Al-Qadisiyah Journal of Veterinary Medicine Sciences
(P-ISSN 1818-5746/ E-ISSN 2313-4429)
www.qu.edu.iq/journalvm

Research article

Anatomical and histological study of the magnum in the pigeon *Columba domestica*

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Received 09/08/2018, Accepted 12/09/2018

Abstract

Most of the study for the Columba domestica anatomically and histologically. In this study , used five birds of the healthy and sedimentary female were used under standard breeding conditions. The anatomical study included the study of the position and shape of the oviduct and the magnum at the resting stage as well as the study of the length of the total oviduct and the length of the magnum. In the histological study, 10% Formalin Formation and 3 pigments, Harris Hematoxylin-Eosin, Van Geisson, and Periodic Acid Schief (PAS) stains were used to show different histological components and measured the highest of the mucosal fold and thickness of muscularis . In the resting stage, the oviduct appeared resting stage in a convoluted tube whose walls are different from the thicknesses and extend from the ovary to the claoca and located on the left side of the abdominal cavity and are dorsally connected with the ventral surface of the kidneys and the dorsal wall and are lateraly connected with the body of lateral wall, oviduct found suspended to the roof of the abdominal cavity by the dorsal ligament the length of the ovary 14.94 cm length while the total length of the magnum 4.18± 0.09. Histologically, the mucousal folds of the magnum are large and occupy the cavities of the magnum, They appear to carry many secondary and tertiary folds and lined with a pseudostratified ciliated epithelial cells and consist of columnar cell and secretory cell, At the resting stage cannot distinguish the parts of the oviduct , including the most easily and the mucosal layer and lamina properia development is not clear.

Keywords: *Columba domestica*, Oviduct, Pigeon.

Introduction

The birds are especially important to humans because of their close connection to them. Some of them are used to feed their meat and eggs as foodstuffs, as is the case in chickens, ducks and others. The pigeon is for the purpose of producing meat, as well as for the purpose of adornment. The Samaritans and the ancient Egyptians were related to it and love it so much that it is the only bird that is not permitted. By destroying his nests in mosques (1). The oviduct is the site of egg white secretion, the membrane of the crust and the formation of the eggshell (2) is the oviducts and the second parts, which is the magnum it is important because it's responsible for production in birds in the domesticated poultry Domestic Fowl, including pigeon are anatomically divided into five area according to the external diameter, mucosal folds and glands, which are infundibulum, magnum, isthmus, uterus and vagina (3, 4, 5). Magnum is the area of white secretion and stays in the egg about 2-3 hours to complete the composition of the egg around the yolk. The size of the egg is connected to the size of the locus than any other component. The larger the size of the egg, the larger the egg size. The whiteness

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has a limited effect on the size of the egg, The albumin is composed of four layers: the internal thick layer is 2.7%, the light internal white is 17.3%, the thick outer layer is 57% and the light outer light is 23%. The first layer that is attached to the yolk membrane is the thick internal whiteness that extends at the poles of the egg After the formation of heavy albumin The second layer is the light internal layer of light and then surrounded by the third layer and then the external layer , the outer layer of the albumin (6), the magnum has thick wall and primary and secondary mucosal folds (7). The transport from the infundibulum to the magnum . Initially, there is a sudden enlargement of the mucous fold, and most often are convolute and about 34 cm in length and (8, 9) reported that most of the females in the Salwa were in the form of a long-shaved white-colored tube with a length of 14.55 cm in the egg-laying stage (10) reported that the size of Taeniopygia Guttata in resting stage to about 59% of its volume Because of differences in the shape and composition of the oviduct and the magnum in different bird species and due to the lack of anatomical and histological studies in the bath compared to other pigeon was conducted this study.

Materials and Methods:

Ethical approval

The Animal Ethical Committee of Veterinary Medicine College, University of Al-Qadisiyah, Iraq, has approved the present study.

For the purposes of the anatomical and histological study of the oviduct for the pigeon, 5 female *Columba domestica* called domestic pigeons, were used free of diseases. The birds were all adult and at the resting stage . After sacrificing the birds, the sternum was removed with the thoracic muscles and the ribs, the area was separated with the sternum, then the following data were recorded:

1-Describe the oviduct anatomically in its location and study the location of the oviduct and its anatomical relation and raise it from the body of the birds.

2-Measure the length of the total oviduct by a ruler inserted from the infundibulum to the back end of the oviduct.

3-Measuring the length of the magnum at the resting stage. As for the histological study, samples were taken from the magnum and the histological slides were prepared by the steps of the preparation of the routine slide and then examined the slides under the light microscope.

Histological measurements:

The dimensions were measured with a micrometer by calibrating all forces using the Ocular Micrometer and the Stage Micrometer (11). The following data were recorded:

1-The number of mucosal folds of magnum.

2-Thickness of the tunic mucosa and its parts (epithelial cells and the lamina properia).

3-Thickness of tunica muscularis and the number of cells lining the secret units.

5-Study the components of the lamina properia of the magnum at the resting stage.

6-Calculation the rate of the previous measurements and the standard error (12).

Results :

Anatomical study:

The oviduct was found in a convoluted tube with flexible elastic walls and a different thicknesses extends from the ovary to the cloaca of the compound and occupies the dorsal part of the ventral cavity, forming in the form of dorsal-connected with the ventral surface of the left and right kidneys and the dorsal wall and is connected with the left lateral wall of the body. The oviduct was found to be suspended dorsally by dorsal ligament and it was found that the rate of the length of the oviduct at the resting stage was reached (14.94±0.16 cm), the magnum of the islets were identified by the folds or folds of the glands that were large and multiple in the

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majority and reached 18.2±0.26 fold. During the study, we found that most of them had the longest and the name of the parts of the oviduct and the most tortuous and the average length at the resting stage (4.18±0.09) cm Figure (1).

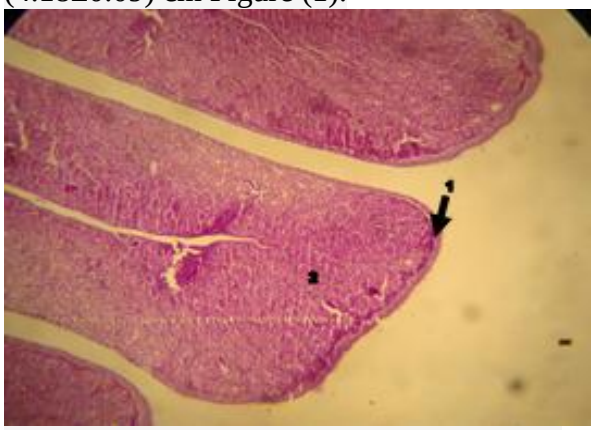

Figure (1): Show the magnum in resting stage (2)

Histological study:

The thickness mucosal fold of magnum (10.67 ± 518) micrometer at the resting stage. The tunica mucosa is composed of primary folds from which secondary folds are formed. The rate of primary fold height (2.44 ± 496) was at the resting stage, these folds are lining by a pseudo stratified ciliated epithelial epithelium at a height of 2.4±15 micrometers at the phase of cessation of production. It is consist of columnar cells and goblet cells. The nuclei of the cavernous cells are located near the basement membrane. Her apical is filled with epoxy PAS (Figure 3). The thickness of the lamina properia at the resting stage (11.22±506) micrometer and containing convoluted tubule glands up to the top of its development in this part, but it is difficult to observe the cavity of these glands, and the lining cells have a pyramid The figure is 15-20 cells. The tunica muscular is external to the glandular layer and consists of smooth muscle fibers arranged in the form of two layers, a thick internal and circular direction and a thin external longitudinal direction separated by a loose connective tissue consisting mostly of fibrous fibers and rich in blood vessels. The rate of thickness of the tunica muscular is at the of resting stage (1.22±51).

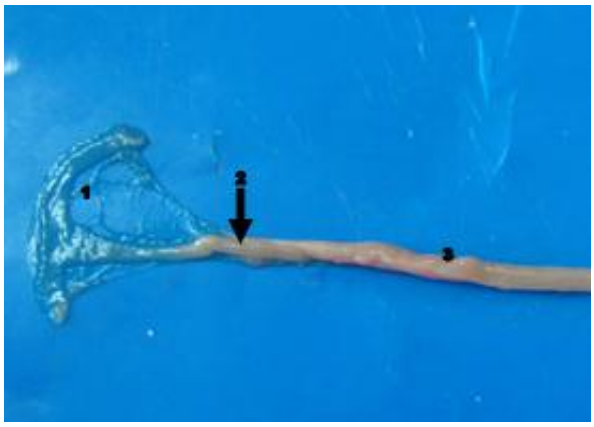

Figure (2) cross section in magnum show pseudostratified ciliated epithelial (1), tubular gland (2) PAS stain X 100

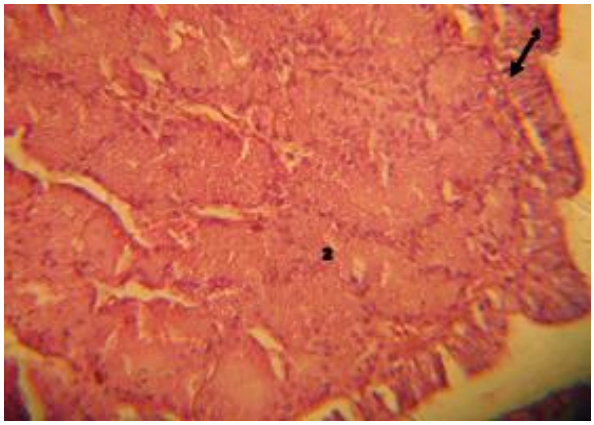

Figure (3): cross section in magnum show the glands occupy the lamina properia (2) H & Eosin X 400

Discussion

Variation the number of eggs that female birds place in the breeding cycle or is called the Clutch egg series depending on the type of bird and season. For example, the pigeons put two eggs in each lap. The number of incubators in the pigeon is about eight baccalaureate per year. The period extends between incubation and another 45 days in autumn and winter, 32 days in the spring and early summer, the oviduct is located in the

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female pigeon studied in the left of the abdominal cavity in the resting stage and suspended on the roof of the abdominal cavity by the ligament of the dorsal, and connect the abdominal edge of the oviduct abdominal ligament and the bottom end is free, and there are five anatomical areas And a job In the ducks, the egg oviduct is many convulsions and has a muscular wall and the oviduct moves. This is dependent on the activity of the oviduct itself and that the upper part or the area of the more sedate movement of the lower area of the vaginal or uterine part because it has to do with the transfer of egg released from the ovary and then the secretion of albumen, membranes and crust on the egg as it passes through the parts of the oviduct, The biggest part of The oviduct has a mean length of 4.18 cm. This result is similar to that found by and is consistent with the findings (13) in domestic poultry. The wall of the oviduct consists of the mucosal layer, which consists of a pseudostratified ciliated epithelial and other non-ciliated and glandular epithelial cells. This is consistent with what the researchers (14, 15) The mucosal layer consists of a loose connective tissue, which many initial folds emerge. There are a small number of secondary folds. The folds are lined with columnar cell, punctuated by a number of cells The magic The peaks of the basal cells in the surface epithelium of the majority are filled with PAS positive substances. This is similar to that in domesticated poultry and researcher (16) as these cells are responsible for the secretion of albumin, The lamina properia shows many alveolar glands, as well as smooth muscle fibers, and these results are identical with (17, 18, 19), We conclude from this study that the length of the oviduct for female pigeons is much shorter than the length of the oviduct in the female chicken, most have a thick wall and primary and secondary folds are thick and long, and the eggs remain in most of about three hours.

References:

1- Ibrahim, HHM.. Education and pigeon Diseases, Ministry of Higher Education and Scientific Research, University of Baghdad, 2005; 2-3

2-Card LE, Nesheim MC. Poultry Production. Lea and Febiger, Philadelphia, Printed in U.S.A 1972; 44-50.

3-Getty R. Avian anatomy In: Anatomy of The Domestic Animal Vol. 2: W.B Saunders Co. 1975; 1935- 1959.

4-Mohammadpour AA. Comparative histomorphological study of uterus between laying hen and duck, *J. of Biol* Sci. 2007; 3479- 3481

5-Khokhlov RYu, Kuzentcov SI. Morphogenesis of tunica mucosa of oviduct of the hen, *Int. J. Morphol*.. 25: 2007; 329- 333

6-Allam Sami. Poultry Breeding and Care, 9th Edition, The Anglo-Egyptian Library. 1989.

7-Dellmann HD, Eurell JA. Textbook of Veterinary Histology, Lippincott Williams and Wilkins, 1998; Pp. 265

8-King AS, Mclelland J. Female Reproductive System In Bird. Their Structure and Function 2 ed. Bailliers and Tindall, London. 1984; 145-165.

9-Ani Samed Abdul-Jabbar. Anatomical and Histological Study of the Egg Channel in the Salivary Bird. Master Thesis, Faculty of Veterinary Medicine / University of Baghdad. 2003.

10-Williams TD, Ames CE. Top-down regression of the avian oviduct during late oviposition in a small passerine bird. The *Journal of Experimental Biology* .2004; 207: 263- 268

11-Galigher AE, Kozaloff EN. Essential of Practical Microtechnique and Febiger, 1964; 67-87.

12-Alrawe Khasha Mahmoud. Introduction to Statistics, Ministry of Higher Education and Scientific Research, Faculty of Agriculture, University of Mosul 2000.

13-Yu JYL, Marquardt RR; Hyperplasia and hypertrophy of the chicken *Gallus domesticus* oviduct during reproductive cycle *Poult. Sci*. 1974; 53. 1096- 1105

14-King AS, Mclelland J Female Reproductive System In Bird. Their Structure and Function 2 ed. Bailliers and Tindall, London. 1984; pp. 145-165.

15-Jamieson BGM; Reproductive Biology and phylogeny of Birds Vol. 6A Jamieson B.G.M.(ed) Reproductive Biology and phylogeny series science publishers, Australia. 2007; 166-191

16-El-Bergeasy GFH. Studies on the oviduct of laying turkey hens with special references to it blood

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(P-ISSN 1818-5746/ E-ISSN 2313-4429)
www.qu.edu.iq/journalvm

supply. Ph.D. Thesis Fac. Vet. Med. Cairo University. 1990.

17-Aitken WO. The Oviduct. In Physiology and Biochemistry of Fowl. (Bell,D.J and. Freeman, B.M, eds) New York Academic Press, 1971; 150-175

18-Davidson MF. Histological studies of changes in the magnum of the domestic hen associated with production "watery white egg" *Br. Poult*. Sci. 27: 1986; 353- 354

19-Strukei DP. Avian Phsiology Rutgers University 4th ed. 2000; 569- 597.

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