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RESEARCH ARTICLE

Histomorphological and histochemical studies on uterus in Japaneis quails

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Abstract : The mucosa of each segment presented lamina epithelial is, lamina propria and lamina mucosa. The mucosa was thrown into folds *viz.*, primary and secondary folds. The number of folds were found to be increased in laying quails. The lamina epithelial is presented pseudo stratified columnar ciliated epithelium in uterus in both the groups of quail. The uterine glands or shell glands were more prominent and found active with increase in their density (680.00 ± 4.08) in laying quails as compared to immature quails (261.50 ± 2.14).

Key words : Histomorphological, Histochemical uterus, Japanese quail

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INTRODUCTION

Very meare information is available in literature on histology and histochemistery of uterus 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 group's *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 cur 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 blocks were 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).

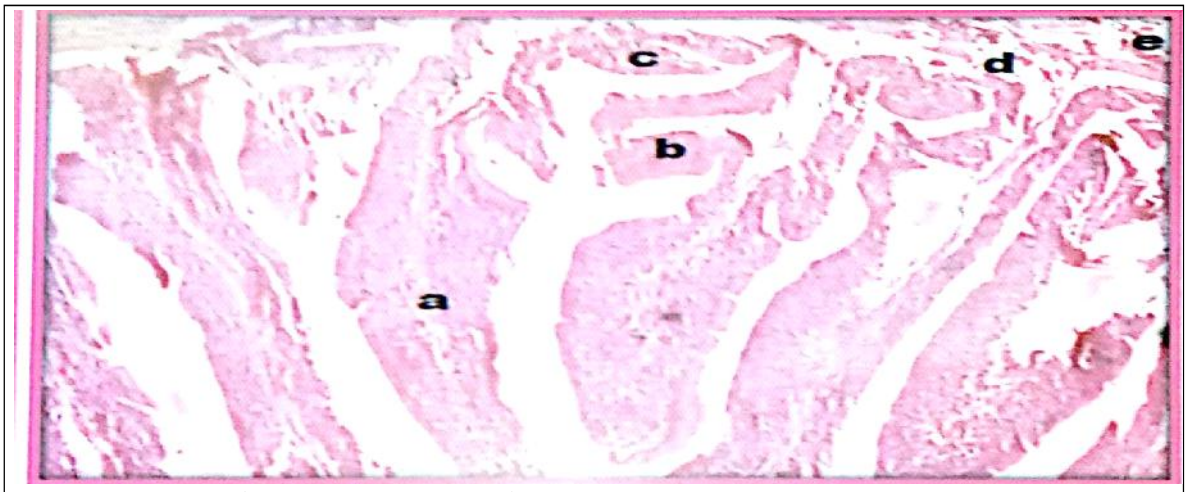
McManus's PAS method (Singh and Sulochana, 1996), was implied to demonstrate the glycogen and mucopolysaccharides in different segments of oviduct in both the groups.

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 Cocharan (1994).

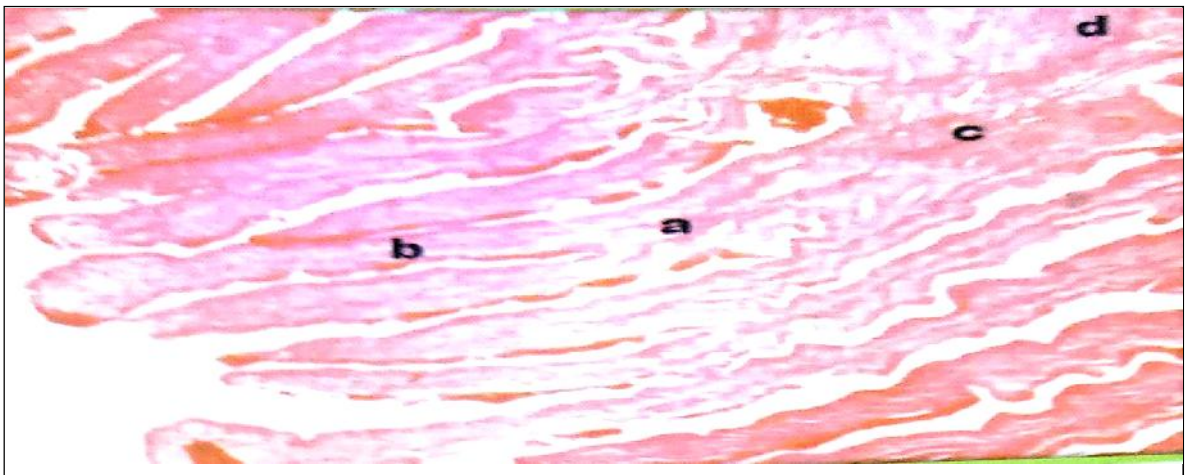
RESULTS AND DISCUSSION

Uterus, the fourth segment of oviduct presented the tunica mucosa, tuica sub mucosa, tunica muscular is and tunica serosa from inside to outward in the present study (Plate 1).This finding was in consonance with the reports of Dellmann and Eurell (1998) in domestic fowl, Lucy and Harshan (1998) in Japanese quail chicks, 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: Microscopic photograph of uterus 4-5 weeks aged Japanese quail showing H and E (80x)



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

Plate 2: Microscopic photograph of uterus 7-8 weeks aged Japanese quail showing PAS (80x)

In the present study, the tunica mucosa presented lamina epithelialis, lamina propria and lamina muscularis mucosea (Plate 2). The average thickness of the tunica mucosa was 1.33 ± 0.21µm in immature quails (group I) and 1.88 ± 0.11µm in quails during laying of eggs (group II) (Table 5). The thickness was found to be increased with the advancement of age.

The uterine mucosa was folded and the folds were divided into primary and secondary. The average number of these folds per field was 5.33 ± 0.21 and 6.50 ± 0.22 in group I and 7.44 ± 0.24 and 8.88 ± 0.11 in group II, respectively. The number of these folds was increased with the advancement of age (Table 1). The average length of primary and secondary folds was 107.33 ± 1.66 µm and 29.66 ± 0.55 µm in immature quails and 242.22 ± 2.22 µm and 37.22 ± 0.36 µm in laying quails (Table 2). These folds were tall, narrow and leaf-like interspersed with blood capillaries and were not broad like magnum observed in the present study. This finding was in agreement with the similar reports of Bakst and Howarth (1975) in Gallus domesticus. Bacha and Bacha (1990) in hen, Ghule *et al.* (2010) in Japanese quails and Berg *et al.* (2001) in Japanese quails. However, Bakst (1978) reported that the uterine mucosa was slightly compressed when opposed to an egg and wide interfold spaces were evident in chicken hen and Lucy and Harshan (1998) observed numerous long, spatula shaped folds covered by ciliated apical cells and basal cells in Japanese quail chicks. The lining epithelium of uterus was pseudostratified columnar ciliated type in quails before and during the laying of eggs (Plate 2). This finding was in consonance with the reports of Ghule *et al.* (2010) in Japanese quails. However, Lucy and Harshan (1998) reported simple columnar epithelium on the primary mucosal folds and Berg *et al.* (2001) recorded both ciliated and non-ciliated cells in Japanese quails. Further, Madekurozwa (2007) reported simple columnar to pseudostratifid columnar cells in the uterine mucosa of immature ostrich and Bansal *et al.* (2010) in Punjab White Japanese quail observed the uterine epithelium as pseudostratified columnar type with ciliated, non- ciliated, non-ciliated, basal and goblet cells.

The average height of the epithelium was increased from 1.83 ± 0.16 µm in immature quails to 2.77 ± 0.14 µm in laying quails with the advancement of age in the present study (Table 3). The uterine epithelial height was found significantly higher when compared to the isthmus and magnum. This finding goes well with the reports of Bansal *et al.* (2010) in Punjab while quails.

The proprial glands were extensive and densely packed with spherical and basal nuclei. The ducts of these

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

Sr. No.	Segment of oviduct	Group I Mean ± SE		Group II Mean ± SE	
		Primary folds	Secondary folds	Primary folds	Secondary folds
1.	Uterus of oviduct (mm)	5.33 ± 0.21	6.50 ± 0.22	7.44 ± 0.24**	8.88 ± 0.11**

** indicate significance of value at P ≤ 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 (± SE) values of length («m) of primary and secondary mucosal folds in uterus in Japanese quail at different groups

Sr. No.	Segment of oviduct	Group I Mean ± SE		Group II Mean ± SE	
		Primary folds	Secondary folds	Primary folds	Secondary folds
1	Uterus of oviduct (mm)	107.33 ± 1.66	29.66 ± 0.55	242.22 ± 2.22**	37.22 ± 0.36**

NS= Non- significant ** indicate significance of value at P ≤ 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 (± SE) values of height of epithelium («m) in uterus in Japanese quail at different groups

Sr. No.	Segment of oviduct	Group I Mean ± SE	Group II Mean ± SE
1.	Uterus of oviduct (µm)	1.83 ± 0.16	2.77 ± 0.14**

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

glands were lined by pseudostratified columnar cells. The ducts were opened onto the surface epithelium (Plate 2). This finding has similarity with the earlier reports of Lucy and Harshan (1998) in Japanese quail chicks and Bansal *et al.* (2010) in White Japanese quails. However, Ghule *et al.* (2010) reported tubular glands in the uterine mucosa of Japanese quails.

The number of shell glands per mm square in immature quails were 261.50 ± 2.14 with a diameter of 0.13 ± 0.021 µ and in the quails during laying period were 680.00 ± 4.08 with a diameter of 0.18 ± 0.02 µm. The number of shell glands were significantly increased with the advancement of age and the increased functional activity of the uterus in the mature quails.

The shell glands were lined with pseudostratified columnar ciliated type of epithelium in quails before and during the laying of eggs This finding has concurrence with the report of Kanchana *et al.* (2009) in Gulinea fowl.

The average thickness of the tunica submucosa of the uterus was 1.50 ± 0.22 µm in group I and 2.88 ± 0.11 µm in group II, respectively (Table 5). The tunica submucosa was consisted of loose connective tissue with small tubular glands. Similar were the report of Ghule *et al.* (2010) in Japanese quails.

The average thickness of the tunica muscularis of the uterus was 3.16 ± 0.16 µm in group I and 6.88 ± 0.11 µm in group II, respectively (Table 5). The thickness of tunica muscularis was found to be increased in laying quails as compared to the immature quails. The muscularis layer consisted of inner circular and outer longitudinally arranged smooth muscle fibres separated by stratum vascularae the collagen fibres. Moreover, the thickness of muscularis layer was increased from infundibulum to uterus. These results are in agreement with the reports of Fujii (1981) in chicken. Bansal *et al.* (2010) in Punjab white quails and Ghule *et al.* (2010) in Japanese quail.

The tunica serosa presented subserosa of loose connective tissue fibres covered by mesothelium in groups I and group II.

Table 4 : Mean (± SE) values of height of number of shell glands per mm^2 in uterus and diameter of shell glands («m) in Japanese quail at different groups

Sr. No.	Parameter	Group I Mean ± SE	Group II Mean ± SE
1.	No. of shell glands per mm^2	261.50 ± 2.14	6.80 ± 4.08**
2.	Diameter of shell glands (µm)	0.13 ± 0.021	0.18 ± 0.02^{NS}

NS = Non significant ** indicate significance of value at P ≤ 0.01
Group I : Japanese quail of 4-5 weeks of age; Group II :- Japanese quail of 7-8 weeks of age

Table 5 : Mean (± SE) values thickness («m) of tunica mucosa, tunica submuosa, tunica muscularis in uterus in Japanese quail at different groups

Sr. No.	Segment of oviduct	Group I Mean ± SE			Group II Mean ± SE		
		Tunica mucosa	Tunica submucosa	Tunica muscularis	Tunica mucosa	Tunica submucosa	Tunica muscularis
1.	Uterus of oviduct (µm)	1.33 ± 0.21	1.50 ± 0.22	3.16 ± 0.16	1.88 ± 0.11*	2.88 ± 0.11**	6.88 ± 0.11**

NS= Non- significant * and ** indicate significance of values at P ≤ 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 6 : McManus's PAS activity for glycogen in uterus in Japanese quail at different groups

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

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