

Histological Study of the Isthmus Segment of the Oviduct in Female Turkey at Egg-Laying Stage

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Abstract

The histological pattern of the isthmus segment of the oviduct in laying turkey was conducted on five adult and healthy females. Morphometric measurements were obtained for thickness of mucosa, height and thickness of mucosal folds, epithelial height, and thickness of muscular coat. The result revealed that the mucosa consisted of longitudinal, broad folds carried secondary ones. The epithelial lining was pseudostratified columnar comprised two cell types, ciliated and non-ciliated cells. The glands were tubular coiled branched showing secretory activity, tunica muscularis was well developed and consisted of two layers.

Introduction

The term oviduct in the avian is used to describe the entire reproductive duct. Only the left oviduct is present in the adult. The development of the right oviduct of female is totally arrested very early in embryonic life. The left oviduct in the laying bird fills most of the dorsal and caudal part of the left of the coelom (1). Its morphologically and functionally divisible into six regions which are infundibulum; magnum; isthmus ; tubular shell gland (2) or red region (3); shell gland pouch and vagina(4,5), rather than five subdivisions infundibulum; magnum; isthmus ; uterus (shell gland) and vagina as (1,6) were divided it. All of these but the vagina are involved in the

process of elaboration of albumen, shell membranes and shell around the central yolk mass (7, 8). The isthmus of domestic fowl extends from the non glandular zone, which delimits it from magnum, to the tubular shell gland, which to the naked eye is marked by a distinct color change from off- white to brown (2, 3, 4, and 5). It is a relatively short and its overall diameter is somewhat less than that of the magnum (4, 5). The isthmus, contain a numerous tubular glands for secreting of the shell membrane (9). The present study aims to describe the histological architecture of isthmus wall on female turkey with relation to its egg laying period.

Materials and Methods

Five adult, healthy female turkey hens at egg -laying period, and about 4-5 kilogram in body weight were used. The birds were sloughed. The body cavity was opened and the oviduct was excised, washed in normal saline for a half an hour then dissected into its segments. The region of oviduct (isthmus) was taken, and placed immediately into fixative (formalin 10%) for overnight, then dehydrated in gradient alcohol series and embedded in paraffin.

Section of 5 micrometer were obtained and stained with two types of stains: the first one was Harris Hematoxylin and Eosin (10, 11), and the second stain was periodic acid schiff (PAS) (12). Morphometric measurements were obtained using ocular micrometer to demonstrate the thickness, height of mucosal folds and thickness of tunica mucosa at all, moreover, height of epithelium and the thickness of tunica muscularis were also measured.

Results

Tunica mucosa appeared with longitudinal, flat and broad folds of the following average length and width

dimensions (\pm SD) as 3000 ± 1.1 , 900 ± 2 micrometer respectively. The longitudinal oriented interfold crypts were opened to

surface, the folds were clearly separated and carried secondary ones (Fig. 1). The surface epithelium was pseudostratified columnar about 20 ± 0.01 micrometer in height and comprised two cell types, ciliated columnar cells with apical nuclei and non ciliated secretary cells which have basal nuclei (Fig. 2). The lamina propria was loose connective tissue about 2980 ± 2 micrometer in thickness extended into the mucosal folds. The glands were tubular branched coiled, ductless and opened

commonly on to the surface. The secretary acini were consisted of 20-25 pyramidal cells filled with secretary granules. The acini were separated by strands of loose connective tissue (Fig. 3). The muscularis was well developed, appeared about 600 ± 2 micrometer in thickness and consisted of two layers: thick circular layer and thin outer longitudinal one separated by rich vascular connective tissue (Fig. 4). The isthmus was covered with a thin serosal layer.

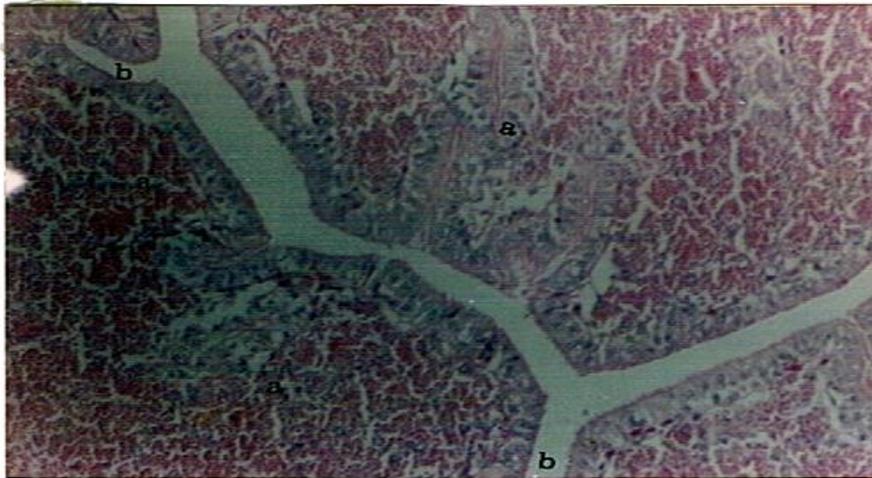


Fig. 1: Isthmus of oviduct of female turkey at egg-laying stage showing
a- broad mucosal folds b- longitudinal interfold crypts

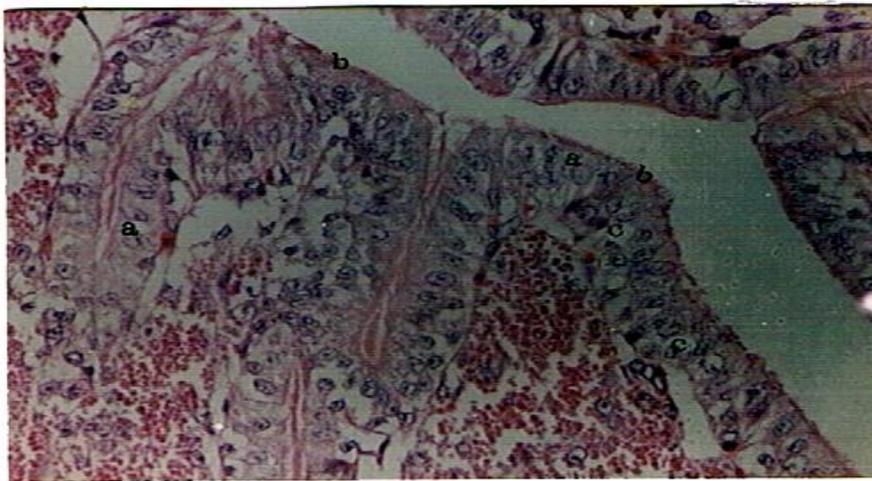


Fig. 2: Isthmus of oviduct of female turkey at egg-laying stage showing
a- surface epithelium was pseudostratified columnar
b- ciliated cells c- non-ciliated cells

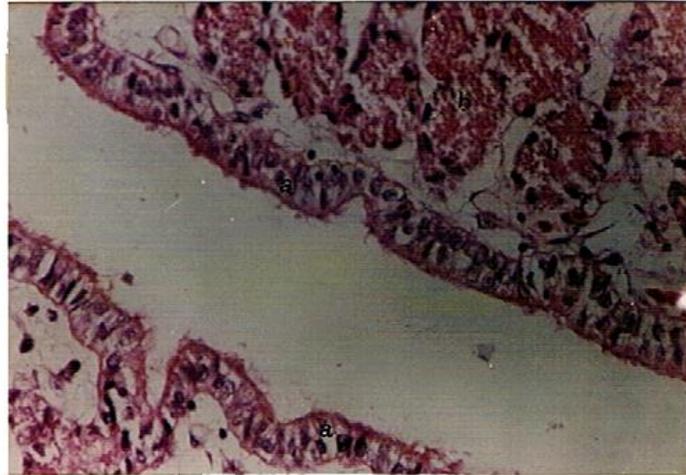


Fig. 3: Isthmus of oviduct of female turkey at egg-laying stage showing
 a- surface epithelium was pseudostratified columnar
 b- glandular acini

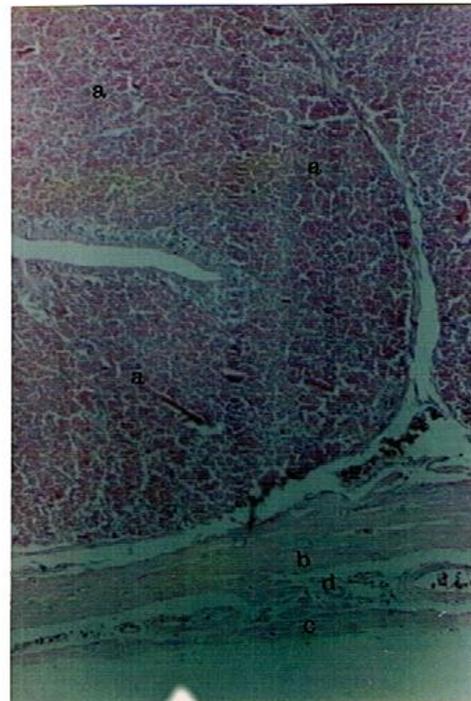


Fig. 3: Isthmus of oviduct of female turkey
 At egg-laying stage showing
 a-lamina propria fill with gland
 b-Thick inner circular muscular layer
 c- Thin outer longitudinal muscular layer
 d- Vascular connective tissue

Discussion

The histological examination of isthmus in turkey females at egg-laying stage showed that it consisted of the three usual tunica as elsewhere in the oviduct of the other domestic fowl(2,3,4, 9,13), in piken duck(14) and in mallard duck (15). The presence of mucosal longitudinal flattened folds and interfolds crypts was in agreement with the findings of (13) in white Leghorn hen. The present results were revealed that the lining epithelium of the isthmus comprised ciliated and non ciliated cells and the absence of mitochondrial cells which are interspersed between the former cells in domestic fowl (2, 3). The ciliated cells were tall columnar, and appeared to be the prominent throughout the epithelium of the isthmus, similar predominant was noticed in the isthmus of white Leghorn hen

by (9). The glands in turkey were appeared as tubular branched coiled , their acini were formed from 20-25 positive PAS secretory cells, as compared with that in the isthmus of domestic fowl , which appeared as tubular branched having acini comprise 4-5 secretory cells (2,5) and of mallard duck , as tubular branched coiled but the acini comprised 9-13 cells (15) The present observation on muscular coat of isthmus in turkey was well developed and consisted of two layers similar to those findings on the laying turkey (16) and mallard duck by (15). The abovarian transport of the egg mass through the infundibulum, magnum, and isthmus is due to peristaltic activity initiated by local distention of the oviductal smooth muscle layer (17).

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دراسة نسجية لمنطقة البرزخ من قناة البيض اناث الديك الرومي في مرحلة وضع البيض

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الخلاصة

استخدم في هذا البحث خمس اناث بالغة من الديك الرومي بصحة جيدة وفي مرحلة وضع البيض لدراسة منطقة البرزخ نسجياً. تم قياس ارتفاع وسمك طيات الغلالة المخاطية فضلاً عن سمك الغلالة واجزائها ومعرفة نوع الغدد فيها. تم قياس ارتفاع الظهارة المبطننة , وسمك الغلالة العضلية , اظهرت النتائج ان الطيات مرتفعة وسميكة تحمل العديد من الطيات الثانوية, والظهارة المبطننة عمودية مطبقة كاذبة تتضمن خلايا مهدبة وخلايا افرازية , اما الغدد فهي نبيبية ملفوفة متفرعة نشطة افرازية. وظهرت الغلالة العضلية متطورة ومكونة من طبقتين .