GROSS AND HISTOLOGICAL STUDY ON THE ABATTOIR OVARIES OF JAFFRABADI BUFFALOES

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ABSTRACT

The gross biometric and histological study was conducted on the ovaries of 30 Jaffrabadi buffaloes collected fresh from the local abattoir.The average weight of left and right ovaries was 4.08 ± 0.38 and 4.32 ± 0.26 g; average length 3.89 ± 0.13 and 4.14 ± 0.18 cm; average width 1.56 ± 0.06 and 1.62 ± 0.09 cm, and average thickness was 1.82 ± 0.08 and 1.90 ± 0.06 cm, respectively.There was no significant (P >0.05) difference in various gross biometric observations of left and right ovaries.The stroma of the ovary had distinct cortex and medulla. The ovarian surface was lined by simple cuboidal epithelium. The average height of epithelium was 4.26 ± 0.33 µm. The ovarian follicles were observed in different developmental stages distributed in the cortex. The average diameter of primordial, primary and secondary follicles was recorded as 26.37 ± 0.84 µm, 38.92 ± 0.66 µm and 74.25 ± 0.52 µm, respectively. The thickness of zona pellucida was 7.68 ± 0.37 µm and 6.40 ± 0.22 µm in secondary and tertiary follicles, respectively.

KEY WORDS : Jaffrabadi buffalo, Abattoir ovaries, Biometry, Histology.

INTRODUCTION

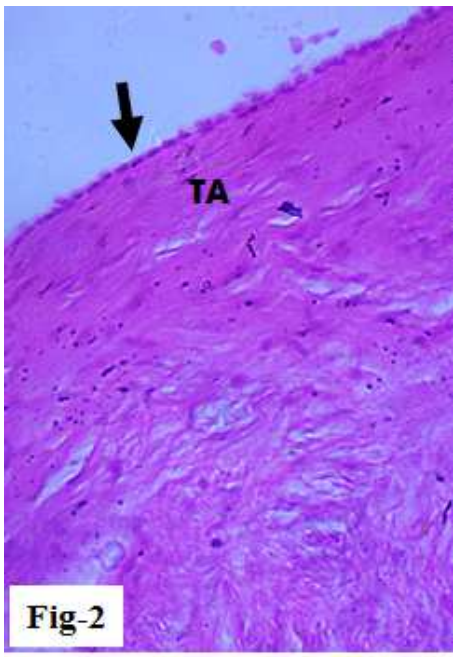
Buffaloes have major contribution in the milk production in India. Reproductive efficiency is the primary factor affecting productivity. Ovary is the primary female reproductive organ and thus for improving female reproduction, understanding of the follicular dynamics is a prerequisite. The information available on the biometry as well as gross and histological features of the ovaries of Jaffrabadi buffaloes is meagre. So, keeping in view all these facts, the present study was conducted on the abattoir ovaries of Jaffrabadi buffaloes.

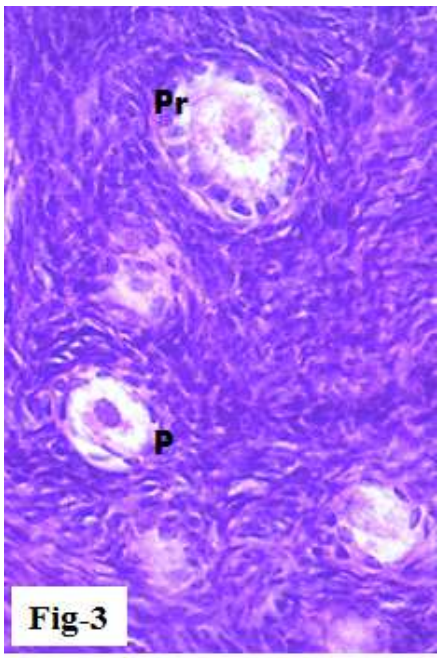
MATERIALS AND METHODS

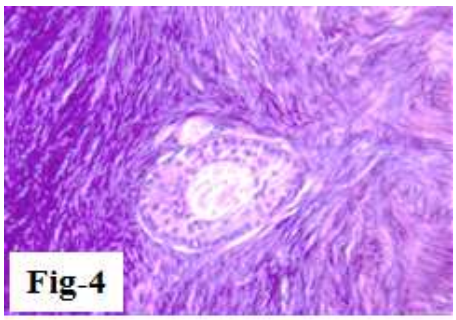
The study was conducted on left and right ovaries of 30 adult Jaffrabadi buffaloes collected fresh from local abattoir. Immediately after collection, the ovaries were fixed in 10% neutral buffered formalin (NBF). Length, breadth, thickness, weight and volume of each ovary were recorded. The Length and breadth were measured with the help of inelastic thread, thickness was recorded with the help of digital Vernier caliper and volume of each ovary was recorded by water displacement method. After biometric observations the whole ovary was processed for histological study by acetone benzene schedule (Bancroft and Stevens, 1990). The paraffin sections of 5-6 µm thickness were cut with the help of rotary microtome. The sections were stained with Haematoxylin & Eosin, Masson's trichrome and Verhoeff's stains (Bancroft and Stevens, 1990). Results were compiled and analyzed statistically(Snedecor and Cochran, 1994).

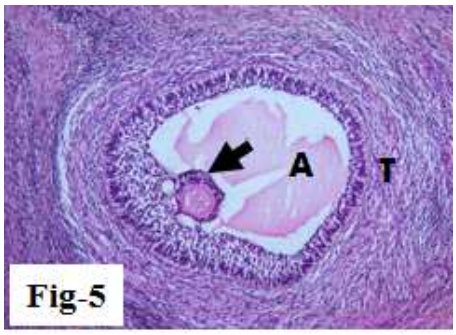
RESULTS AND DISCUSSION

The gross morphological study of ovaries of Jaffrabadi buffaloes showed that the shape of the ovaries was elongated oval. The ovaries having large size of follicles on surface were spherical in shape (Fig.1). The normal ovaries were light pink in colour and firm in consistency. The surface of the ovaries having protruding small follicles was smooth and fluctuated on palpation and in some









LEGENDS TO PHOTOGRAPH

Fig. 1 Gross photograph of ovaries of Jaffrabadi buffalo

Fig. 2 Micro-photograph of ovary showing surface epithelium (arrow) and tunica albugenia (TA), H& E stain (X 400)

Fig. 3 Ovarian cortex showing the primordial (P) and primary follicles (Pr),H & E stain (X 400)

Fig. 4 Micro-photograph of secondary follicle, H & E stain (X 100)

Fig. 5 Micro-photograph of tertiary follicle showing oocyte (arrow), antrum (A) and theca cell layer (T),H & E stain (X 100)

ovaries which were in luteal phase having corpus luteum had hard consistency. The gross biometrical observations, viz., weight, volume, length, breadth and thickness on ovaries were recorded. The average weight of left and right ovaries was 4.08 ± 0.38 and 4.32 ± 0.26 g; average length 3.89 ± 0.13 and 4.14 ± 0.18 cm; average width 1.56 ± 0.06 and 1.62 ± 0.09 cm, and average thickness was 1.82 ± 0.08 and 1.90 ± 0.06 cm, respectively. There was no significant (P >0.05) difference in various gross biometric observations of left and right ovaries. Khandoker *et al.* (2011**)** and Baragoth (2014) also reported that there were no significant differences in different biometric observations of left and right ovaries of buffalo.

The histological observations revealed that the stroma of ovary had distinct cortex and medulla. The cortex comprised of surface epithelium, tunica albugenia, and different ovarian follicles and corpora lutea. The ovarian surface was lined by simple cuboidal epithelium or stratified cuboidal epithelium at certain locations (Fig. 2). The average height of epithelium was 4.26 ± 0.33 µm. Tunica albugenia comprised of connective tissue rich in collagen fibres. The connective tissue of tunica albugenia was arranged in 2-3 layers and the average thickness was 95.44 ± 4.56 µm. However, Bhardwaj and Roy (2004) recorded the mean height of epithelium and thickness of tunica albuginea as 5.68 ± 0.04 µm and 76.26 ± 6.00 µm, respectively, in Indian buffalo. Baragoth (2014) recorded that the thickness of tunica albuginea in ovaries of buffalo during follicular phase was 115.14 ± 3.92 µm.

The ovarian follicles were observed in different developmental stages distributed in the cortex. The primordial follicles were present in the outer part of cortex surrounded by single layer of squamous cells, consisted of an oocyte without a zona pellucida (Fig. 3). The average diameter of primordial follicles was 26.37 ± 0.84 µm. Wezel and Rodgers (1996) recorded the maximum and minimum dimensions of primordial follicles as 38.0 ± 5.4 and 28.9 ± 4.3 µm, respectively in bovine. The primary follicles were lined by single layer of cuboidal cells. The average diameter of primary follicles was 38.92 ± 0.66 µm. The secondary or growing follicles were characterized by an oocyte surrounded by two or more layers of granulosa cells enclosed within a basement membrane (Fig. 4). The average diameter of secondary follicles was 74.25 ± 0.52 µm. In the secondary follicle the oocyte was surrounded by a well-developed zona pellucida. The thickness of zona pellucida of secondary follicle was 7.68 ± 0.37 µm. Earlier Bhardwaj and Roy (2006) recorded the diameter of secondary follicle as 81.77 ± 6.23 µm and thickness of zona pellucida of secondary follicle as 4.77 ± 2.45 µm in buffalo.In the present study, two types of tertiary follicles were observed, viz., young and mature. Follicular atresia was seen at all stages of development of follicles. The tertiary follicle consisted of a primary oocyte surrounded by many layers of granulosa cells. The average thickness of zona pellucida of tertiary follicle was 6.40 ± 0.22 µm. The granulosa cells were surrounded by a multi layered theca cells, and an antrum filled with the fluid was present (Fig. 5).

The central part of the ovaries comprised of medullacontained connective tissue, blood vessels, lymphatics and nerve fibres. The medullary connective tissue was comprised offibrocytes and fibroblast cells and the collagen and reticular fibres. The elastic fibers were present only in the wall of large blood vessels. Similar findings were observed by Eurell and Frappier (2006).

REFERENCES :

Bhardwaj, R.L. and Roy, K.S. (2004). *Indian J. Anim. Sci.,***74**: 156-59.

Bhardwaj, R.L. and Roy, K. S. (2006). *Indian J. Anim. Sci.,***76**: 506-509.

Bancroft, J.D. and Stevens, A. (1990). Theory and Practice of Histological Techniques. 3rdedn. Churchill Livingstone, UK, pp. 109-137.

Baragoth, A.F. (2014)..*Wasit J. Sci. & Med.,***7**: 255-264.

Eurell, J.A. and Frappier, B.L. (2006). Textbook of Veterinary Histology. 6thedn. Blackwell Publishing, Iowa, USA, pp. 256-277.

Khandoker, M., Jahan, N., Asad, L., Hoque, S., Ahmed, S. and Faruque M.O. (2011). *Bang. J. Anim. Sci.,***409** (1-2): 23-27.

Snedecor, G.W. and Cochran, W.G. (1994). Statistical methods. 9thedn. Iowa State University Press, Ames, Iowa, USA.

Wezel, I.L.V. and Rodgers, R.J. (1996). *Biol. Reprod*., **55**: 1003-1011.

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