



Histomorphological and histochemical studies on vagina of oviduct in Japanese quails

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Abstract : The mucosa of each vagina presented lamina epithelialis, lamina propria and lamina mucosae. The mucosa was thrown into folds viz., primary and secondary folds. The number of folds were significantly reduced in vaginal part of oviduct. The lamina epithelialis presented pseudostratified columnar ciliated epithelium in vagina in both the groups of quail.

Key words : Histomorphology, Histochemistry, Vagina oviduct, Japanese quail

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INTRODUCTION

Very meagre information is available in literature on histology and histochemistry of vagina in Japanese quails, hence present investigation was made.

RESEARCH METHODOLOGY

The present study was conducted on twenty Japanese quails. The birds were equally divided into two groups viz., group I (4-5 weeks of age) and group II (7-8 weeks of age). Apparently healthy quails were used for this study.

For histological study, tissue pieces of 3 to 5 cm thick, were cut across the center of each segment of the oviduct and were fixed in 10 per cent neutral buffered formalin overnight at room temperature. These tissue pieces were then treated with routine methods of dehydration of ascending grades of alcohol (ethanol), cleared in xylene and embedded in paraffin wax. Each prepared paraffin block was sectioned serially at 3 to 5 μ thickness. The sections were stained with Mayer's haematoxyline and eosin stain for general histological and micrometrical observations (Singh and Sulochana, 1996). The following special staining techniques were also used for histomorphological study: Masson's trichrome for collagen fibres (Luna, 1968) and Verhoeff's stains for elastic fibres (Luna, 1968).

McManus's PAS method (Singh and Sulochana, 1996), was implied to demonstrate the glycogen and

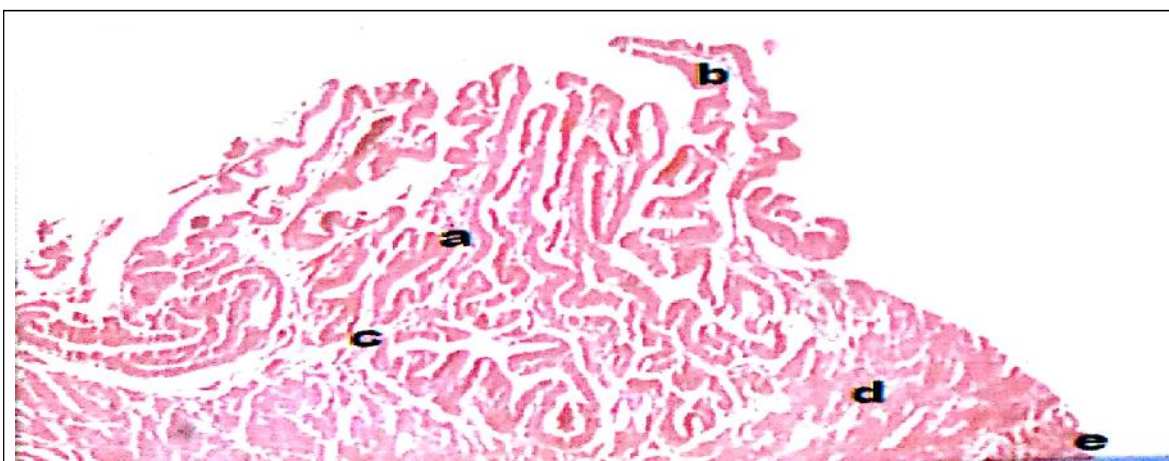
mucopolysaccharides in different segments of oviduct in both the groups.

The micrometrical observations of infundibulum of oviduct was recorded in microns (μ) as per the method of Culling (1969). The micrometrical observations were made by using ocular micrometer duly calibrated with stage micrometer. The measurements were recorded by calculating the average of 4 to 5 fields from each of stained slides.

The data obtained was statistically analyzed and compared for micrometrical observations as per the method suggested by Snedecor and Cochran (1994).

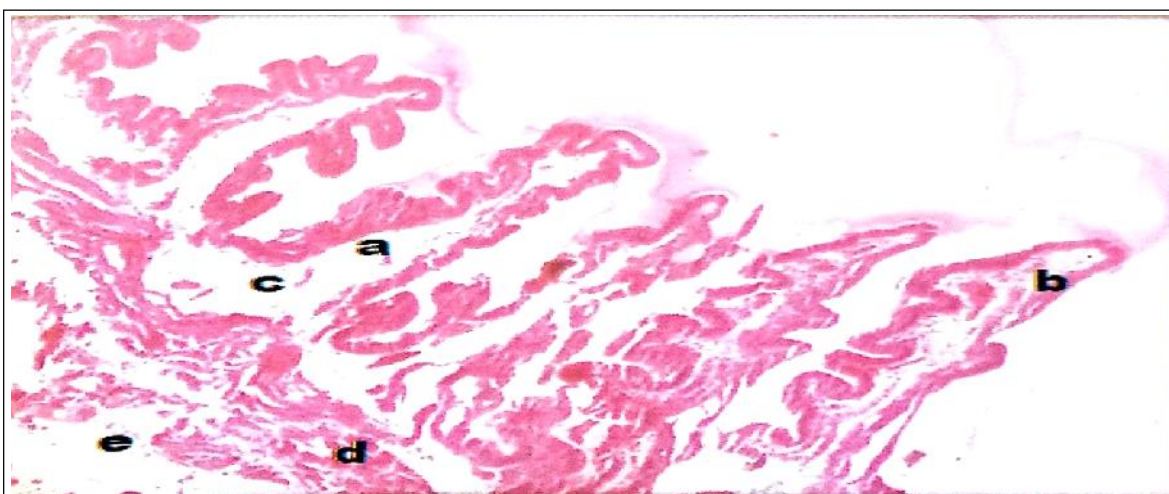
RESULTS AND DISCUSSION

Histological structure of vagina, the fifth segment of oviduct, presented the tunica mucosa, tunica muscularis and tunica serosa from outside to inward in the present study (Plate 1 and 2). This finding was in consonance with the reports of Dellmann and Eurell (1998) in domestic fowl, Bansal *et al.* (2010) in Punjab white quails and Ghule *et al.* (2010) in Japanese quails.



(a) Primary mucosal fold, (b) Secondary mucosal fold, (c) Tunica submucosa, (d) Tunica muscularis, (e) Tunica serosa

Plate 1 : Histoarchitecture of vagina 4-5 week aged Japanese quail showing H and E (80x)



(a) Primary mucosal fold, (b) Secondary mucosal fold, (c) Tunica submucosa, (d) Tunica muscularis, (e) Tunica serosa

Plate 2 : Histoarchitecture of vagina 7-8 week aged Japanese quail showing H and E (80x)

In the present study, the tunica mucosa presented lamina epithelialis and lamina propria and lamina muscularis mucusea. The average thickness of the tunica mucosa was $1.33 \pm 0.21 \mu$ in immature quails (group I) and 1.74 ± 0.14 mm in quails during laying of eggs (group II) (Table 4). The thickness was found to be increased with the advancement of age.

The mucosa was thrown into long, narrow and slender folds in the present study (Plate 1 and 2). This finding was in too similar with the report of Bakst and Howarth (1975) in *Gallus domesticus* and Bacha and Bacha (1990) in hen.

The mucosa was folded and divided into primary and secondary (Plate 1 and 2). The average number of these

Table 1 : Mean (\pm SE) values of number of primary and secondary mucosal fold per microscopic field in vagina in Japanese quail at different groups

Sr. No.	Segment of oviduct	Group I Mean \pm SE		Group II Mean \pm SE	
		Primary folds	Secondary folds	Primary folds	Secondary folds
1.	Vagina of oviduct (mm)	4.83 ± 0.16	5.50 ± 0.22	5.66 $\pm 0.16^{**}$	6.44 $\pm 0.33^{**}$

** indicate significance of value at $P \leq 0.01$

Group I : Japanese quail of 4-5 weeks of age; Group II : Japanese quail of 7-8 weeks of age

Table 2 : Mean (\pm SE) values of length (-m) of primary and secondary mucosal folds in vagina of oviduct in Japanese quail at different groups

Sr. No.	Segment of oviduct	Group I Mean \pm SE		Group II Mean \pm SE	
		Primary folds	Secondary folds	Primary folds	Secondary folds
1.	Vagina of oviduct (mm)	31.33 ± 0.61	13.50 ± 0.67	59.22 $\pm 1.01^{**}$	10.37 $\pm 0.32^{**}$

NS = Non-significant ** indicate significance of value at $P \leq 0.01$

Group I : Japanese quail of 4-5 weeks of age; Group II : Japanese quail of 7-8 weeks of age

Table 3 : Mean (\pm SE) values of height of epithelium (-m) in vagina in Japanese quail at different groups

Sr. No.	Segment of oviduct	Group I Mean \pm SE	Group II Mean \pm SE
1.	Vagina of oviduct (μ m)	1.00 \pm 0.00	1.66 \pm 0.16

NS = Non-significant * and ** indicate significance of values at $P \leq 0.05$ and 0.01 , respectively

Table 4 : Mean (\pm SE) values thickness (-m) of tunica mucosa, tunica submuosa, tunica muscularis in vagina of oviduct in Japanese quail at different groups

Sr. No.	Segment of oviduct	Group I Mean \pm SE				Group II Mean \pm SE	
		Tunica mucosa	Tunica submucosa	Tunica muscularis	Tunica mucosa	Tunica submucosa	Tunica muscularis
1.	Vagina of oviduct (μ m)	1.33 ± 0.21	1.50 ± 0.22	3.16 ± 0.16	1.77 $\pm 0.14^{NS}$	3.33 $\pm 0.16^{**}$	7.55 $\pm 0.17^{**}$

NS = Non-significant * and ** indicate significance of values at $P \leq 0.05$ and 0.01 , respectively

Group I : Japanese quail of 4-5 weeks of age; Group II : Japanese quail of 7-8 weeks of age

Table 5 : McManus's PAS activity for glycogen in vagina of oviduct in Japanese quail at different groups

Sr. No.	Segment of oviduct	Group I		Group II	
		Regional showing PAS		Regional showing PAS	
		Lining epithelium	Proprial gland	Lining epithelium	Proprial gland
1.	Vagina of oviduct	+	+	++	++

+ Weak PAS +ve reaction; ++ Moderate PAS +ve reaction; +++ strong PAS +ve reaction

Group I : Japanese quail of 4-5 weeks of age; Group II : Japanese quail of 7-8 weeks of age

folds per field was 4.83 ± 0.16 and 5.50 ± 0.22 in group I whereas it was 5.66 ± 0.16 and 6.44 ± 0.33 in group II, respectively (Table 1). The average length of primary and secondary folds was $31.33 \pm 0.61 \mu\text{m}$ and $13.50 \pm 0.67 \mu\text{m}$ in immature quails and $59.22 \pm 1.01 \mu\text{m}$ and $10.77 \pm 0.32 \mu\text{m}$ in laying quails (Table 2). The number of folds and their length was significantly decreased with the advancement of age in the present study. This observations has similarity with the reports of Fertuck and Newstead (1970) in the vagina of Japanese quails and Bansal *et al.* (2010) in Punjab white quails. They further opined that the mucosal folds were longer in infundibulum, magnum and isthmus but decreased in lower part of oviduct, which may be responsible for selection, storage and transport of sperms.

The lining epithelium of vagina was pseudostratified columnar ciliated types in immature quails and during the laying of eggs. This finding has similarity with the reports of Fertuck and Newstead (1970) in the vagina of Japanese quails, Dellmann and Eurell (1998) in domestic fowl, Berg *et al.* (2001) in Japanese quails, Bansal *et al.* (2010) in Punjab white quails and Ghule *et al.* (2010) in Japanese quails.

The average height of the epithelium was increase from $1.00 \pm 0.00 \mu\text{m}$ in immature quails to $1.66 \pm 0.16 \mu\text{m}$ in laying quails with the advancement of age in the present study (Table 3). However, the epithelial height of vagina was significantly decreased as compared to the infundibulum, magnum, isthmus and uterus in the present study. This finding has supported by the reports of Fertuck and Newstead (1970) in Japanese quails and Bansal *et al.* (2010) in Punjab white quails.

The proprial glands could not be demonstrated in the lamina propria in the present study. This finding goes well with the reports of Fertuck and Newstead (1970) in Japanese quails and Bansal *et al.* (2010) in Punjab white quails.

The average thickness of the tunica submucosa of the vagina was $1.50 \pm 0.22 \mu\text{m}$ in group I and $3.33 \pm 0.16 \mu\text{m}$ in group II, respectively (Table 4). The submucosal thickness was increased with the advancement of age in the laying quails. The tunica submucosa was consisted of loose connective tissue without glands. Similar were the reports of Ghule *et al.* (2010) in Japanese quails.

The average thickness of the tunica muscularis of the vagina was $3.16 \pm 0.16 \mu\text{m}$ in group I and $7.55 \pm 0.17 \mu\text{m}$ in group II, respectively (Table 4). The thickness was significantly increased in laying quails as compared to immature quails. This layer was highly developed than other segments oviduct. The muscularis layer consisted of inner circular and outer longitudinally arranged smooth muscle fibres. The collagen fibres were interspersed between the two muscle layers. This finding was in concurrence with the reports of Gopinath and Hafeezuddin (1980) in domestic fowl, Fujii (1981) in chicken, Bansal *et al.* (2010) in Punjab white quails and Ghule *et al.* (2010) in Japanese quails.

The tunica serosa presented loose connective tissue fibres in lamina epithelialis serosa covered by mesothelium in group I and group II.

The lining epithelium and the proprial glands of the vagina showed weak reaction for glycogen by PAS activity in the immature quails. However, with the advancement of age, the reaction was observed to be moderate the lining epithelium and proprial glands of the vagina in the quails during laying of egg. Similar were the reports of Bansal *et al.* (2010) in Punjab white quails.

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