INTRA EPITHELIAL CAPILLARIES OF IMMATURE AND MATURE OVIDUCT OF INDIGENOUS GEESE (*ANSERANSER*), HISTOMETRICAL STUDY

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ABSTRACT

A total of twelve oviducts of indigenous geese were used in this study. In immature geese the four parts of oviduct were lined by simple cuboidal to low simple columnar epithelium.The mean height of cuboidal epithelium was 20±1µm, and 29±2µm for columnar epithelium and at this period the intra epithelial capillaries were not observe in all parts of oviduct. The mature and laying geese the epithelium lining has changed into ciliated pseudostratified columnar epithelium which its height has measured about58±3µm in isthmus and 60±1µm in magnum. The intraepithelial capillaries were appeared only in the isthmus and magnum regions and most of these capillaries in the isthmus have arranged between the basal cells at the basement membrane. The intra epithelial capillaries of magnum region were observed at the center of epithelium.

INTRODUCTION

The epithelia are the tissues which cover all free surfaces of the body and consisting sheet of densely packed cells with very little intercellular spaces and lack direct vascular supply (1)(2). The reducing in the intercellular spaces that provided with contiguous cells linked by cells junctions (3) (4) .The study is aimed to investigate the intra epithelial capillaries in the epithelium of immature and mature oviduct regions of indigenous geese and the relationship between these capillaries and stage at which was observed(mature and or immature).

MATERIALS AND METHODS

This work has conducted on twelve geese involved of six mature (laying) and six immature. The samples of oviduct have dissected out and fixed in formalin solution 10%. After well fixation the specimens were processed with up grading ethanol alcohol then paraffin embedding andhave sectioned at 5-6 μm by using rotary microtome and stained with the Hematoxylin and Eosin stain, PAS stain (to distinguish the basement membrane from subepithelial connective tissue) ,and Van Giesson stain to differentiate the component of subepithelial connective tissue (5). The heights of epithelium lining of the different parts of oviduct have measured and the region which showed the presence of capillariesin the epithelium was measured with oculometer. (6)

RESULTS AND DISCUSSION

In immature geese,the results showed that, the mucosal folds of Infundibulum, magnum, isthmus, and uterushave lined by simple cuboidal to low simple columnar epithelium (fig.1). The mean of epithelialheights of cuboidal type was 20±1µm and 29±2µm for columnar epithelium. The epithelium of all parts of oviduct was lacked from capillaries and the capillaries were restricting at the lamina propria which was loose connective tissue (fig.2).

In mature and laying geesethe result showed that, the epithelial lining mucosal folds of all parts of oviduct was ciliated pseudo stratified columnar epithelium (fig.3).Themean of epithelial heightwas 58±3µm in isthmus and 60±1µm in magnum, and the intra epithelial capillaries were occupiedonly in these two parts (isthmus and magnum) of oviduct.This epithelium lining was consisting of three types of cells (basal cells, ciliated columnar and secretory columnar cells),most of basal and secretory columnar cell have heterochromatic nuclei and the apical part of columnar secretory cells contains secretory granules filled with positive PAS stain mucous secretions. Most of intra epithelial capillaries havearrangedbetween the basal cells at the basement membranein isthmus (fig.3) and reached to the middle level of epithelium as in magnum (fig.4).

Many of previous studies have restricted with intraepithelial vascularization of the olfactory epithelia of nasal cavity in mouse (**7**) and vascularization of olfactory

epithelium in vomeronasal organ in rat (8). Other studies have involved the vascularization of central nervous system in rat (9).The epithelial capillaries were seeing also in pathological patterns of same malignancies, as well as in case of the benign prostatic hyperplasia (10) and in case of malpighian epithelium. The blood capillaries within the epithelium have appeared in the lesion of the glans penis which revealed blood capillaries within the malpighian epithelium (11), also the intra epithelial capillaries of pterygium have recorded in growth of these vessels from the stroma into the epithelium can be interpreted as a reaction to hypoxia or deficiency of any other substance transported via the blood stream (12).The present study investigated the capillaries in the epithelium of oviduct in immature and mature indigenous geese and observed that, the capillaries have seen in the epithelia of mature oviduct regions only, this result suggest that the maturation of female reproductive system always under the effect of estrogen hormones (13), the well vascularizationhave provided more much of estrogen to their receptors on epithelial cells**,** so the vascularization is related with maturation of epithelium be functionional and development of underlying glands this result were consistent with result of (14). On the contrary with that the different parts of oviduct of immature geese were lack this type of vascularization.

The present study found that the epithelial capillaries have seen in the magnum and isthmus of mature oviduct, while the rest parts of mature oviduct were lacked these intra epithelial capillaries, this suggest that these parts of mature oviduct related with production of thick, thin egg albumin and thin egg membrane, so the capillaries provided good and direct nutritional exchanges between these capillaries and epithelium, this also compatible with (3).The present investigation showed that, most of the capillaries in the epithelium which appeared in the magnum at the center of epithelium which revealed highest of 60±1µm, this suggest that the capillaries extended with extensions of epithelium cells toward the lumen of oviduct, On the contrary with epithelial capillaries of isthmus which appeared in the isthmus and showed lowest epithelial heights. The oviduct of birds is a structure that undergoes cyclic variation in its functional epithelium. This epithelium contains both secretory and ciliated cells. The present study concluded the suggestion that the epithelial capillaries occupied epithelium as a result to highly

nutritive effort when the epithelium subjected to certain functions as responses to maturation.

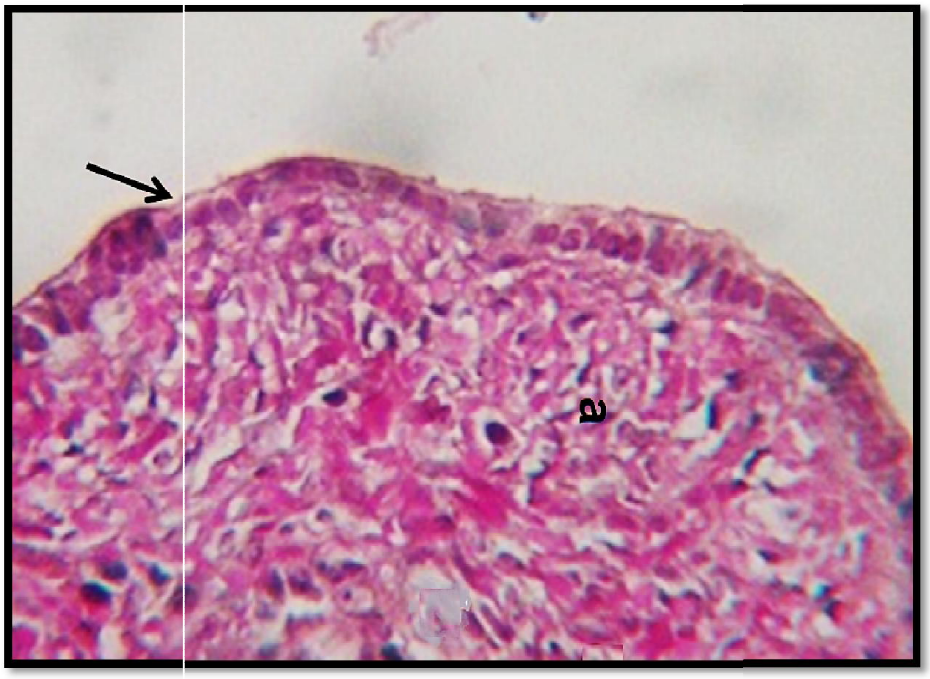

Fig.1: Histological section (Isthmus) of immature geese shows: lamina propria of cellular loose connective tissue (a) and simple cuboidal epithelium (arrow). (Van Giesson) stain 400X.

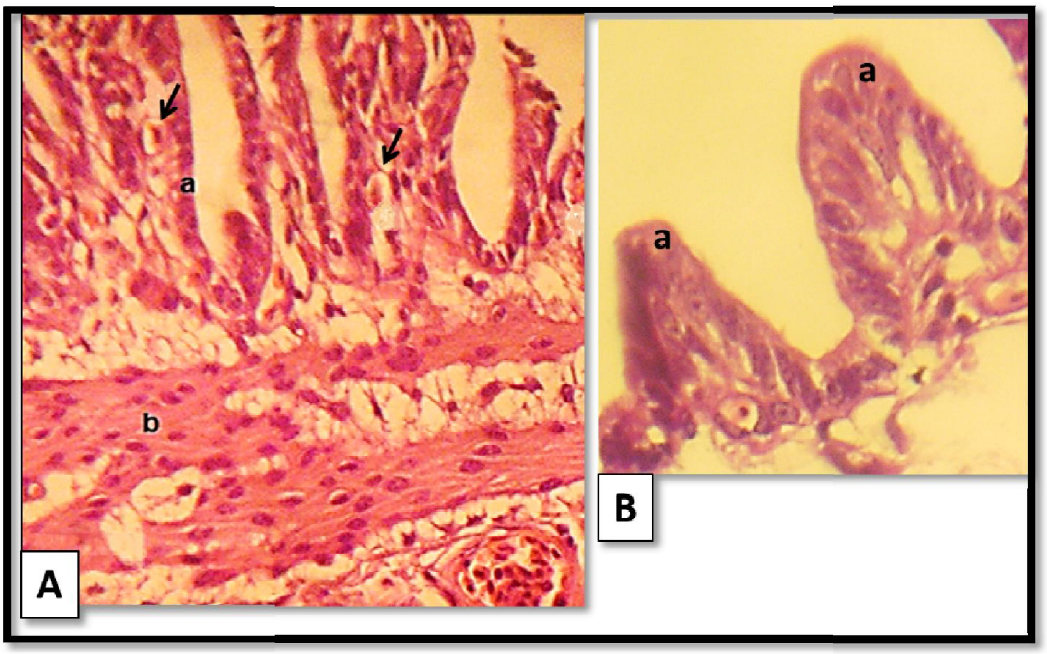

Fig.2: Histological section of Infundibulum (neck part) of immature geese shows: low simple columnar epithelium (a), muscularis mucosa (b) and capillaries within lamina propria (arrow) (H&E) stain 400X.

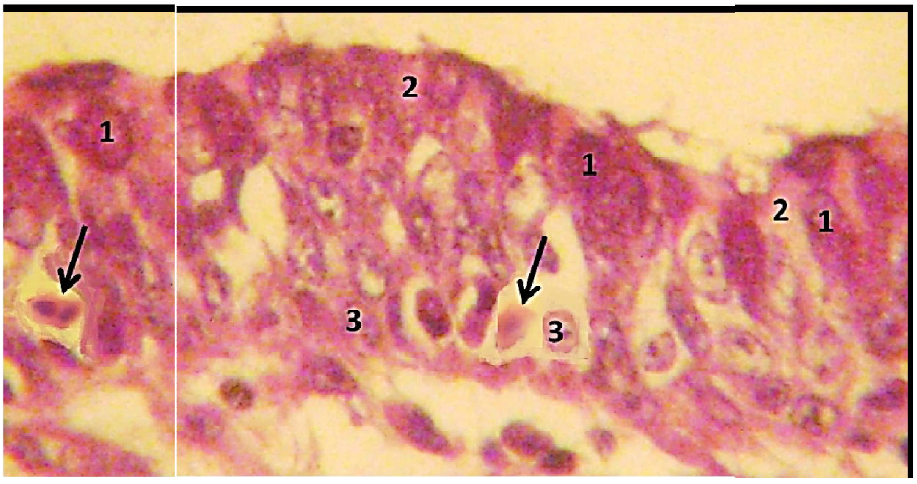

Fig.3: Histological section (isthmus) of mature geese shows: secretory columnar cells (1), ciliated columnar cells (2), basal cells (3) and intra epithelia capillaries with nucleated RBC (Black arrow) (H&E) stain 1000X.

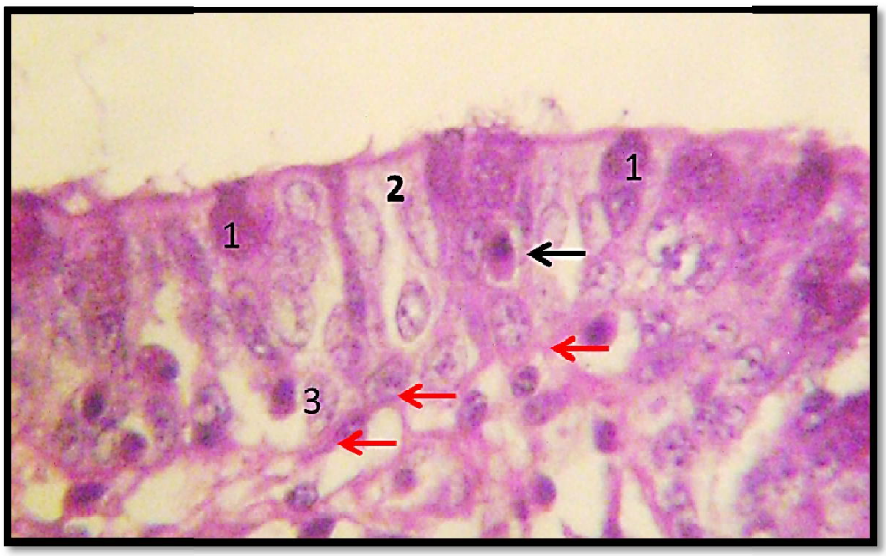

Fig.4: Histological section (magnum) of mature geese shows: secretory columnar cells (1), ciliated columnar cells (2), basal cells (3), Basement membrane (Red arrows) and intra epithelia capillaries with nucleated RBC (Black arrow) (PAS) stain

الشعيرات الدموية داخل ظهارة قناة بيض الإوز المحلي الغير ناضج والناضج,(*Anseranser*)، دراسة نسجية

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الخلاصة

استخدمت اثنا عشرَ قناةِ بيض للأوزِ المحلي الناضجة والغير ناضجة. في الاوزات الغير ناضجة اظهرت النتائج ان ألاجزاء الاربعة لقناةِ البيض كانت مغطاة بظهارةِ مكعّبِة بسيطةِ إلى ظهارة عمودية بسيطة. معدل إرتفاع الظهارةِ المكعّبةِ كَانَ 1±20 مايكروميتر، و2±29 مايكروميتر للظهارةِ العمودية وفي هذه الفترة لم يلاحظ وجود للأوعية الدموية الشعرية داخل الظهارة.في ألاوزَات البياضة و البالغِة واظهرت البطانةِ الطلائيةِ ظهارةِ من النوع المهدب الكاذب المطبق العمودي وبلغ معدل ارتفاعِها 3±58 مايكروميتر في البرزخِ و1±60 مايكروميتر في منطقة المعظم . واظهرت النتائج انتشار ألاوعية الشعرية داخلِ ظهارة منطقتي البرزخِ المعظم فقط وأغلب الأوعية الشعرية الطلائيةِ في البرزخِ رتّبتْ بين الخلايا الأساسيةِ والغشاء القاعدي، بينما الاوعية الشعرية الدموية الطلائية داخل المعظم حدّدتْ مكان في المستوى الاوسط للظهارةِ.

REFERENCES

1. Samuelson, D.A. (2007). ″Text book of Veterinary Histology″.Saunders Elsevier, St. Louis, Missouri. P: 34.

2. Gartner, L.P. and James, L. H. (2006).Color Atlas of Histology. 4th Ed. Lippincott Williams & Wilkins Com.West Camden Street, Baltimore, Maryland USA.Pp:25-26.

3. Aughey, E. and Fredric, L.F. (2010).Comparative Veterinary Histology with Clinical Correlates.Manson Publishing Ltd.Corringham Road, London.Pp:22, 209-210.

4. Banks, J.W. (1986). Applied Veterinary Histology. 2nd Ed. Williams & Wilkins Com. East Preston St. Baltimore, USA. P: 52.

5. Luna, G. (1968). ″Manual of Histological Staining Methods of The Armed Forced Institute of pathology″. 3rd Ed. McGraw Hill book Co. New York. P: 71.

6. Heideamp,W.H.(2010).Cell Biology Laboratory Manual .Saint Peyer, Minnesota, USA. P:22.

7. Cuschieri, A. and Bannister, L.H.(1975).The development of olfactory mucosa in the mouse ;Light microscopy . J. Anat.119:227-239.

8. Breipohl, W.; Bhatangar, K.P.; Blank, M. and Mendosa, A.(1981).Intra epithelial blood vessels in the vomeronasal organ neuro-epithelium of the rat. Cell Tissue Research. 215:465-473.

9. Caley, D.W. andMaxwell,D.S.(1970) development of the blood vessles of and extra cellular spaces during post natal maturation of rat cerebral cortex. J. Comparative neurology. 138: 31-48.

10. Montironi, R. ;Galluzzi, C.M.; Diamanti, L, Taborro, R.; Scarpelli, M. and Pisani, E.(1993). Prostatic intra-epithelial neoplasia. Qualitative and quantitative analyses of the blood capillary architecture on thin tissue sections. Pathol,Res pract. ,189:542-8.

11. Grosshans, E.; Kleinclaus, I.; and Guillaume, JC. (2002). Intraepithelial capillary hemangioma. Ann. Dermatol. Venerol. 129:46-55.

12. Seifer, P. and Walter, S. (1998). Capillaries in the epithelium of pterygium. British Journal of Ophthalmology.82:77-81.

13. Sangari, S.K.; Sen Gupta, P.; Pradhan,S. and Khatri. K. (2002). Intra-epithelial capillaries in the neuro-epithelium of vomeronasal organ in adult guinea pig. J. Anat. Soc.India.51:50-52.

14. Joensuu, T. K. (1990). Chick oviduct differentiation. The effect of estrogen and progesterone on the expression of progesterone receptor. Cell Diff. Develop. 30: 207-218 .