

## DETECTION OF PREEVULATORY FOLLICLE SIZE AND EARLY PREGNANCY BY USING ULTRASONOGRAPHY IN THOROUGHBRED MARES DURING FOAL HEAT

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**ABSTRACT**

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The present study was conducted to detect the preovulatory follicle diameter and early pregnancy detection using ultrasonography in Thoroughbred mares. The follicular growth were recorded from day 8 post-partum till ovulation daily by using ultrasound machine with 5 – 7.5 MHz transrectal probe in twelve normally foaled Thoroughbred mares. All mares which were detected with largest follicle size and a characteristic uterine pattern of edema (cart-wheel like appearance) were mated with stallion every second day. Ultrasonography was carried out for early pregnancy diagnosis from day 14<sup>th</sup> post mating. The mean diameter of preovulatory follicle was 40.91±4.52 mm and early pregnancy was diagnosed in 100% mares on 14<sup>th</sup> day by detecting the embryonic vesicle with mean size of 10.25±0.59 mm by transrectal ultrasonography.

**Key words:** Preovulatory follicle, Early pregnancy, Ultrasonography, Thoroughbred mares

The Thoroughbred is a horse breed best known not only for its use in horse racing but also for other riding disciplines such as show jumping, combined training, dressage, polo, and fox hunting. The main objective of the equine breeder is to get maximum number of foals from breeding mare in its lifetime using the limited breeding season efficiently and it can be achieved if one foal is obtained every year during the breeding life of that mare. A strategy to obtain an interval of less than 12 months between foaling is to breed mares during foal-heat (Schillela et al., 2001).

The introduction of transrectal ultrasonography to evaluate the dynamic changes of the equine ovaries and uterus has been a major advance in equine reproduction (Squires et al., 1988). The wide use of transrectal ultrasonography is carried out for detection of follicular development, size of preovulatory follicle, ovulation and uterine edema for timely breeding. After mating the ultrasonography is used for detection of

early pregnancy, twins and embryonic development for growth of healthy embryo. The size of a follicle is an important factor for growth as well as the selection process of the dominant follicle (Gastal et al., 1997) and is used as a guiding tool to predict ovulation in the mare. Ultrasonography provided the opportunity to visualize the mare's ovary to detect the diameter of ovulating follicle (Benallou and Meliani, 2011) to predict the day of ovulation according to follicles size in mares to reduce the number of services. All the breeding mares need to be examined for pregnancy diagnosis as early as possible after breeding (Bansal et al., 2009). The use of ultrasound enables us to diagnose pregnancy at an early stage, 14 days after ovulation almost 100% accurate (Bansal et al., 2009). Keeping in view the present research was planned to study the preovulatory follicular size, follicular growth rate and early detection of pregnancy in Thoroughbred mares.

The present work was carried out on twelve Thoroughbred mares from fManjari Horse Breeder's Farm at Manjari, Taluka Haveli, District Pune. Mares

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which foaled successfully without any difficulty in foaling were randomly selected. All the mares were between 7-15 years of age and weighing between 500 to 600 kg. All the mares were fed green fodder (Lucerne), dry (hay) and concentrate HH Growth- L feed (contains ingredients like Factory Graded and Flaked Oats, Steam Flaked Barley, Steam Flaked Corn, Equi-Rice (Heat Stabilized Rice Bran), **Rice Bran Oil** as well as HH Pellet) were fed 4 kg per mare divided three times in a day. All the mares had free access to drinking water.

The foal heat was detected with visual external symptoms like urination, winking of vulva, vaginal discharge, relaxation of vulva and reddening of vaginal mucosa. The mares were teased with stallion for detection in estrous which includes lack of resistance of the mare in the presence of a stallion as well as allowing stallion to mount prior to scanning. The opening of the cervix was visualised by application of vaginal speculum. The experimental mares were examined by rectal palpation and ultrasonographically to reveal the presence of intrauterine fluid accumulation, detection of cyst and follicular growth on either of the ovaries since day 8 postpartum. The follicular growths were recorded from day 8 post-partum till ovulation daily in experimental mares. The average follicular growth per day as well as mean diameter of preovulatory follicle was recorded. The preovulatory follicle was diagnosed based on their loss of clear spherical shape (pear shape appearance) as well as their margins became irregular. All mares which were detected with largest follicle size and a characteristic uterine pattern of edema (cart-wheel like appearance) were mated with stallion. Mating was performed every second day, using two registered stallion. The ovulation was confirmed ultrasonographically (ovulation, day 0), on next day by observing rupture of preovulatory follicle. The flushing of uterus was done with one to two litres of warm, sterile saline (Normal saline) and a suspension of antibiotics Benzyl penicillin (3 gm), Gentamycin (30 ml) and 7.5 % Sodium bicarbonate (25 ml) were instilled into the posterior uterine body to remove fluid and resolve any infection, after 6-8 hrs of

mating. After treatment, temporary Caslick operation (vulvoplasty) was done to prevent pneumovagina. The early pregnancy diagnosis was carried out first on 14<sup>th</sup> day postmating by ultrasonography.

In the present study, the mean diameter of the follicle was 34.83 $\pm$ 4.13, 39.25 $\pm$ 4.24 and 43 $\pm$ 1.13 mm on 8<sup>th</sup>, 9<sup>th</sup> and 10<sup>th</sup> day after foaling. The mean diameter of preovulatory follicle was 40.91 $\pm$ 4.52 mm and the mean interval from foaling to first ovulation was 9.66 $\pm$ 0.14 days in experimental mares. The result of the present study for the mean size of preovulatory follicle is in close agreement with Dimmick *et al.* (1993) and Ginther *et al.* (2008) reported 40 $\pm$ 0.7 and 40 mm while Shirazi *et al.* (2002) reported 42.6 $\pm$ 1.24 mm preovulatory follicle size in mares. Slightly larger mean diameter of preovulatory follicle were reported by Benallou and Meliani (2011) and Newcombe and Cuervo-Arango (2013) reported 43.16 mm and 43.5 mm, respectively. Gastal *et al.* (2008) observed 38.3 $\pm$ 0.7 mm diameters of preovulatory follicles in mares which lower than results of present study. The variation in the mean diameter of the preovulatory follicle than the results of present study may be due to differences in breed, parity, climate and season and managemental conditions of the mares. (Alemayehu *et al.*, 2006), number of preovulatory follicles (Dolezel *et al.*, 2012) and the interval between examinations.

In the present study, the mean growth rate of follicle was 4.5 $\pm$ 1.23 and 3.66 $\pm$ 0.76 mm from day 8 to 9 (3-2) and 9 to 10 (2-1) before ovulation. The results in the present study for growth rate of the follicle are slightly lesser than Koskinen *et al.* (1989) who reported 3 mm growth rate up to two days before ovulation in Finnhorse mares and also by Ginther *et al.* (2008) who observed 3 mm/day growth rate to the diameter of approximately 35 mm four days before ovulation, continued growth up to two days before ovulation. Pierson and Ginther (1985) and Derar and Hussein (2011) observed 2.7 mm/day growth rate of preovulatory follicle from -7 to -1 day before ovulation and 2.32 $\pm$ 0.18 mm at day 1 from the day of follicular deviation, respectively. The variation in the growth rate of preovulatory follicle may be due to

differences in breed, body weight of the mare, season, nutrition, technique of measuring follicle diameter and environmental conditions.

In the present research work, the early pregnancy was diagnosed with transrectal ultrasonography using 7.5 MHz probe on day 14 postmating. The pregnancy was confirmed after detection of embryonic vesicle. The embryonic vesicle was detected in twelve (100%) experimental mares on day 14 with transrectal ultrasonography and the mean diameter of embryonic vesicle was 10.25 $\pm$ 0.59 mm. In the present experiment, the minimum size of embryonic vesicle detected was 7 mm while the maximum size of embryonic vesicle was 13 mm. Out of 12, in 7 (58.33%) mares size of embryonic vesicle detected in the range of 10-12 mm. The result of the present study for detection of early pregnancy on day 14 postmating was in close correlation with Palmer and Driancourt (1980), Simpson *et al.* (1982), Kilicarslan *et al.* (1996) and Bansal *et al.* (2009) reported detection of embryonic vesicle on day 14 postbreeding in mares. Lower days required for detection of the embryonic vesicle than the result obtained in the present study were also reported by Ginther (1985) reported on 11<sup>th</sup> day and Paolucci *et al.* (2012) observed embryonic vesicle on 8<sup>th</sup> day postmating in mares. The mean diameter of embryonic vesicle in the present study is slightly less than that observed by Bansal *et al.* (2009) who reported 13 mm size on 14<sup>th</sup> day. The variation in the detection of embryonic vesicle may be due to the differences in days after ovulation, frequency of probe, technician and experience of the operator.

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