DOMINANT FOLLICLE DIAMETER AT INSEMINATION IS RELATED TO POSITIVE PREGNANCY OUTCOME IN DAIRY CATTLE

S. KAPSE[1]*, M. SINGH[2], A. SHARMA[3] AND P. KUMAR[3]

Department of Veterinary Gynaecology and Obstetrics
CSK Himachal Pradesh Krishi Vishvavidyalaya, Palampur - 176 062

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ABSTRACT

Transrectal ultrasonographic examination of ovaries of thirty dairy cattle, showing clear cervico-vaginal discharge at estrus, was carried out on the day of 1st artificial insemination (AI) to establish a relation between the dominant follicle diameter and subsequent pregnancy. Pregnancy diagnosis was undertaken on day 60 post-AI. The difference (P<0.05) between mean follicular diameter in pregnant (11.53±0.32 mm, n=10) and non-pregnant (10.16±0.35 mm, n=20) cattle suggested a relation between dominant follicle diameter at AI and subsequent pregnancy outcome in dairy cattle.

Keywords: AI, Cattle, Dominant Follicle, Pregnancy, Ultrasonography

Ovarian follicles in bovines achieve ovulatory capacity at a diameter of ≥10 mm (Sartori *et al.,* 2001). On the other hand, induced ovulation of small, incompetent follicles might result in reduced embryo survival because of luteal inadequacy and short estrous cycle (Santos *et al.*, 2004). This study was conducted with the objective to derive a relationship between follicular diameter at artificial insemination (AI) and subsequent pregnancy status in dairy cattle.

At the livestock farm of CSK HPKV, Palampur (32.6°N, 76.3°E, altitude 1290.8m) and in nearby field institutions, about 30 dairy cattle showing behavioral signs of estrus and apparently normal and clear cervico-vaginal mucus discharge, tone of uterine horns and without any abnormality of genital tract were selected for the present study.

Using transrectal real time Color Doppler ultrasound machine (Mindray, Model DC-3 with linear rectal probe of 7.5 MHz frequency), both the ovaries of all the animals were scanned for recording the presence of detailed structures on the ovaries. Measuring the diameter of the largest dominant follicle accessed the ovarian follicular diameter. This was measured by averaging follicular diameter at the widest point and perpendicular to the first measurement using the internal calipers on the ultrasound machine. Pregnancy diagnosis was undertaken about 60 days post-AI using the same ultrasound equipment. The data was statistically analyzed using student's t test with the help of Statistical Analysis Software, SAS® 9.2 TS Level 2M2 for windows.

In the present study, among the thirty dairy cattle evaluated for their dominant follicle diameter at AI, the difference between mean follicular diameter in pregnant (11.53±0.32, range: 10.0-13.0 mm, n=10) and non-pregnant (10.16±0.35, range: 8.0-13.0 mm, n=20) cattle was appreciable (P<0.05). The competence of bovine oocytes increases with an increase in follicular diameter (Arlotto *et al*., 1996). In fact, better RNA synthesis is observed in large oocytes (Fair *et al*., 1995). Moreover, the bovine follicles achieve ovulatory capacity at a diameter of approximately 10 mm (Sartori *et al.,* 2001). The behavioral estrus is not dependent upon the follicle size, therefore, follicle size appears to be a strong indicator of follicle maturity and perhaps a better indicator of fertility than serum estradiol at the time of AI or expression of estrus (Perry *et al.,* 2007). Others suggested that the cattle not conceiving

[1]M.V.Sc. Scholar, [2]Professor-cum-Head, [3]Assistant Professor; *kapse.supriya@ymail.com

following ovulation of a smaller follicle might had poor luteal profile (smaller corpus luteum with less progesterone secreting capacity) than the cattle ovulating larger follicles (Vasconcelos *et al*., 2001).

In conclusion, the ovarian follicles ovulating after attaining a mean diameter of 11.53±0.32 mm at the time of AI were more likely to become pregnant than their cohorts ovulating a follicle with a lesser diameter, thus, suggesting a correlation of follicle size with the pregnancy outcome in dairy cattle.

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