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RESEARCH ARTICLE

ANATOMICAL STUDY OF THE PRIMARY BRONCHI AND THE LUNG IN YELLOW-VENTED BULBUL (*PYCNONOTUS GOIAVIER*)

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Abstract

Macroscopic account of the primary bronchi and lung in the five birds of yellow-vented bulbul (*Pycnonotus goiavier*), the target organs recognized then the shape, position, dimensions of each specimen were recorded, the primary bronchi and lungs exist within the ribs cage, after syrinx the trachea divided in two primary bronchi which consist of cartilaginous rings as C-shape. Mean number of cartilaginous rings of left and right primary bronchi are (10.4 ± 0.39) and (10.6 ± 0.39) , and the mean length of the left and right primary bronchi were (0.34 ± 0.024) cm and (0.36 ± 0.024) cm. The lung appear small in size, pyramidal in shape, bright pink color and unlobed, its location craniodorsally from the body cavity and extend from the first to the fourth rib. Each lung have contained two borders, two extremities and two surface, the medial borders of left and right lung are thick and very close together, the lateral borders very thin and attach dorsally with ribs, the left and right proximal extremity are wide, while the two distal extremities are narrow and terminate closely from left and right kidney, the dorsal surface of both lungs was convex and contain shallow four grooves, while the ventral surface concave and contain hilus. The mean total width, length and thickness of left lung are (0.82 ± 0.037) cm, (1.16 ± 0.067) cm and (0.26 ± 0.026) cm, and the mean total width, length and thickness of right lung are (0.82 ± 0.041) cm, (1.1 ± 0.062) cm and (0.26 ± 0.024) cm.

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INTRODUCTION

Yellow-vented Bulbuls are medium-sized songbirds. Some are colourful yellow, red or orange vents. There are 130 species worldwide and 3 species which occur in Iraq (1). The respiratory system plays a vital role in thermo-regulation, sense of smell, and produced of voice are associated with it (2;3 and 4). In birds the trachea bifurcation at syrinx to the right and left extapulmonary bronchi, both enter the target lungs via the hilus at septal surface as an intrapulmonary primary bronchus (5; 6; 7; 8 and 9). In avian the lungs is specialized organ and differ from other organs by extension during the mechanisms of ventilation (10). The lung was firmly attachment to the ribs that leaves deep costal impressions (11 and 12). The avian lungs lie in the craniodorsal part of the thorax extend from second rib cranially to the sixth rib caudally and very adhere to the ribs (13 ;14 ;15 and 16)

MATERIAL AND METHODS:

Five adult birds of yellow-vented Bulbul are collected from Al-Hilla city markets. The birds was deeply anesthetized by interamuscular administration of combination consist of diazepam (1mg/Kg) and Ketamine HCL(30mg/Kg) (17), after that open the chest to make bleeding by puncture of the heart to get full hemorrhage, then wash the specimen with tap water to remove from the blood and impurities, then record the specification of the primary bronchi and lungs and the primary bronchi separated to record macroscopic measuring.

1-Calculate the number of cartilage rings in the primary bronchi.

2-Measure the length of primary bronchi from bifurcation of the trachea into the lung hilus.

3-Measure width, length and thicker area of the left and the right lungs.
The instruments used in this study such as vernier, and amplifier lens (X6 and X12).

RESULTS

The primary bronchi and the lung of yellow-vented Bulbul lie exist within the rib cage , after formed syrinx the trachea was divided into two primary bronchi (left and right) (figure:1,2) . The primary bronchi consisted of short tube extend caudally from the syrinx to enter the proximal third of the visceral surface of the lungs through the hilus (figure:2,3),and note that the heart covers the distal part of the ventral side of the primary bronchi , the esophagus pass through the dorsal surface of the syrinx to the medial surface of the left and right primary bromchi (figure:2) .The structure units of bronchi as C-shaped cartilaginous rings ,the opened side located medially (figure:3,4) .The mean number of cartilaginous rings of left and right primary bronchi are (10.4 ± 0.39) and (10.6 ± 0.39) ,and the mean length of the left and right primary bronchi were (0.34 ± 0.024) cm) and (0.36 ± 0.024) cm).

The left and the right lung was surrounded by a thin colorless membrane ,the lung appear small in size , pyramidal in shape, bright pink color and unlobed ,its location craniodorsally from the body cavity and extend from the first to the fourth ribs (figure:1) . Each lung have contained two borders (medial and lateral) ,two extremities (proximal and distal) and two surface (dorsal and ventral) ,the medial borders of left and right lung are thick and very close together and cover vertebral column, the lateral borders very thin and attach dorsally with ribs .The left and right proximal extremity are wide and extend cranially while the two distal extremities are narrow and terminate closely from left and right kidney .The dorsal or costal surface of both lungs was convex and contain shallow four grooves represent the impressions of ribs ,while the ventral or the visceral surface concave and contain hilus on the proximal third . The mean total width , length and thickness of left lung are (0.82 ± 0.037) cm) , (1.16 ± 0.067) cm) and (0.26 ± 0.026) cm) , and the mean total width ,length and thickness of right lung are (0.82 ± 0.041) cm) , (1.1 ± 0.062) cm) and (0.26 ± 0.024) cm) .

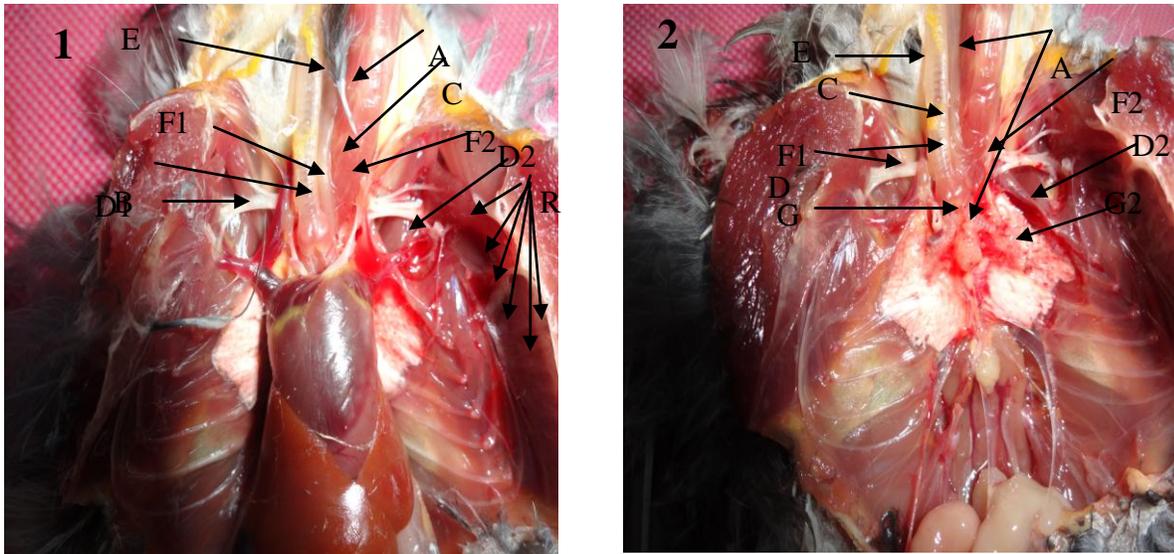
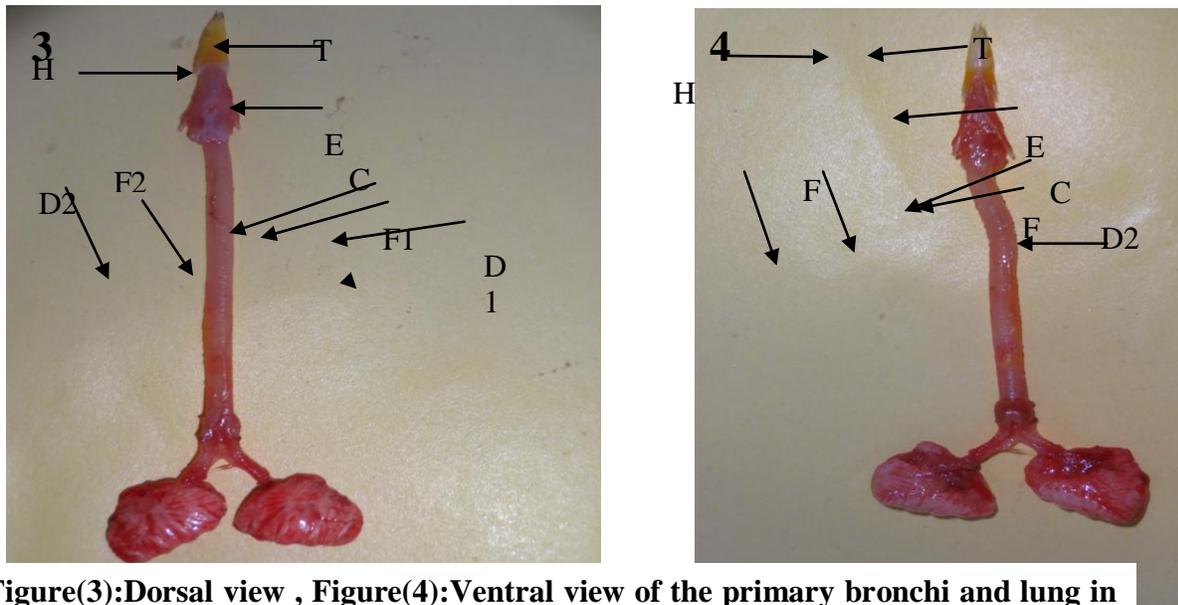


Figure (1 and 2): Explain ventral view of thoracic cavity of the yellow-vented Bulbul :
(A) Esophagus ,(B)Heart , (C)Syrinx , (D1)Right lung , (D2)Left lung, (E)Trachea,
(F1)Right primary bronchus, (F2)Left primary bronchus, (G1)Right kidney, (G2)Left
kidney, (R)Ribs.



Figure(3):Dorsal view , Figure(4):Ventral view of the primary bronchi and lung in yellow-vented Bulbul :(T)Tongue , (H)Larynx , (E)Trachea, (C)Syrinx ,(F1)Right primary bronchus, (F2)Left primary bronchus ,(D1)Right lung ,(D2)Left lung.

DSCUSSION

In this study the primary bronchi and the lung of yellow-vented Bulbul lie exist within the rib cage, the trachea was divided into two primary bronchi (left and right) as short tube extend caudally from the syrinx to enter the proximal third of the visceral surface of the lungs through the hilus similar with (18 and 19) in the Bee-eater and *Columba palumbus* pigeon.

The heart of yellow-vented Bulbul covers the distal part of the ventral side of the primary bronchi ,the structure units of bronchi as C-shaped cartilaginous rings ,the opened side located medially these consequences in agreement with (18;22and23).

The mean length of left and right primary bronchi approximately equal which disagree with(18;19 and 20) who mentioned that in Bee-eater the length (1.025 ± 0.15 cm) and (1.075 ± 0.14 cm) while the length of left and right bronchi in *Columba palumbus* are (0.7 ± 0.1 cm) and (0.65 ± 0.05 cm) ,and in turkey the length of left and right primary bronchi are (4cm) and (5cm),and the number of cartilaginous rings in the left and right primary bronchi are equal which disagree with (18) who mentioned that in Bee-eater the number of cartilaginous rings are (18.5 ± 0.50) and(18.5 ± 1.5) this due to differences in species of birds.

The left and the right lung was surrounded by a thin colorless membrane and appear small in size , pyramid in shape ,bright pink in color and unlobed these results agreement with (18 and 19), but disagreement with (4) who see the lung appeared as flattened rectangular structure , elongated parallelogram and trapezium-shaped in chicken , turkey and duck respectively

The lungs in yellow-vented Bulbul extend from first to the fourth ribs ,disagree with (18 ; 19 and 21) who talk about the lung in Bee-eater ,*columba palumbus* and *Columba domestica* pigeon extend from first to the sixth ribs.

The lung contain two surface ,two extremities and this agree with (19) in *Columba palumbus* pigeon ,but results are disagreement with (3 and 21) who see the lungs characterized by three surfaces (costal, vertebral and septal) in duck ,turkey and *Columba domestica* pigeon .

The medial borders of left and right lung in this study are thick and the lateral borders very thin and attach dorsally with ribs ,these consequences in agreement with (18) in Bee-eater bird

The left and right proximal extremity are wide and extend cranially that's agree with (18) in Bee-eater bird and disagreement with (19) how mentioned that the proximal extremity narrow in *Columba palumbus* pigeon.

The distal extremities are narrow and terminate closely from left and right kidney. These consequences differ with (19) how observed the distal part was wide and contact with left kidney while distal part of right lung was very contact with right kidney and formed impression because the right kidney was introduced than left kidney. The measurement of the lungs in yellow-vented Bulbul is disagreement with (18;19 and 21), in Bee-eater the mean width, length and thickness of the left lung was $(0.9 \pm 0.14 \text{ cm})$, $(1.6 \pm 0.15 \text{ cm})$ and $(0.36 \pm 0.02 \text{ cm})$ and the mean width, length and thickness of right lung was $(0.95 \pm 0.15 \text{ cm})$, $(1.77 \pm 0.17 \text{ cm})$ and $(0.4 \pm 0.1 \text{ cm})$ while in *Columba palumbus* pigeon show the average width and length of the left lung was $(2.7 \pm 0.7 \text{ cm})$ and $(2.75 \pm 0.05 \text{ cm})$ while the average width and length of right lung was $(2.45 \pm 0.65 \text{ cm})$ and $(2.8 \pm 0 \text{ cm})$, in *Columba domestica* pigeon the mean length of left and right lung was $(3.1 \pm 0.66 \text{ cm})$ and $(3.1 \pm 0.66 \text{ cm})$, the differences in results due to variations of species of birds

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