ANATOMICAL STUDY OF THE PRIMARY BRONCHI AND THE LUNG OF THE BEE-EATER BIRD *(MEROPS ORIENTALIS)*

Nabeel Abd Murad Al-Mamoori

College of Veterinary Medicine, AL- Qadissiya University, Iraq.

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ABSTRACT

The present study has been out to examine macroscopic structure of the primary bronchi and lung in Bee-eaters bird *(Merops orientalis)* observed exist within the rib cage, the distal part of the trachea are divided into two primary bronchi (left and right) and the macroscopic appearance of the primary bronchi consists of a short tube extend caudally from syrinx to enter the proximal third of the visceral surface of the lungs through the hilus. The basic unit consisting of the primary bronchi are cartilaginous rings which takes - C - shape. The mean total length of left and right primary bronchi are (1.025 ± 0.15 cm) and (1.075 ± 0.14 cm); and the number of cartilaginous rings in left and right primary bronchi are (18.5 ± 0.50) and (18.5 ± 1.50). The lungs are small, pyramidal-shaped, unlobed, bright pink color, and surrounded by thin colorless membrane the pleura and the air sacs. The lung contains two surfaces (dorsal and ventral), two borders (medial and lateral) and two extremities (proximal and distal). The mean total length, width and thickness of the right lung are (1.77 ± 0.17 cm), (0.95 ± 0.15 cm) and (0.4 ± 0.10 cm) while the mean total length, width and thickness of the left lung are (1.6 ± 0.15 cm), (0.9 ± 0.14 cm) and (0.37 ± 0.02 cm).

INTRODUCTION

The bee-eater bird (*Merops orientalis*) is a migratory bird common. It is well known to beekeepers as a predator of bees. It has a number of habits that make it useful in locating bees, and use of bee-eater birds in monitoring for the Asian honey bee (1 and 2). The respiratory system of birds differ from mammals due to specific structures includes nasal cavity, larynx, trachea, syrinx, bronchi, lungs and sacs (3; 4 and 5), while in mammals the respiratory system includes nostrils, nasal cavity, larynx, trachea, bronchi, lungs and absence of syrinx and sacs (6). The respiratory system plays a vital role in thermo-regulation, the sense of smell, and produced of voice are associated with it (7; 8 and 9). In birds the trachea bifurcation at the syrinx into the right and left primary bronchi, both enter the target lungs via the hilus at septal surface as an primary bronchus (10; 11; 12**;** 13 and 14).

In avian the lungs is specialized organ and differ from other organs by extension during the mechanisms of ventilation (15). The lung was firmly attachment to the ribs

that leaves deep costal impressions. (16 and 17). The lung of birds are unlobuled and deeply imprinted by the thoracic vertebra the primary bronchus pass through the lung and its caudal border continuous with the abdominal air sac (18; 19 and 20).

The aim of this study was design to providing anatomical continued features Bee-eater bird (*Merops orientalis*).

MATERIALS AND METHODS

The experimental animal of the present study include five adult Bee-eater bird (*Merops orientalis*) were collected from the places of beekeeping of Al-Diwanyia city, After catching the bird by fishing machine the bird was died thus directly open the chest and wash the specimen with tap water to remove from the blood and impurities that may be present during the process of open the chest and then record the specifications of the primary bronchi and lungs and its relationship with the neighboring organs. Finally the lungs and the primary bronchi separated to record macroscopic measuring.

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

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

3- Measure the length, width and the thicker area of the left and the right lungs.

In this study used some instruments such as (vernier, and amplifier lens (X6 and X12)).

RESULTS

In the present study the primary bronchi and the lung of Bee-eaters bird lie exist within the rib cage, it was note that the distal part of the trachea after formed syrinx was divided into two primary bronchi (left and right) (Figure: 1, 2). The result showed that of the primary bronchi consists of a short tube extend caudally from syrinx to enter the proximal third of the visceral surface of the lungs through the hilus (Figure: 1, 2). That the lateral border of the primary bronchi be facing descending, ascending aorta and interior, inferior vena cava, and note that the heart covers the distal part of the ventral side of the primary bronchi (Figure: 1), either from the dorsal side has facing the esophagus. The structure unit consisting of the primary bronchi are cartilaginous rings which takes - C - shape, which will be open from the medial side and connected with each other by annular ligaments. The mean total length of left and right primary bronchi were (1.025 ± 0.15 cm) and (1.075 ± 0.14 cm); and the number of cartilaginous rings in left and right primary bronchi are (18.5 ± 0.50) and (18.5 ± 1.50).

The lung was small, pyramidal-shaped, unlobed, bright pink color, and surrounded by a thin colorless membrane the pleura and the air sacs. They are confined to the craniodorsal part of the body cavity, lying facing and deeply indented by the thoracic vertebrae and ribs between first and sixth ribs(Figure: 1) . The lung have contained two surfaces, two borders and two extremities. The dorsal (Costal) surface is convex and seen in this surface five deep grooves derivation embedded, while the ventral (Visceral) surface concave contain the hilus on the proximal third .The proximal extremity is wide and extend cranially while the distal extremity is narrow, extend caudally and attached with kidney in the right lung is very contact with right kidney and formed impression because the right kidney is introduced than left kidney while the distal extremity of the left lung observed contact with left kidney(Figure: 1). The medial border thick and based on muscles of vertebral column, while the lateral border is thin and facing ribs dorsally and viscera ventrally. The mean total length, width and thickness of the right lung are (1.77 ± 0.17 cm), (0.95 ± 0.15 cm) and (0.4 ± 0.10 cm) while the mean total length, width and thickness of the left lung are (1.6 ± 0.15 cm), (0.9 ± 0.14 cm) and (0.37 ± 0.02 cm).

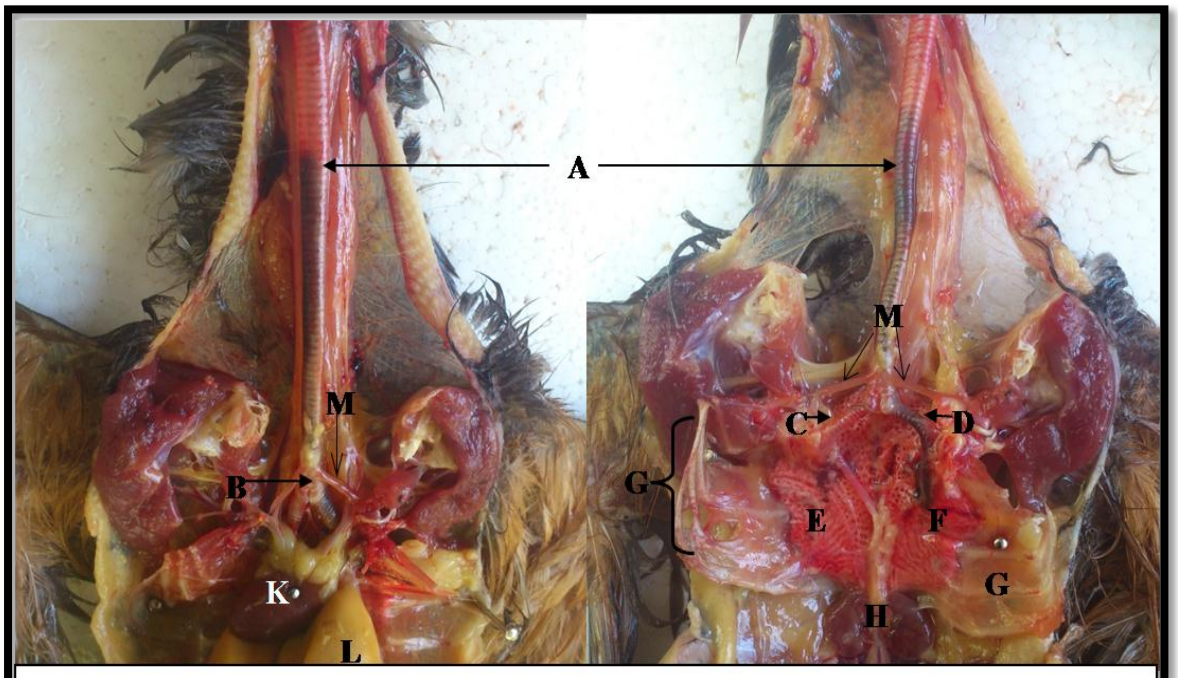

Figure (1) : Explain the primary bronchi and lung in Bee-eaters bird:-

A- Trachea. B- Syrinx. C- Right primary bronchus. D- Left primary bronchus. E- Right lung. F- Left lung. G- Ribs. H- Kidney (Right and Left). K- Heart. L- Liver. M- Trachealis muscle.

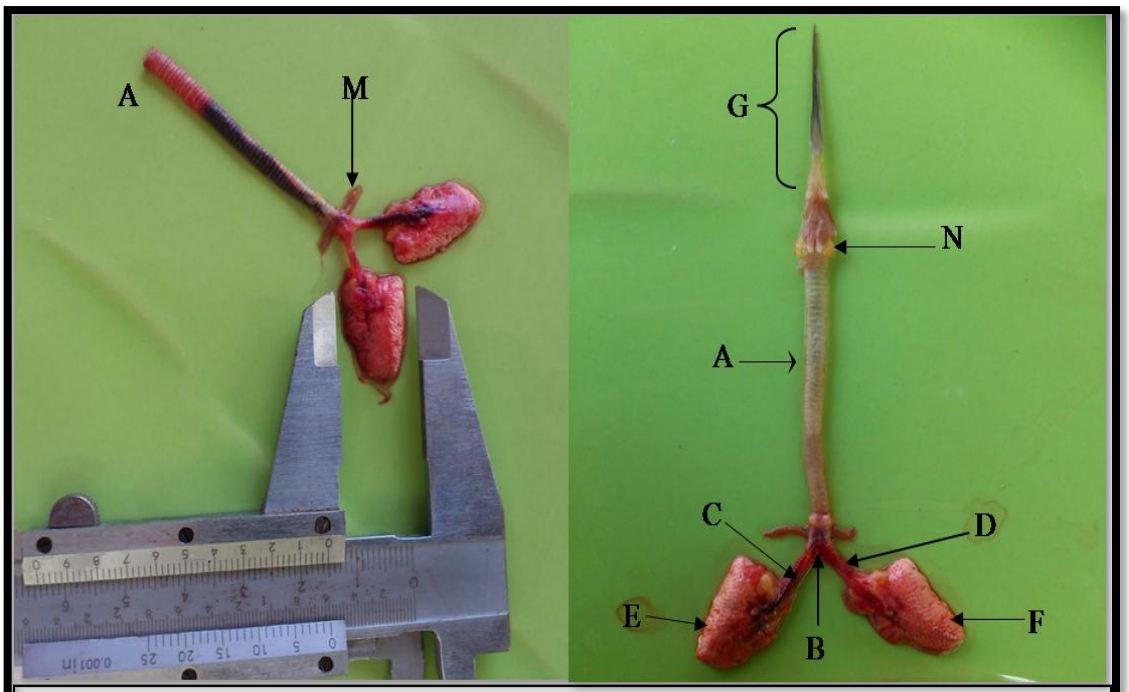

Figure (2) : Explain ventral view the primary bronchi and lung in Bee-eaters bird:-

A- Trachea. B- Syrinx. C- Right primary bronchus. D- Left primary bronchus. E- Right lung. F- Left lung. G- Tongue. M- Trachealis muscle. N- Larynx.

DISCUSSION

The current study has focused on anatomical specification of the primary bronchi and lungs of adult Bee-eaters bird. The primary bronchi in this study similar to almost anatomical description such as shape, unity structural and position with (21) in the *Columba palumbus* pigeon.

The mean length of the right and left primary bronchi of Bee-eaters is approximately equal which disagree with (14 and 21) who mentioned that in Turkey the right and left bronchi are (5cm) and (4cm), while in the *Columba palumbus* pigeon the right and left bronchi are (0.65 ± 0.05 cm) and (0.7 ± 0.1 cm) and right bronchi is this difference due to species bird.

The Lungs in Bee-eaters appear relatively small, unlobed, pyramidal-shaped, bright pink color this agreement with (21), but these results disagreement with (9) who see the lung appeared as flattened rectangular structure, elongated parallelogram, and trapezium-shaped in chicken, turkey, and duck respectively.

In this study the lungs extend from the first to the sixth ribs firmly attachment with it, agree with (11 and 21) refer to the lung in *Columba domestica* and *Columba palumbus* pigeons extend from first to sixth ribs, and it contain two surface (dorsal

and ventral) and two extremities (distal and proximal) and this agree with (21) in *Columba palumbus* pigeon but differ from other birds like duck, turkey and *Columba domestica* pigeon characterized by present three surfaces (costal, vertebral, and septal) (8 and 11).

The measurement of the lung in Bee-eaters bird is disagreement with (11 and 21), in *Columba domestica* pigeon the length of right and left lungs was (3.1± 0.66cm) and width of right and left lungs was (3.1± 0.66cm), while show the length and width of the right lung in *Columba palumbus* pigeon are (2.8 ± 0 cm) and (2.45 ± 0.65 cm) while the length and width of the left lung are (2.75 ± 0.05 cm) and (2.7 ± 0.7 cm) observe the differences in the type one as in the pigeons, these variations due to species of bird.

دراسة تشريحية للقصبات الأولية والرئتين في طائر الوروار(*Merops orientalis*)

نبيل عبد مراد المعموري

كلية الطب البيطري، جامعة القادسية، القادسية ، العراق .

الخلاصة:

إن القصبات الأولية والرئتين في طائر الوروار (أكل النحل) تتواجد داخل القفص الصدري، وان الجزء القاصي من الرغامي ينقسم إلى قصبتين أوليين هما الأيسر والأيمن تتكون للقصبات الأولية من أنبوب قصير يمتد خلفيا من عضو التغريد (المصفار) إلى إن يدخل الثلث الداني من السطح ألحشوي للرئتين من خلال السرة. إن الوحدة البنائية الأساسية المكونة للقصبات الأولية هي الحلقات الغضروفية التي تأخذ شكل حرف -C- . أن متوسط طول القصبة الأولية اليسرى واليمنى كان (1,025 ± 0,15 سم) و (1,075± 0,14 سم)، وعدد الحلقات الغضروفية في القصبة الأولية اليسرى واليمنى كان (18,5 ±0,50) و (18,5 ± 1,50). تكون الرئتين صغيرة الحجم وهرمية الشكل و غير مفصصة و ذات لون وردي لامع ومحاطة بغشاء الجنبة الرقيق عديم اللون والأكياس الهوائية. تتكون الرئتين من سطحين (ظهري وبطني) وحافتين (إنسية و وحشية) ونهايتين (دانية وقاصية). إن متوسط طول وعرض وسمك الرئتين اليمنى هو (1,77±0,17 سم)، (0,95±0,15 سم) و (0,4± 0,10 سم) بينما كان متوسط طول وعرض وسمك الرئتين اليسرى هو (1,6±0,15 سم) ، (0,9 ± 0,14 سم) و (0,37± 0,02 سم).

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