes are known to have greater incidence of maternal dystocia[2, 3]. However, a higher incidence of fetal dystocia has been also recorded for both[4] and buffaloes[4, 6]. Although genetic traits can influence the incidence of dystocia[7], a decrease of their incidence appears to occur in free management systems, such as pasture[8]. However, the incidence variation of dystocia observed between housing and pasture systems can be the reflex of several factors related with cows (genotype, nutrition, body condition score and exercise) and factors related with the herd size and the calving management[9]. Several factors have been identified as risk factors for dystocia, with feto-pelvic disproportion the most common type of dystocia[10].

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Although factors for heifers and multiparous cows can be distinguished, calf birth weight has been described as one of the most important factors related to dystocia[14, 26] and gestation length might also be influencing birth weight of calf. Moreover, several other factors have also been identified, such as climate during the last trimester[14, 26], sire, and calf sex[15]. Although most of the increase in dystocia prevalence for male calves was attributable to higher calf birth weight, calf body dimensions contribute to dystocia, regardless of calf birth weight or calf sex [16]. Numerous studies have provided important information about individual risk factors associated with dystocia and stillbirths, but we are not aware of any Canadian study that has been performed using multifactorial risk assessment statistical models. Metabolic status of cattle could also affect fetus development and subsequent calving ease, as most heifers are still growing when bred (and pregnant), whereas most cows are bred during the peak of lactation. Indeed, age at first parturition and milk production during gestation of lactating dairy cows have recently been associated with calf birth weight[17], probably due to energy partitioning between growth (heifers), and intrauterine growth of the fetus. However, the effect of days in milk at conception on calving related disorders is unknown. In recent years, artificial insemination (AI) companies have provided cattle producers with the opportunity to use semen from sires with favorable estimated breeding values for calving ease, particularly primiparous females. Despite great efforts to reduce the incidence of dystocia and stillbirth in dairy cattle, both remain unacceptably high in some herds[18, 19]. Herd management and nutrition could be decisive regarding calving ease and perinatal mortality. In this regard, higher dystocia prevalence in dairy and beef cows has been reported in confinement systems (especially tie stalls), perhaps due to inadequate exercise and mobility[20, 21], and psychological stress[22]. Consequently, confirming and identifying potential risk factors for dystocia in heifers and cows in a confinement system, such as tie stall, is critical to reduce its prevalence. In addition, this information is of particular importance in Canada, as 75% of Canadian dairy operations are tie-stall housing [23]. Therefore, the objective of these studies was to investigate factors affecting incidence of dystocia in crossbred cows like effect of parity, age, sex, season and gestational length as a contributing factors for occurrence of dystocia.

MATERIAL AND METHODS

Experimental animals

The present study was conducted on forty crossbred cows maintained by the farmers in and around Bangalore city with a history of calving difficulty presented to the clinic of the Department of Veterinary Gynecology and obstetrics, Veterinary College, Bangalore, Karnataka Veterinary Animal and Fisheries Sciences University, during April 2015 to May 2016. Immediately after presentation, complete history regarding the obstetrical clinical status of the cows was obtained. Information regarding age, parity of the dam and time elapsed from onset of labour to presentation were recorded. The clinical status of each animal was noted down and detailed reproductive tract examination was conducted to know the cause of dystocia as well as to record any abnormalities of vulva (*viz*. edema, bruising and necrosis), presence of vaginal discharge and presentation of extremities of fetuses outside the vulva were also recorded. Body temperature, respiratory rate, pulse rate and heart rate were recorded for all cows.

Parity: Information regarding the parity of the dam was obtained to compare variations if any in the incidence of dystocia between primipara and pluripara and among pluripara in the second, third and fourth parity and above.

Age: The age of the dam at the time of its presentation with the complaint of dystocia was obtained from each case record and accordingly the animals were grouped to be between two to four years, four to six years, six to eight years and eight years and above. The incidence of dystocia in these different

age groups was compared to know whether there was any predisposition of age of the animals to dystocia.

Sex: The incidence of dystocia due to male and female calves were recorded and their influence on the occurrence of dystocia was studied.

Season: Clinical cases were analyzed to study the effect of season on the incidence of dystocia. The entire year was classified into four seasons as per the classification detailed by Department of Economics and Statistics, Government of Karnataka: Cold (January - February), Hot (March - May), South –West monsoon (June - September) and North-East monsoon (October to December).

Length of gestation: The gestational period at the time of presentation of the obstetrical case was obtained to analyze the relationship between the duration of pregnancy and the incidence of dystocia. The animals were grouped into those presented earlier to eight months, between eight to nine months and at term.

Viability and condition of the fetus: The number of cases where live, dead, dead and emphysematous fetuses were encountered in relation to the approximate duration of dystocia was obtained for analysis of cases. The caesarian section was carried out by doing epidural and line infiltration of local anesthetic (2 % lignocaine hydrochloride). Surgical intervention was made via left ventrolateral site. After removal of the fetus, loose fetal membranes and evacuation of the fluid, the uterus was sutured in two layers using chromic catgut (no. 1) in an inversion (Lambert) pattern. Abdominal wall was closed. Intravenous fluid (Ringers Lactate) therapy was instituted perioperatively. Analgesics and antibiotics were administered preoperatively on the day of operation and same drugs were used for another 4 to 6 days, respectively. Antiseptic dressing of the incision line was continued twice daily from day of operation up to 5 days till suture removal. All the animals were discharged on the day of surgery. Postoperative care was assigned to the local field veterinarian. The progress of the cases was ascertained regularly from the owner's on telephone every alternate day till suture removal. The suture was removed on 10^{th} postoperative day. Survival of dams and post-partum complications if any, were also recorded.

Statistical analysis

The data generated on different causes of dystocia cows was tabulated according to, age, parity and season, sex of fetus, interval from onset of labour to the presentation, viability and condition of fetus and maternal survival rate. To establish the temporal relationship between the duration of dystocia, condition of the birth canal, and the maternal/fetal recovery rate were compared by Univariate Chi-square test as per the methods of Steel *et al*. [25].

Mean values (M± SE) for the concentrations of various parameters of dystocia cows were computed. In order to ascertain the magnitude of, the data were analyzed statistically using Analysis of Variance[25]. Tukey test was applied for multiple means comparison, where necessary. In order to ascertain magnitude of variation in various parameters between eutocia and dystocia cows, cows survived and dead following caesarean section, the data were subjected to two tailed paired T-test. For all tests, values of $P<0.05$ were considered significant.

RESULTS AND DISCUSSION:

Effect of Parity on incidence of Dystocia:

The proportions of cows presented with dystocia that were in their first, second, third and fourth was 42.50, 37.50, 15.00.and 5.00 per cent, respectively. The effect of parity on incidence of dystocia was found to be significant ($P< 0.05$) (Table 1). The incidence decreased with increasing in parity. Significantly higher proportions of dystocia in cows in their first parity as observed in the present study may be ascribed to immaturity and incomplete development or poor pelvic relaxation and fetopelvic disproportion may be the causes for increased rate of dystocia in young cows [11, 12].

Effect of Age on incidence of Dystocia:

In the present study, the incidence of dystocia decreased significantly with advancing age (Table 2). These results agreed with those obtained by Gaafar *et al*. (2011) who also reported that the percentage of incidence of dystocia in Friesian cows decreased significantly ($P < 0.05$) with age progression, which decreased from 7.4% at 3–5 years of age to 4.6% at 11–13 years. Roughsedge and Dwyer[13] also found that first-calf heifers account for the majority of calving difficulties. High rates of dystocia among first-calf heifers and young cows are mostly due to their smaller size at first parturition than at subsequent calvings.

Effect of sex of calf on incidence of Dystocia:

Significantly higher ($P < 0.05$) number of dystocia was observed in dams carrying male fetuses than female (62.50% vs. 37.50%) (Table 3). These results are in concordance with those obtained by Johanson and Berger[14, 26] and Ettema and Santos[27] Lombard *et al*. [28] and Gaafar *et al*. [29] who found that calf sex affected the incidence of dystocia, and it was higher in males than in females. The higher dystocia rate in male calves as found in the present study has been primarily attributed to their larger size (by 1–3 kg, accounting for 50% of the increased dystocia) [30, 31] but also to their longer gestation length (by approximately 1 day)[31].

Effect of Season on incidence of Dystocia:

The incidence of dystocia was high in cold season (42.50 per cent) followed by hot (37.50%), south- west monsoon (15.00 per cent) and the least incidence of 5.00 per cent was noticed during north east monsoon seasons and the effect season on incidence of dystocia was significant ($P<0.05$) (Table 4). Similar to the findings of the present study, previous studies have also reported that season significantly influenced incidence rate of dystocia in cows [32, 33, 4, 34, 35]. Cold weather during the last trimester has been associated with increased dry matter intake, increased thyroid hormone concentration, increased blood and nutrient flow to the uterus and increased gestation length and reduced plasma estradiol concentrations leading to increased birth weight and dystocia[14, 26, 31]. Colburn *et al*.[36] suggested that greater calf birth weight and calving difficulty may be expected in winter following severe spring temperatures. Seasonal differences in dystocia risk have been attributed to increased gestation length, calf birth weight and stillbirth in colder weather[31, 36] and less intensive calving supervision and more opportunity for exercise at pasture in the summer[30, 37, 38].

Effect of Gestation period on incidence of Dystocia:

In the present study of the forty dystocia cases referred to the clinic, of which 38 (95.00 per cent) cows had completed gestation period (Table 5). One each (2.50 per cent) animals with dystocia were eight to nine months and less than eight months and they were few weeks short of gestation. Similar to findings of the present study, Singla *et al*. [4, 34] have also recorded 77 of 89 cases of cows of different dystocia which completed their gestation period and only few cases had not completed gestation.

Table 1: Effect of parity on incidence of dystocia in crossbred cows

Parity	Total	Per cent
1	17	42.50
2	15	37.50
3	06	15.00
>4	02	5.00
Total	40	100
$\chi^2 = 15.4^*$ (3df)		

Table 2: Effect of age on incidence of dystocia in crossbred cows

Age in years	Total	Per cent
2-4	17	42.50
4-6	15	37.50
6-8	06	15.00
>8	02	5.00
Total	40	100
$\chi^2 = 15.4.*$ (3df)		

Table 3: Effect of fetal sex on incidence of dystocia in crossbred cows

Fetal sex	Number	Per cent
Male	**25**	**62.50**
Female	**15**	**37.50**

Table 4: Effect of season on incidence of dystocia in crossbred cows

Season	Number of cases	Per cent
Cold	17	42.50
Hot	15	37.50
South west monsoon	06	15.00
North east	02	5.00
Total	40	100
$\chi^2 = 15.4*$ (3df)		

Table 5: Effect of gestation length on incidence of dystocia in crossbred cows

Gestation length	Number of cases	Per cent
>9 months	38	95.00
8---9 months	01	02.50
< 8 months	01	02.50
Total	40	100
$\chi^2 = 38.500$		

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CONCLUSION

It can be concluded from the present study that; the incidence of dystocia was highest in cows aged between two to four years and lowest in cows above eight years. Further, the incidence was higher in cows between four to six years as compared to those aged six to eight years. The incidence of dystocia was highest among first lactation, while the respective incidence in second, third and four or more parity cows was 37.50, 15.00 and 5.00 per cent. The incidence of dystocia was highest during cold season (42.50 per cent), while corresponding incidence during hot, south-west and north-east monsoon seasons were37.50, 15.00 and 5.00 per cent,

respectively were recorded. The highest incidence of dystocia corresponded closely with the calving season. Significantly higher (61.54%) number of dystocia was observed in dams carrying male fetuses than female (38.46%). The incidence of dystocia was higher in primiparous (57.50 per cent) as compared to pleuriparous cows (42.50%).

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