



Histometric comparative study of the Harderian gland between newly hatching and two month old turkey bird

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ARTICLE INFO.

Article history:

-Received: 20/1/2025

-Received In Revised Form: 1/ 3/2025

-Accepted: 19/3/2025

-Available online: 30/6/2025

Keywords:

harderian gland, collecting duct, turkey bird, secretory units.

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ABSTRACT

Twenty healthy turkey bird of both sexes at two ages (1week, 2months) were used in the current study. They were selected from local farm in Iraq. The Harder gland were consisted of one lobe located in the medioposterior part and ventrally aspect of the orbit behind the eye ball and surrounded by the ocular muscles. It was oval shape, pink to red in color, with rough surface, it was compound tubuloacinar gland. Many ducts were drained in to central collecting duct of the wide irregular lumen. Thin connective tissue capsule of mesothelium covered the gland completely, this capsule were sent trabecula which dividing the gland into a lot of lobules. The gland lined with columnar cells epithelia different in heights, with basally located dark nucleus and light stained cytoplasm which contained secretory vacuoles. The secretory unites were incompletely surrounded by myoepithelial cells, the dark elongated Myoepithelial cells were clearly noticed.

1. Introduction

The Harder gland is one of the orbital glands which located at the orbital bony box posterior to the eyeball and it extended medioventrally. The Harder gland is found in almost all animals except fish and some mammals (Klećkowska-Nawrot, et al, 2015). Johann Jacob Harder in 1694 described the gland for first time, in red and fallow deer. After the 1970 many others researcher were interested in studying the structure and functions of the Harder gland. The Harder gland has many important functions in animals; the excretion and the function of the gland vary with species (Payne, 1994). In some animals this gland very developed as compared to lacrimal gland , the functions of the gland are unlike with animal species (Buzzell, 1996). Harderian gland is usually situated in the posterior side of the eyeball in close to the bottom of the orbit supplied with only one duct which opens on the surface of the nictitating membrane. Numerous and various functions were attributed to this gland such as eye protection against the bright light and photodynamic process (Funasaka et al., 2010). In fact, the gland may act also as an endocrine gland (Pradidarcheep et al., 2003). The gland is lobulated and of compound tubule- acinar or tubule- alveolar in type open with main collecting duct, the lining epithelium of the Harder gland is simple columnar (Payne, 1994).

The study aimed to analyzed the Histomorphological differences between two

important ages for optimizing turkey bird vaccination schedules..

Materials and methods :-

In the current investigation, twenty healthy turkeys of both sexes at two ages—one week and two months—were used. They were chosen from an Iraqi local farm. The birds were kept in sanitary cages with stringent hygiene regulations. Water and food were provided for them. Histotechniques were performed at the University of Diyala's veterinary medicine laboratory in Iraq. After being dissected, Harderian glands were promptly preserved in 10% formalin saline. Serial slices were then cut (6 µm) and prepared for paraffin embedding. Haematoxylin and Eosin staining was then performed for standard histological analysis (Bancroft, 2007).

Result:

Morphological observation:

In turkey the Harderian gland consisted of one lobe located in the medioposterior and ventrally aspect of the orbit behind the eye ball and was surrounded by the ocular muscles. In gross inspection, the gland was relatively large when compared to the eye. It was strap- like , pink to red in color, with rough surface (Fig.1).

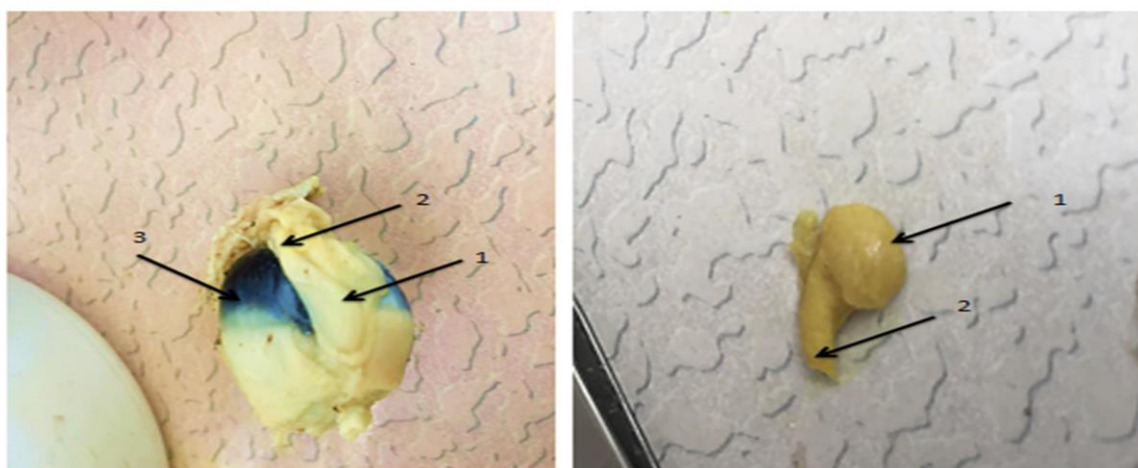


Figure (1.1): Harderian gland at (A) newly born and (B) two months age turkey harder gland (1) , eyeball (3), main duct (2).

Microscopic results:

Turkey's acinotubular gland was a composite Harderian gland. Numerous ducts were emptied

into the large, uneven lumen's primary collecting duct. Simple columnar epithelium with circular to oval, darkly pigmented nuclei surrounded the

glandular units. A thin capsule of connective tissue encased the gland, sending numerous septa that split it into several lobes (Fig. 2). The secretory cells were surrounded by myoepithelial cells with a flat, darkly pigmented nucleus (Fig. 3).

Histometric observation:

Harderian gland was covered by a thin fibrous connective tissue capsule enclosed the gland completely and composed of single layer of mesothelium cells and blood vessels. the capsule thickness differ according to age and ranging from (0.6 μ m, 0.8 μ m) respectively. Fine

connective tissue trabeculae originated from capsule and divide the parenchyma of the gland into small lobules (fig.2) the number of lobules in each gland were (2 ± 0.01 , 3 ± 0.01) respectively (tab.1)

The gland lined with columnar cells epithelia different in heights, with basally located dark nucleus and light stained cytoplasm which contained secretory vacuoles. The epithelia thickness were (2 ± 0.01 , 1.9 ± 0.01) μ m respectively. The secretory unites were incompletely surrounded by myoepithelial cells, the dark elongated Myoepithelial cells were clearly observed (Fig.2).

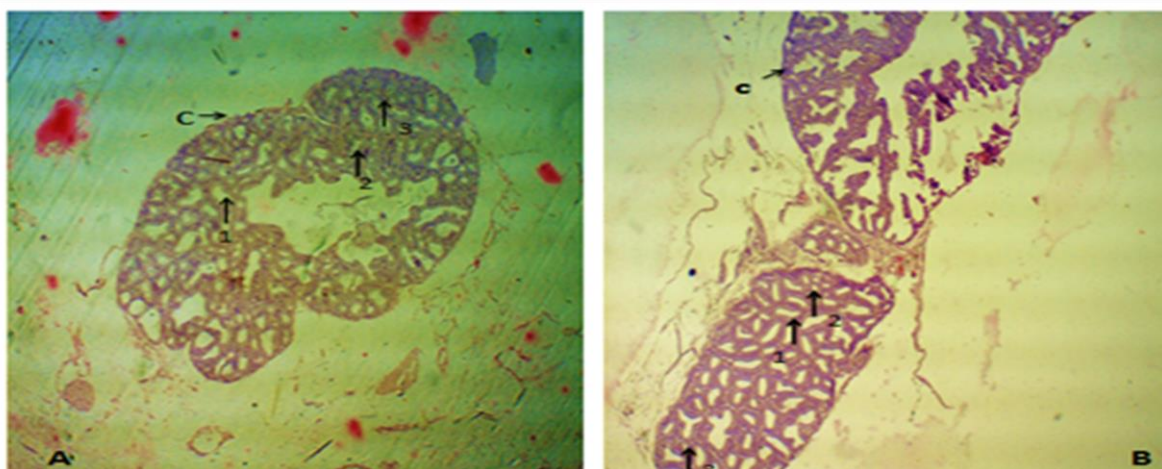


Fig.2. Longitudinal histological section of Harderian gland (A) newly born and (B) two months age turkey showing: Thin connective tissue capsule (c). Central collecting duct (1). Glandular acini (2) Lobe (3). (H& E stain X4)

The Harder gland secretion was drained by central duct with irregular wide lumen lining with one layer of columnar cells (Fig.3).

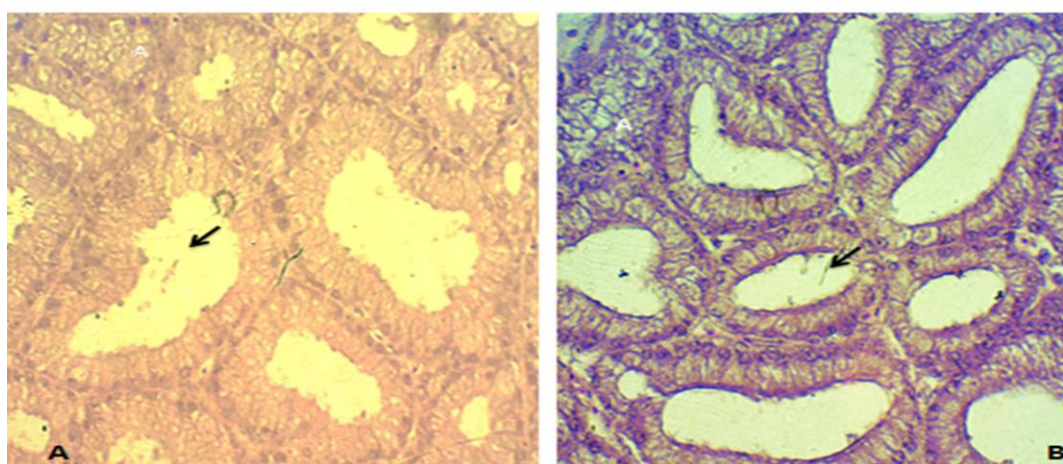


Fig.3 Harderian gland at (A) newly born and (B) two months age turkey show collecting duct arrows, Alveoli (A). (H& E stain X10).

The dimensions of harder gland were (421.8 ± 0.07 , 2237 ± 0.07)mm respectively(tab.1) There were many cells types aggregated in the interstitial connective tissue around the secretory unites and the duct. The cells concentration

around the duct was larger than that around the secretory unites. The dimensions of acinus unit were(13.9 ± 0.03 , 15.3 ± 0.03) um respectively. The secretory duct dimensions were(7.2 ± 0.01 , 9 ± 0.01) um respectively(tab.1)

Tab.1.histological parameters of the harderian gland in two ages of turkey.

age	Capsule thickness 40	Gland dimensions 4x	Secretory duct 100x	Acinus dimension 100x	Epithelia thickness 100x	No. of lobes
1 week	0.65 ± 0.03	421.8 ± 0.07	7.2 ± 0.01	13.9 ± 0.03	2.2 ± 0.01	2 ± 0.01
2 months	$0.850.03 \pm$	$22370.07 \pm$	9 ± 0.01	15.3 ± 0.03	1.9 ± 0.01	3 ± 0.01

Discussion

The ocular muscles encircle the single lobe that makes up the turkey's Harderian gland, which is situated in the medioposterior and ventrally portion of the orbit behind the eyeball. This observation is consistent with Dimitrov's (2012) findings about pheasants. Upon close examination, the gland appeared comparatively larger than the eye. It had a rough surface, was strap-like, and ranged in colour from pink to red. The same outcomes were noted in osprey by Kozlu et al. (2010). Harderian glands differed between sparrows and domestic poultry, appearing uneven in shape (Payne, 1994). Conversely, the turkey's Harderian gland was a compound acinotubular gland. Numerous ducts were drained into the wide, irregular lumen's central collecting duct. The epithelia that lined the glandular units were simple columnar epithelium with round to oval darkly stained nuclei. The gland was covered with thin connective tissue capsule which sends many septa dividing the gland into many lobes. This result in pigeon was differ from those of domestic fowl and turkey (Maxwell et al., 1986). It was also compounded acinotubular and lined with high columnar cells. Similarly the Harderian gland of fowl, duck and turkey possessed central collecting duct that lined with simple columnar secretory epithelium (Burns and Maxwell, 1979). Where in domestic duck the gland was compound tubular .

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دراسة مقارنة نسيجية لغدة هاردر بين طائر الديك الرومي حديث الفقس وطائر الديك الرومي البالغ من العمر شهرين

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الملخص

تم استخدام عشرين طائر ديك رومي صحي من كلا الجنسين في عمرين (1 أسبوع ، 2 أشهر) في الدراسة الحالية. تم اختيارهم من مزرعة محلية في العراق. كانت غدة هاردر تتكون من فص واحد يقع في الجزء المتوسط الخلفي والجانب البطني من المدار خلف كرة العين وتحيط به عضلات العين. شكل الغدة بيضوي ، لونها وردي إلى الأحمر، مع سطح خشن ، غدة مركبة انبوبية عنبية. تم تصريف العديد من القنوات في قناة التجميع المركزية للتجويف غير المنتظم الواسع. كانت الغدة مغطاة بمحفظة رقيقة من النسيج الضام الليفي وتتكون من طبقة واحدة من خلايا الظهارة المتوسطة والأوعية الدموية تحيط الغدة وترسل العديد من الحواجز التي تقسم الغدة إلى العديد من الفصيصات، الغدة مبطنة بظهارة خلايا عمودية مختلفة في الارتفاعات، مع نواة داكنة تقع في الأساس وسيتوبلازم ملطخ بالضوء يحتوي على فجوات إفرازية.

الكلمات المفتاحية: غدة هاردر ، قناة التجميع ، طائر الديك الرومي ، الوحدات الإفرازية.