Short Communication

CHARACTERISTICS OF REPRODUCTIVE TRACT INVOLUTION IN POSTPARTUM CROSSBRED JERSEY COWS

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ABSTRACT

The study designed to assess the normal reproductive tract involution in postpartum crossbred Jersey cows. Pluriparous crossbred Jersey cows (n = 10) which had recently calved were subjected to ultrasonographic assessment for postpartum involution once in two days till complete involution. The results showed that the involution time required for the vagina and cervix was 23 and 29 days respectively. The Mean ± SE of vaginal and cervical involution (cm) varied from 2.15±0.07 to 1.12±0.07 and 3.76±0.10 to 1.74±0.09 respectively. The uterine involution (cm) of gravid and non-gravid horn diverge from 4.27±0.12 and 3.47±0.14 to 1.89±0.13 and 1.67±0.14 respectively from day 4 to 23. The present findings document the reference value and period of reproductive tract postpartum involution in crossbred Jersey cows.

Keywords: Crossbred Jersey Cows, Involution, Reproductive tract

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It is crucial to prioritize maintaining good reproductive performance in order to ensure successful breeding of dairy cows. A key aspect of this is to aim for one calf per year, as it not only expands the livestock population but also leads to increased milk production by stimulating the growth of secretory tissue in the udder during gestation (Peter *et al.,* 2009). After calving, the dam experiences a range of physical and structural changes in its uterus and ovaries to regain reproductive abilities. These changes, which take place during the postpartum period, involve the contraction

and shrinking of the uterus, the resumption of ovarian function and regular ovarian cyclicity, and the removal of bacteria that may have entered the uterine cavity during parturition (Elmetwally, 2018).

The rate at which the uterus undergoes involution, as well as subsequent reproductive performances, depends on various factors, including parity, season, nursing and milking frequency, climate, milk production quantity, nutrition quality, breed, and health issues before and after giving birth (Cengic *et al.*, 2012). Doppler sonography is considered an excellent non-invasive method for objectively assessing uterine involution in cattle. The duration of uterine involution was reported to be 23 days in primiparous cows and 27 days in multiparous cows, demonstrating the effectiveness of this technique in determining the progression of uterine recovery after parturition (Hajurka *et al.,* 2005). The reduction in uterine size follows a decreasing logarithmic scale, with the most significant changes occurring during the initial days after calving. The progress of uterine involution can be assessed by monitoring the reduction in horn diameter and wall thickness. In normal cows, the involution process typically takes around 26-52 days to complete, as reported by Noakes *et al.* (2001) and on the other hand, cows experiencing abnormal puerperium require a longer duration to complete the involution process, as observed in the study by Cengic *et al*. (2012). With this background the present study was designed to characterize the normal reproduction tract involution in postpartum crossbred Jersey cows.

Pluriparous Jersey crossbred cows (n = 10) maintained at Dairy Unit of Livestock Farm Complex, Veterinary College and Research Institute, Orathanadu, Tamil Nadu Veterinary and Animal Sciences University, Tamil Nadu, India was utilized in the study. All experimental animals were in their second to fifth parity, which had calved recently were selected randomly for the study during the period between April 2022 to December 2022. The cows were housed in a loose housing system and provided with a standard balanced diet consisting of concentrates, chopped green fodder, dry fodder, mineral mixture and *ad-libidum* drinking water. The selected animals have calved normally and were free from postpartum infections and metabolic diseases.

Biometry of reproductive tract using Ultrasound scanning: Per-rectal examination of the reproductive tract was undertaken to assess the gross morphological changes before attempting the ultrasound scanning. Real-time, transrectal B-mode ultrasonography (USG) was utilized to examine the process of reproductive tract biometrical status with 7.5 MHz linear endo-rectal transducer (SonoScape S2V, Italy). All the calved animals were subjected for ultrasound scanning of tubular tract for every third day from the day of parturition (Day 0) to day 30. The following parameters of the reproductive tract were estimated as described by Heppelmann *et al.* (2015) and Sukareksi *et al.* (2019).

Diameter of gravid and non-gravid uterine horns: The transducer was positioned transversely at approximately 2 cm cranial

to the bifurcation of the uterine horns for obtaining the cross-sectional images and the diameters of pregnant and non-pregnant horns were recorded. Previously gravid uterine horn was identified based on its relatively larger size than the non-gravid horn. The uterine horns were considered symmetrical when their diameters were within one cm of one another, and no further changes in diameter could be differentiated during two successive examinations.

Diameter of cervix: The transducer was positioned dorsally and parallel above the cervix and measurements of cervical diameter were recorded.

Diameter of vaginal canal: The transducer was positioned dorsally and caudally to the cervix and measurements of vaginal diameter were recorded.

Statistical analysis: The biometrical parameters of the involuting reproductive tract were statistically analysed and the level of significance was arrived by employing the t-test as per Snedecor and Cochran (1994).

The uterus was in the pelvic brim between 12 - 16 days postpartum on rectal examination. The diameter of involuting gravid and non-gravid uterine horns were presented in Figure 1. By day 2 postpartum, the diameter of previously gravid uterine horm was significantly ($P < 0.05$) larger than the non-gravid horn. Sequential analysis revealed that, by the mean day of 21.5±0.46 both the horns were of similar size. A similar biometry of involuting uterine horns was recorded by Saut *et al.* (2011) in crossbred cows, but Abdel-Khalek *et al.* (2013) documented larger diameter in *Bos taurus* cows, which might be attributed to the genetic predisposition of the animals. In the present study, rapid involution was noticed in gravid-horn compared to the non-gravid horn during first two weeks of parturition and gradually continued till the end of involution which occurred by the mean day of 22.1±0.46 and 20.9±0.46 in gravid and non-gravid horn respectively. Our findings are in concurrence with Kallero (2010), who reported complete involution by day 20-25 postpartum. However, Saut *et al.* (2011) and Cengic *et al.* (2012) documented a delayed involution period of 38 - 45 days in the normal puerperal period.

In the present study, ultrasonographic observation revealed that the Mean ± SE of vaginal diameter (cm) ranged from 2.15±0.07 on day 3 to 1.12±0.07 on day 23; the cervical diameter ranged from 3.76±0.10, 3.36±0.10, 3.10±0.12, 2.78±0.16, 2.66±0.13, 2.54±0.13, 2.48±0.13, 2.35±0.12, 2.39±0.17 and 1.72±0.08 on 2, 5, 8, 11, 14, 17, 20, 23, 26 and 29 days postpartum, respectively (Figure - 1). Abdel-Khalek *et al.* (2013) studied the diameter (cm) of cervical measures in Friesian cows on day 7,14,21,28, and 35 which were 4.00±0.26, 3.62±0.35, 3.18±0.38, 3.00±0.30, 3.00±0.30, respectively; however, the cervical diameter (cm) on day 2,10,17 and 25 was 8, 5.5, 4, 2.7, respectively in crossbred cows (Kallero, 2010). Sukareksi *et al.* (2019) summarized that noteworthy changes in cervical size occur from the first to the 16th day of postpartum. In crossbred Jerey cows the rapid cervical

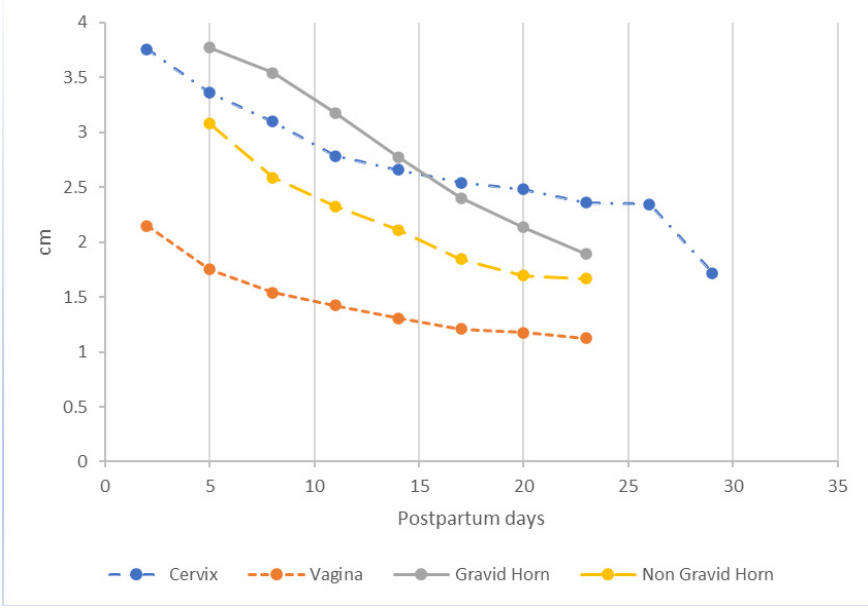

Fig. 1. Changes in vaginal cervical and uterine horn diameter in postpartum crossbred Jersey cows

involution occurs after parturition till 11 days postpartum and gradual involution thereafter and ceases by day 29.

Based on the study, it is concluded that the involution of the reproductive tract takes 23 to 29 days postpartum in crossbred Jersey cows. The vaginal and cervical involution ranged from 2.15±0.07 to 1.12±0.07 and 3.76±0.10 to 1.74±0.09 respectively. The involution of gravid and non-gravid uterine horn ranged from 4.27±0.12 and 3.47±0.14 to 1.89±0.13 and 1.67±0.14 respectively in the period of 21.5±0.46 days postpartum.

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