

Ovarian antral follicular dynamics in Ankamali Pigs

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Published online at www.veterinaryworld.org on 25-03-2011

Abstract

The present study was designed with the objective of understanding the ovarian antral follicular dynamics in Ankamali pigs, an indigenous south Indian breed of pig, that derives its name from Ankamali block in the Ernakulam district of Kerala, also found in Karnataka, Tamil Nadu, parts of Maharashtra and Andhra Pradesh. For the present study, the ovaries were collected from apparently healthy, non pregnant, cyclic and middle aged (2 to 5 years) Ankamali pigs slaughtered at civil meat processing and production centre, Frazer town, Bangalore during the month of February to May 2010. The February month was transition month from winter to summer and the month of March, April and May were considered as summer months. A total of 640 ovaries were collected and the surface antral follicles on the ovaries were classified into Group I (small, <3 mm), Group II (medium, 3-6.9 mm) and Group III follicles (large, 7-12 mm) on the basis of their diameter. The results of the present study revealed that the number of Group I follicles were significantly ($P<0.05$) higher compared to Group II and Group III follicles. Similarly, Group II follicles were significantly ($P<0.05$) higher compared to Group III follicles during different months of observation. An attempt was also made in the present study to find out the approximate ratio between the small, medium and large follicles wherein it was 7: 4:1 during the month of February and March and it was 6: 5: 1 during the month of April and May. The ovarian follicular dynamics established in the present study during winter to summer transition month like February and during summer months like March, April and May shall throw some insights into the ovarian physiology in Ankamali breed of pig. Key words: Ovarian follicles, follicular dynamics, South Indian Pig, Ankamali pigs,

Introduction

The porcine species are the litter bearing animals with a continuous growth and development of follicles without any demarcated waves during the estrous cycle, multi-ovulators with the ovulation of 15 to 20 Graafian follicles in an estrus and with a litter size up to a maximum of 12 to 13. But, the litter size in the indigenous pigs is only around 6 to 8 at birth and 3 to 5 at weaning (Anon., 2008). This necessitates the study of ovarian physiology in desi breeds of pigs and the possible manipulations that can be suggested to augment reproductive efficiency. Indigenous pigs are of three types namely Desi, Gahuri and Ankamali, inhabiting northern India, north-eastern India and Kerala province located in southern India, respectively (Bhat *et al.*, 1981).

Ankamali pig derives its name from the Ankamali block in the Ernakulum district of Kerala. They are also widely distributed in Kerala, Karnataka, Tamil Nadu, parts of Maharashtra and Andhra Pradesh. Ovarian follicular dynamics has been extensively studied in cow, buffaloes, sheep and to certain extent in goats. But, the work done on this

aspect in pigs, particularly in Ankamali pigs is very scarce or not available. Hence, the present study was taken with the objective of understanding the ovarian follicular dynamics in Ankamali pigs.

Material and Methods

The ovaries were collected from apparently healthy, non-pregnant and cyclic Ankamali pigs in the age group of 2 to 5 years brought for slaughtering at civil meat processing and production centre, Frazer Town, Bangalore during the month of February to May 2010. Immediately after collection the ovaries were placed in sterile plastic box containing 0.9 per cent sodium chloride solution and transported to the laboratory in ice cold condition within two hours. Ten ovaries were collected in each collection and such collections were repeated four times a week and a total of 640 ovaries were collected. In the laboratory, the ovaries were washed twice with sterile 0.9 per cent sodium chloride solution and the surface antral follicles were classified into Group I (small, <3 mm), Group II (medium, 3-6.9 mm) and Group III follicles (large, 7-12 mm) on the basis of their diameter (Kelly *et al.*, 1988) measured using a Vernier calipers, hand

Table-1. Mean \pm SE values of different groups of ovarian antral follicles in Ankamali pigs (n = 160).

Groups	February	March	April	May
Group I	21.71 \pm 1.13 a	21.40 \pm 0.94 a	20.60 \pm 0.95 a	20.45 \pm 1.09 a
Group II	12.19 \pm 0.51 b	13.23 \pm 0.56 b	15.41 \pm 0.63 b	14.54 \pm 0.65 b
Group III	3.99 \pm 0.18 c	3.80 \pm 0.16 c	3.89 \pm 0.14 c	3.75 \pm 0.18 c

Note: Group I: Small follicles (< 3 mm), Group II: Medium follicles (3-6.9 mm), Group III: Large follicles (7-12 mm). Mean values bearing different superscripts differed significantly (P < 0.05) within a column.

lens and a scale. Number of Group I, Group II and Group III follicles in each ovary were noted.

Statistical analysis: Different group of follicles in ovaries collected during the month of February to May 2010 were statistically analyzed using computerized statistical software, GraphPad Prism (San Diego, USA, 2010) by application of one-way ANOVA with Bonferroni's post test. The values are expressed as mean \pm SE. Significance or non-significance of differences between the mean values were determined at 5 per cent level of significance.

Results and Discussion

The mean \pm SE values of Group I follicles were significantly (P<0.05) higher compared to Group II and Group III follicles. Similarly Group II follicles were significantly (P<0.05) higher compared to Group III follicles during different months of the observation (Table 1). The approximate ratio between the small, medium and large follicles was 7 : 4 : 1 during the month of February and March. Wherein, it was 6 : 5 : 1 during the month of April and May.

The results of the ovarian antral follicular dynamics in Ankamali pigs in the present study were in conformity with Guthrie *et al.* (1995) who reported the highest number of medium and small follicles and lowest number of large follicles during the luteal phase of the estrous cycle in the pig. However, Knox (2005) reported about 13 to 50 small follicles compared to 30 medium follicles and absence of large follicles at about day 11 of the estrous cycle in pigs. The number of small follicles reported in the present study was in agreement with Quesnel *et al.* (1998), Knox (2005) and Schwarz *et al.* (2008). The follicles measuring 3 to 6.9 mm considered as medium follicles in the present study were in agreement with Guthrie (2005), who opined that the predominant follicles in pigs grew up to 4 to 5 mm and thereby resulted in atresia. The large follicles in the present study were of the size 7 to 12 mm which is in agreement with Hughes and Varley (1980) who has given the size of preovulatory follicles with a diameter of 10 to 12 mm. Evans (2003) opined that the understanding of antral follicular dynamics in different species is most important for designing

improved methods to manipulate reproduction in domestic animals. In the present study, the ovarian antral follicular dynamics in Ankamali pigs is established which was lacking hitherto, as the paucity of information was there in the literature. The findings of the present study shall throw some light on the reproductive status with respect to ovarian physiology in Ankamali breed of pigs.

Acknowledgement

The authors are thankful to the authorities at civil meat processing and production centre, Frazer Town, Bangalore for extending their cooperation in collecting the ovaries from the slaughtered Ankamali pigs.

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