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Histological finding of the lower part of trachea and lung in cobra gees *(Anser Anser)* in south Iraq

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Abstract:
The main purpose of this study was to give detailed information about the histological image aspect of the lower part of tracha and lungs in cobra geese which had received a little attention in the field of veterinary histology , fifteen males adult geese weighing 2-4 Kg were used. The goose were euthanized by the method of inhalation anesthesia, the tracha and lung tissue was taken and fixed in 10% formalin for 24-48 and then subjected to the routine histological procedure to produce slides which were stained by hematoxylin & eosin and masson trichrome stain and then examined by the light microscope.
The histological study revealed that the distal part of trachea of cobra gees that consists of four layers mucosa , lamina propria, submucosa and adventia , the first layer mucosa has ciliated psedostratified columnar cells and non-ciliated cells basal cells with highly numbers of inter epithelial mucous cells which aggregate as mucous glands in addtion the lung that consisted of secondary bronchus and para bronchus, secondary bronchus and air capillaries, secondary bronchus lined by stratified ciliated columnar cells, lamina propria containing connective tissue and muscularis layer inner wall of para bronchus had openings lead to cavities called atrium.
Key words:Lung,Ossefication and Trachea .

Introduction

Birds are considered as one of the most important nutritional sources, they constitute a high rate of human consumption specially poultry
(**Glatz, *et, al.*,2008).** Geese belong to Anatidae, were domesticated water fowl widespread in many countries like China, Australia and canada (**Fedde,1998; Suthers, 2004; Reece, 2005; and Nash, 2007**), and considered as one of the most important domestic birds characterized by high ability of tolerance, feed mainly on green grass, some grains, and seeds, are well adjusted to live on lands as well as living in ponds and swamps of villages and countryside. Geese become an important source of meat, livers, fats, feather and eggs, are could be bread in the farms with no much costs, and play role in agriculture (turning up the soil and eradication of the weeds, therefore geese were kept in the farms particularly in the farms of Al-cotton) (**Mahdi, 1982; Hatab, *et a1*., 1992; Gonzalez *et al*., 2009).**

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Respiratory system in birds has the principal function of exchanging oxygen and carbon dioxide between atmosphere and blood, It is also involved in temperature regulation and phonation, In addition, flying ability, a faster rate of metabolism, perfectly developed and efficient is mainly responsible for two important biological functions, very efficient and effective gas exchange (connected with thermoregulation) and the voice production, It has the common features of the respiratory system of mammals but it differs significantly in the anatomical arrangement of its parts **(Baker, 2001; Beckers *et al*., 2003; Bottino *et al*., 2006)**.

The respiratory tract is resemble to some rather with mammals, but there are different with trachea in birds will be complete tracheal ring **(Getty 1975).**and in the birds, the trachea locaited in the midline of ventral side to the esophagus and extend from laryngeal cricoid cartilage to the syringeal tympanum **(Lbe *et al*., 2008)**.

The respirtory consist of primary and secondary bronchi are made of a chain of C-shape cartilaginous rings held collectively by annular ligaments. The dimensions of these rings are variable in concerning bird species. The secondary bronchi originate from primary bronchi at dissimilar position with variable number, and named according to the parts of the lung and their supply. They are dividing into Parabronchi (tertiary bronchi), and freely anastomosis with each other. Tiny respiratory air capillaries form extensive networks that interconnecting the tertiary bronchi and permitting gas exchange. **Aspinall,*et al* (2005) Demirkan,*et al* (2006) - Lbe,*et al* (2008).**

Method:

One type of bird was taken in this study, which is the cobra gees. The birds collected from samawah city Market which taken fifteen adult healthy male from cobra geese were euthanized by the method of inhalation anesthesia . Birds were weighed before euthanasia , after that , it was dissected by fixing board .Then doing longitudinal incision through the neck and chest to study the organs of (lower trachea and lung).

For histological study, all the specimens were taken (trachea and lung) from each dissected birds were collected and fixed in 10% neutral buffered formalin. After well fixation the specimens were dehydrated by passing them through a series of ascending ethanol alcohol each for two hours (70%, 80%, 90% , 95% and 100%) and then specimens were cleared in xylene for one hour after that embedded in paraffin wax and then the blocks were sectioned at 6µm thickness and stained with either one of the following stains: Mayer's Haematoxylin and Eosin routine stain for general features identification and Masson trichrome stain for the staining of the collagenous and smooth muscle fibers (Bancroft and Stevens, 2010).

Result and Discussion

Trachea

Distal part of trachea of cobra gees Consists of four layers mucosa , lamina properia , sub mucosa and adventitia (Fig. 1).

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The first layer mucosa has ciliated pseudostratified columnar cells and non-ciliated cells basal cells with highly numbers of inter epithelial mucous cells which aggregate as mucous glands , all of these rested on basement membrane. this result matched with Bacha and Bacha, (2000); Yildizi (2005); Aughey and Frye,(2001);Auda (2007);AL-Ameli (2015) in birds generally. Our results are in agreement with Al-Badari and AlSalman, (2016) who explained that the trachea of laying hens at one year is lined with ciliated, pseudostratified columnar epithelium and the tracheal calcification of the lower part in this age are increasing than the upper part, while at six month ,the trachea appeared as unfilled hyaline cartilaginous tube without any calcification.

Cobra gees mucosal layer has numerous crypts lines with pseudostratified ciliated columnar cells with goblet cells and mucous glands. That agrees with Al-Ameli (2015)in black francolin, Al-Mussawy *et al*.(2012) in indigenous turkeys and Auda (2007)in quail. Lamina properia contain loos connective tissue with fibroblasts , blood vessels and collagen fibers. Beneath lamina properia was sub mucosa consisted of loose connective tissue (adipose tissue) and beneath these layers a hyaline cartilage was superior and inferior compressed a loose connective tissue between them included elastic fibers . The result also agreed with Waad ,(2015) in coot birds and guinea fowl ; AL-Ameli (2015) in black francolin ; Al-Mussawy *et al.,* (2012) in indigenous male turkeys ;Beytut ,(2007) in Japanese quail; Rajathi *et al.*, (2009) in quail ; Jafiar, (2017) in white eared bulbul ;Gazi, (2017) in European starling explained that trachea is consisted of loose connective tissue (adipose tissue) under lamina properia.

The ossified cartilage was surrounded by perichondrium the latter composed of two layers outer fibrous layer and inner cellular layer. And the last layer was adventitia that had loose connective tissue with blood vessels. , this finding matched with Gazi, (2017) in European starling and Khaksar *et al*.,(2012) in turkey .

Lung

Histological results of cobra gees lungs revealed that consisted of secondary bronchus and Para bronchus, secondary bronchus and air capillaries. a result which was in a line with that obtained in domestic fowl (Maina *et al*., 2010) and in the Aseel and Vanarajia (Dewangan, 2011).

Secondary bronchus lined by stratified ciliated columnar cells, lamina properia containing connective tissue and muscularis layer.

The results in this study achieved that the presence of Para bronchus lined by simple cuboidal epithelium followed with thin connective tissue and smooth muscle , inner wall of Para bronchus had openings lead to cavities called atrium , latter lined by simple cuboidal to squamous cells. Air capillaries lined with simple squamous cells opening into atria. a result was a line with that obtained in the wood pigeon (Alumeri *et al*., 2013), in the local Indian pigeon (Deshmukh *et al*., 2017) and in the Aseel and

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Vanarajia (Dewangan, 2011) as well as in different types of the birds (Pesek, 2000; Al-Mussawy, 2011; Mania, 2000, Demirkan *et al*., 2006; Schachner *et al*., 2009).

Conclusion

This study reveals the histological of the distal part of the tracha and lung in the cobra geese, such as the distinct wall and epithelial layer thickness that are differ from those in different birds, that could be useful for future studies that deal with different sciences, such as public health and industries of this bird.

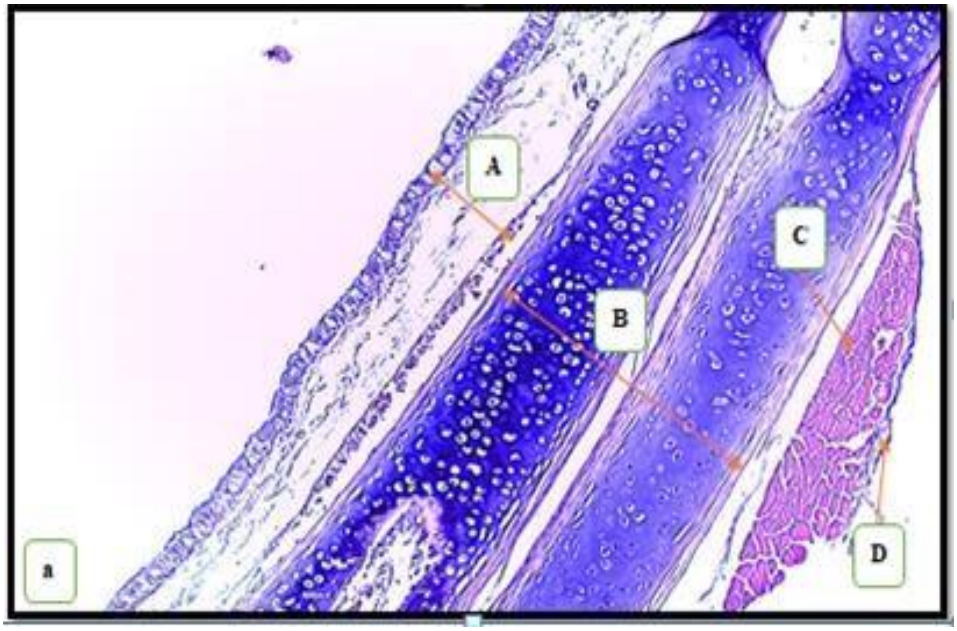

Fig.**1**. Cross section of the trachea in cobra show: **A**. Mucosa, **B**. Sub mucosa, **C**. Muscularis layer, **D**. Serosa,

X 100 H & E

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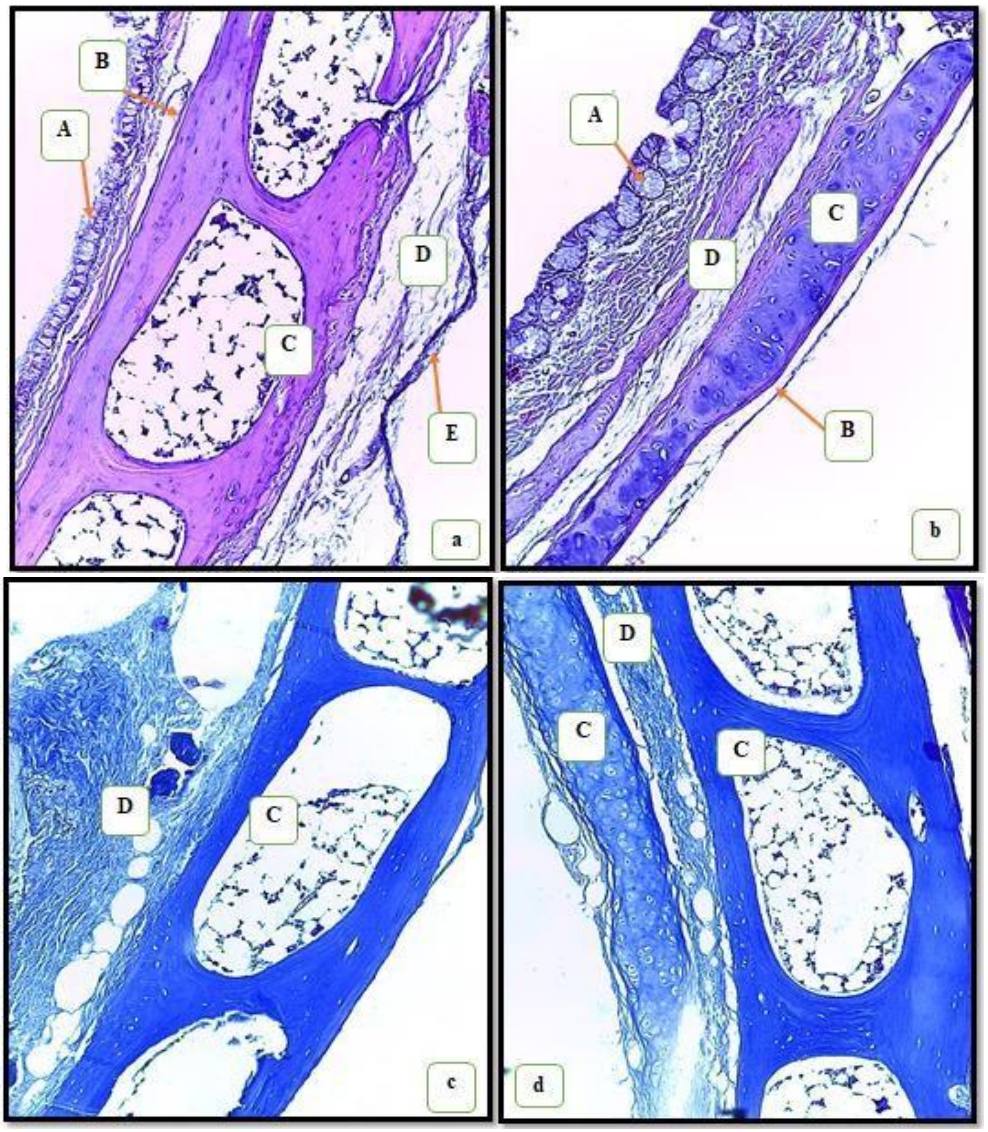

Fig.**2**. Cross section of the trachea in cobra show: **A**. Epithelium with goblet cells, **B**. Perichondrium, **C**. Hyaline cartilage, **D**. Connective tissue, **E**. Serosa.

(a,b) X 100 H & E and (c, d) X 100 Masson Trichrome stain

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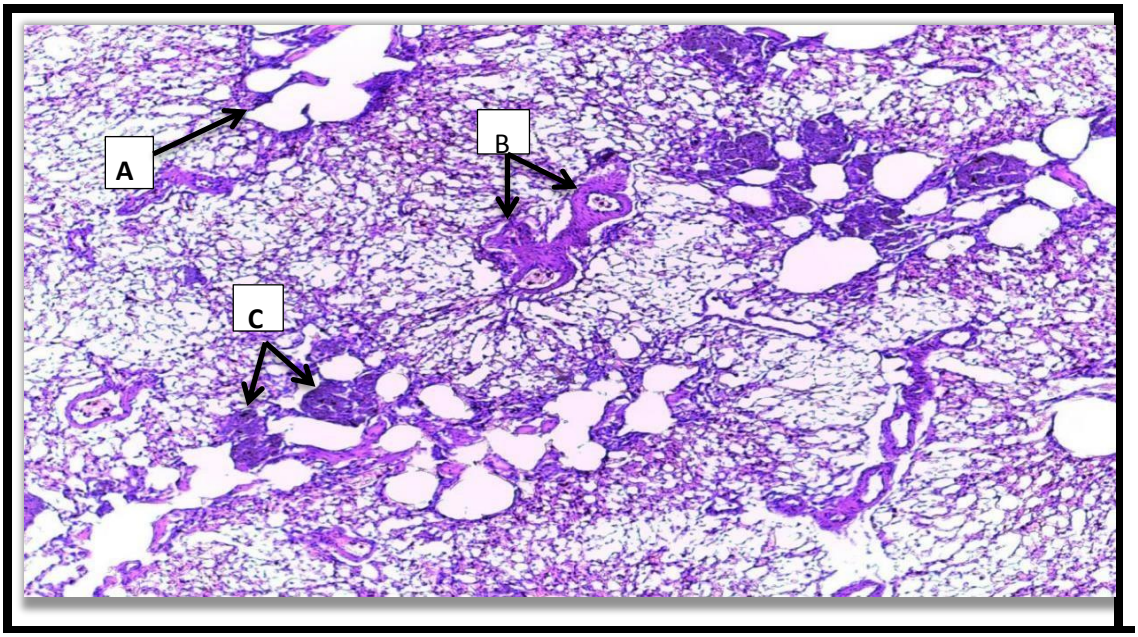

Fig.**3**. Cross section of the lung in cobra show: **A**. parabronchous ,**B**. Blood vessels ,**C**. smooth muscle ,
X100 H& E stain

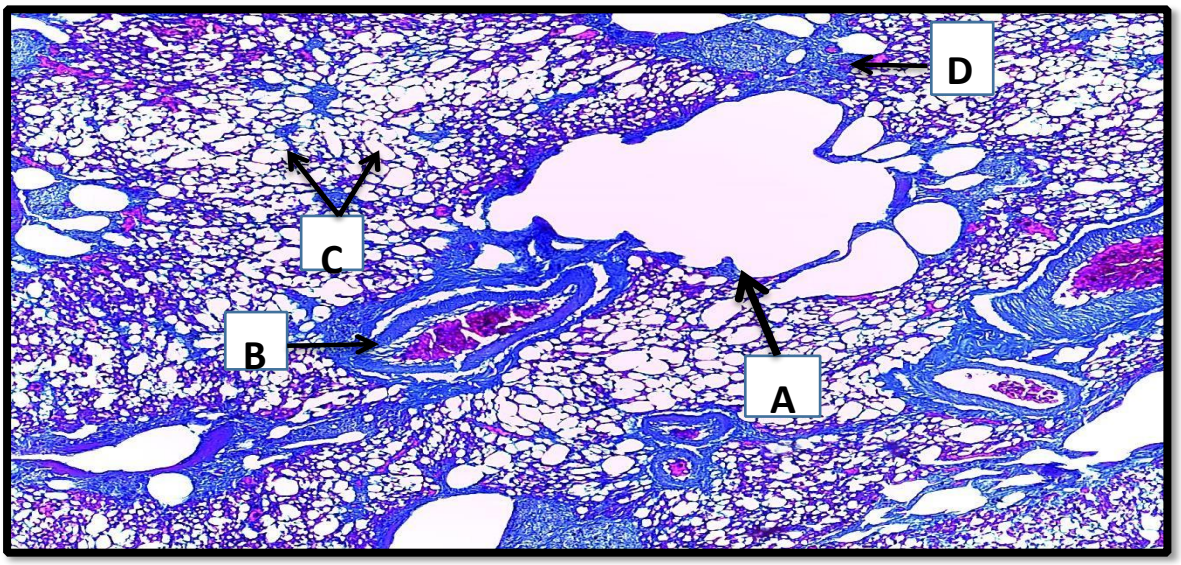

Fig.**9**. Cross section of the lung in cobra show: **A**.parabronchous,**B**.blood vessel,**C**.air capillares,**D**.smooth muscle

X100 masson traichrome stain

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