



HISTOLOGICAL STUDY OF THE MAGNUM AND VAGINA IN TURKEY HENS *Meleagris gallopavo*

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ABSTRACT

In the current study, total of (10) indigenous adult turkey hens (*Meleagris gallopavo*) aged about (45-55) weeks were purchased from local supplier in Diala city, Iraq. Birds were kept under normal conditions (outdoor) and allowed to access feed and water *ad libitum* for two weeks to eliminate those have the signs of illness. The euthanasia done by overdose of ketamine (25mg/Kg. B.W) xylazine (10mg/Kg. B.W), intramuscular injection. The mucosa of the magnum is thick wall, arranged in long, wide and branched more voluminous folds, variable in size and length than elsewhere with narrow clefts between them lined with simple columnar epithelium. The mucosal folds of the vagina is raised and more slender into numerous, narrow, low longitudinal folds carrying secondary folds which were particularly regular in arrangement lined by a ciliated pseudo stratified columnar epithelium.

KEYWORDS: *Meleagris gallopavo*, histological study, magnum, vagina etc.

INTRODUCTION

The mucosal epithelium of the magnum in the avian is generally simple columnar, with variable numbers of mucus-secreting and ciliated cells. The lamina propria contrasts sharply to that of the infundibulum; it's filled with long, tubular glands that can be branched and coiled. The secretory cells of these glands can be cuboidal to columnar in shape. In addition to the glands there is a small amount of loose connective tissue with diffuse lymphatic tissue^[1,2].

In young chicken the mucosa of the magnum is lined by an epithelium consist of ciliated columnar cells and secretory goblet cells. This epithelium avarice considerably in height, being reduced to 10mm in the upper magnum during active secreting but increase to a maximum of 25mm in the posterior magnum. The ciliated cells are comparatively narrow with a well-developed tuft of apical cilia and a central to apical, oval nucleus, whilst the secretory cells possess a typically goblet structure with a rounded, basal nucleus and abroad. Alveolar, apical region containing numerous mucigen granules^[3]. In the laying hen, the walls of the magnum consist of an outer muscular layer (muscularis) and inner lamina propria containing tubular glands, lined by secretory cells. The surface epithelium of the magnum is lined by ciliated and secretory non- ciliated (granular) cells^[4,5,6]. In laying pekin duck, the mucosa of the magnum is lined by an epithelium consists of alternating ciliated columnar cells and secretory goblet cells. The margnal glands are long, tubular, branched coiled which are opened of all points on the luminal surface. The tunica muscularis of the magnum is formed from of an outer longitudinal arranged layer and inner circulatory arranged one the mucosa of the magnum of immature Japanese quail (*Coturnix Japonica*)^[7] had low rounded primary folds and shallow invigilation in the intervening grooves with a few small glands^[8]. The glandular cells were low columnar non- ciliated and

stained weakly. A smooth muscle layer had developed in this region^[9] found that the luminal epithelium of the magnum of the mature was simple columnar consists of alternating ciliated cells and non- ciliated secretory cells. The mucosa had thickened considerably and the primary folds were finger-like, with numerous small secondary folds. The mucosal folds of the magnum were packed with glands that were filed with intensified stained granules observed at the base of the secondary folds. In immature ostrich with inactive ovaries the mucosa of the magnum is arranged in branching convoluted folds, separated by deep furrows and lined with non ciliated cells which more densely covered by microvilli. In contrast the mucosa of the magnum in birds with active ovaries formed convoluted folds which were lined by both ciliated and non-ciliated cells. The distribution of ciliated cells was not uniform, with clumps of ciliated cells occurring adjacent to non- ciliated area^[10]. In mature Rhea (*Rhea americana*), the tunica mucosa of the magnum is pseudo stratified columnar epithelium with a more ciliated than secretory cells which containing PAS+ granules in the cytoplasm^[11]. The epithelium of magnum was ciliated pseudo stratified columnar in turkey and pigeon. In lamina propria, mucosal glands with basophilic cytoplasm were seen very extensive. In pigeon, mucosal folds showed different shape and size of them and were smaller than turkey. It was seen $1987.5 \pm 161.25\text{mm}$ and $775.12 \pm 35.16\text{mm}$ in turkey and pigeon respectively^[12]. In Ostrich (*Struthio camelus*), the mucosa of the magnum is thick wall, make up different folds, separated by deep furrow and lined by pseudo stratified ciliated columnar epithelium. The folds were more prominent than that of the infundibulum. The ultra structure of the surface epithelium showed two types of cells: ciliated and non ciliated granular cells. The ciliated cells are narrow with an expanded apex carrying the cilia^[13].

In laying ducks, the epithelium and cilia were determined to be well developed and lamina propria was filled with glands in the region of magnum, isthmus and uterus. In ducks which were in the quiescent phase of the reproductive cycle, the ciliated and secretory cells lining the epithelium and the proprial glands were determined not to have fully developed^[14].

The magnum of the Guinea fowl, presents well developed mucosal folds, and they formed large duct-like structures in the lamina propria. These duct-like structures were lined by pseudo stratified epithelium which was resembled the mucosal epithelium. In chickens, the lamina propria of the magnum did not contain such developed secretory mucosal folds^[15]. Many small secondary folds surface was covered by a ciliated pseudo stratified columnar with non ciliated cells including occasional goblet cells. The propria submucosa within these folds lack tubular glands, consisting of loose connective tissue that was variably populated with cells of defense. The region connecting the vagina and the uterus has sperm host glands that supported the temporary storage of spermatozoa within the avian reproductive tract^[2,16].

In the layer hen during egg production period, the luminal surface reveals longitudinally oriented, parallel tracts densely covered by a ciliated pseudo stratified columnar epithelium. The primary folds of vaginal mucosa, which lack exocrine-type tubular glands, are divided into smaller parallel secondary and tertiary folds^[17]. In duck, the tunica mucosa of the vagina is characterized by the presence of mucosal folds which arranged longitudinally and lined by ciliated columnar epithelium contains apical nuclei alternating with secretory goblet cells with basal nuclei^[18]. In ostrich (*Struthio camelus*), the luminal surface of the vagina showed thin longitudinal oriented mucosal folds. The lamina propria is formed of fibrous connective tissue with blood vessel and nerves in addition to aggregated lymph nodules in the sub mucosa^[10,13]. In mature rhea (*Rhea americana*). The mucosa of the vagina was coated by a ciliated pseudo stratified columnar epithelium within mucosa cells containing PAS+ grains. The muscularis tunica is thicker than that in the other parts forming the vaginal sphincter mucosal. The vagina possesses a well-developed muscular layer, especially circular, indicating a great contraction capacity^[11]. In turkey hen, the vagina was lined with a ciliated pseudo-stratified columnar epithelium that had a light to moderate PAS- positive staining in the apical cytoplasm^[17]. The vaginal epithelium and sub epithelial luminal mucosa are heavily populated with lymphocyte, macrophages, and plasma cells^[19]. The tunica muscularis in the turkey hen and peckin duck is similar to the tunica muscularis in hen^[20].

MATERIALS & METHODS

In the current study, total (10) indigenous adult turkey hens (*Meleagris gallopavo*) aged about (45-55) weeks, these birds purchased from local supplier in Diala city, Iraq were used birds were kept under normal conditions (outdoor) and allowed to access feed and water *ad-libitum* for two weeks to eliminate those have the signs

of illness. the euthanasia done by overdose of ketamine (25mg/Kg. B.W) and xylazin (10mg /Kg. B.W), intramuscular injection. Abdominal laparotomy was performed; the ovary and oviduct immediately removed from the abdominal cavity. Then specimens were washed with 0.9% normal saline and transferred to 10% formalin solution in labeled containers. The period of fixation in 10% formalin solution (48) hours After fixation the specimens almost 1-2cm were washed with running tap water for (4-6) hours, the specimens were proceed with Histological technique as the following steps^[21].

Dehydration: in order to remove all extractable water from them, Clearing, Infiltration: The specimens of ovary and oviduct were transported to a melted paraffin in two steps each step rest for two hours using oven at (58°C).

Embedding (Blocking): The specimens were blocked with paraffin wax and then sectioned using standard histological techniques.

Sectioning: Standard histological techniques was applied using rotary microtome, exactly 5-6µm thick were prepared from the center and margin of each specimens.

Mounting: The section were carried out from bath and fixed on a slide contained mayor's albumin (mixture of egg albumin with glycerin), slides were dried in an oven with (40°C) for (24) hours (21,22).

Staining:

1-Harris hematoxylin and Eosin stain: For appearance of the general structure of tissue.

2- Periodic Acid Schiff (PAS): For coloring the basement membrane and mucopolysaccharide materials:

3- Van Gieson's Stain: For staining connective tissue and muscular fibers and its constituents.

RESULTS & DISCUSSION

The mucosa of the magnum is thick wall, arranged in long, wide and branched more voluminous folds, variable in size and length than elsewhere with narrow clefts between them lined with simple columnar epithelium as shown in (Figure 1, 2). The lamina propria-sub mucosa is rich in branched tubular glands that are highly well developed and opened to the epithelial surface, the glandular cells are pyramidal with large spherical or rounded basal nucleus which containing PAS+ granules. This explains the increase in the size and length of mucosal folds of the magnum due to the development of glandular layer in its wall as compared with other parts of the oviduct that leads to increase the surface area of secretion and explains the importance of the magnum in the manufacture and secretion of albumin as given in (Figure 3). Same results were found in laying hen^[14], in turkey and pigeon^[12] and in ostrich^[10].

This result as reported in laying pekin duck by^[17], but in domestic fowl the external layer seems to be oblique^[3]. The mucosal folds of the vagina is raised and more slender into numerous, narrow, low longitudinal folds carrying secondary folds which are particularly regular in arrangement lined by a ciliated pseudo stratified columnar epithelium as shown in as shown in (Figure 4,5).



FIGURE 1: Histological Section of Magnum Showed : a-Primary fold b- Secondary fold (H&E stain x40)

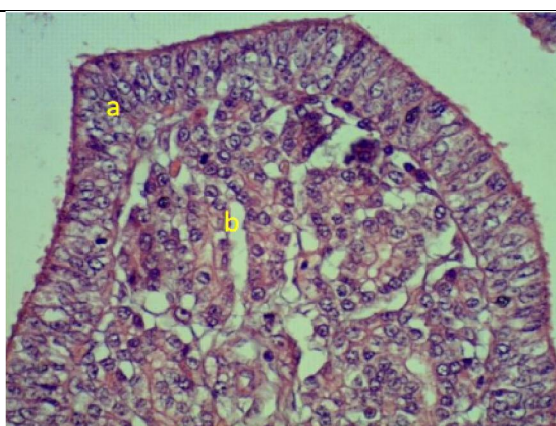


FIGURE 2: Histological Section of Magnum Showed: a- Ciliated pseudo stratified columnar epithelium b- Lamina propria (H & E stain x400).

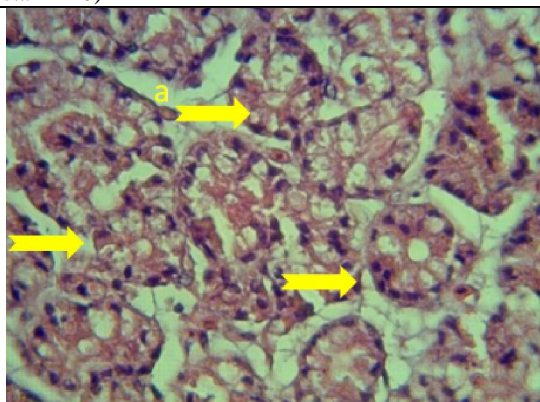


Figure 3: Histological Section of Magnum Showed: a-Lamina propria filled with branched tubular glands (arrowheads) b- Lumen of acinar (H&E stain x400).

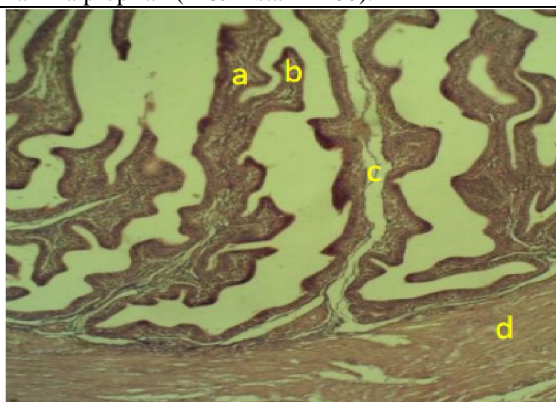


Figure 4: Histological section of vagina showed: a- primary mucosal folds. b- Secondary mucosal folds. c- lamina propria. d- tunica muscularis (H&E Stain x40)



FIGURE 5: Histological Section of Vagina Showed: a- Ciliated pseudo stratified columnar epithelium b- Lamina propria c- Lymphocyte d- Macrophage (H & E stain x400)

The lamina propria-submucosa is lack glands and consisting of cellular loose connective tissue that is variably populated with lymphocytes and macrophages as shown in (Figure 5). These information declared in the avian by ^[2,16]. The great part of thickness in the vaginal wall is composed of a thick, inner circular layers are well developed than that in other parts forming the vaginal sphincter. The outer,). This result was also found in turkey hen and pekin duck^[20] and in rhea's ^[10].

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