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دراسات مورفولوجية على مرئ الجمل أثناء فترات نموه

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أجريت بعض الدراسات المورفولوجية على مرئ الجمل أثناء فترة ماقبل الولادة ومابعدها ، وقد أستعمل لهذه الدراسة ٢٢ عينه أخذت من الجمل وحيد السنم في مراحل النمو المختلفه وقد لوحظ أن وضع المرئ للجمل لا يتغير خلال مختلف مراحل النمو حيث يقع الثلث العلوى للمرئ العنقي على الحنجره وعلى القصبه الهوائيه. بينما يقع الثلث الأوسط من المرئ العنقي على السطح العلوى الجانبي من القصبة الهوائية من ناحية اليسار ويقع الثلث السفلي على الجانب الأيسر من القصبه الهوائية بينما يقع المرئ على السطح العلوى للقصبه الهوائيه ، وقد لوحظ زيادة طول وقطر وسمك جدار المرئ مع زيادة العمر حيث يصل الطول في الجمل البالغ ١٧٥ سم والقطر حوالي ٢١ سم ، وينقسم المرئ في الجمل الى جزء يمثل الاتصال البلعومي المرئ وجزء عنقي وجزء صدرى ، بينما الجزء البطني غير موجود ، ويبلغ الجزء العنقي في الطول ضعف طول الجزء الصدرى تقريبا .

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SOME MORPHOLOGICAL STUDIES ON THE ESOPHAGUS OF THE CAMEL DURING ITS ONTOGENETIC PERIODS

(With 2 Tables & 4 Figures)

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SUMMARY

Twenty two dromedary camels in different stages of development were used. The studies showed, unchanging in the position of the esophagus during all the developmental stages. At the pharyngoesophegeal junction it lies dorsal to the larynx, at the thoracic inlet on the left side of the trachea and its thoracic part lies dorsal to the tranchea. The length, diameter and thickness of its wall increase with the age. The length of the esophagus in adult camel is about 175 cm, and the diameter is about 2.1 cm. In adult camel the cervical part is nearly equal two times the thoracic part in its length but at the same time the thoracic part has a thicker wall and narrower diamerter than the cervical part.

INTRODUCTION

These anatomical studies on the camel's esophagus may be an attempt to give some informations on the esophagus of a long-necked mammal. The length and diameter of the individual parts of the esophagus of the camel are importent for the internal medicine and surgery.

MATERIAL and METHODS

Ninteen camel fetuses with CVRL of 20-100 cm, a young camel of 1.5 years of age, and two adult camels 5 and 6 years of age were used for the anatomical studies. The material was collected from the Cairo abattoir and after measuring their CVRL by flexible cloth topet the fetuses were immediately injected with 10% formaline intrathoracically and put, together with esophagi of the young and adult camels into 10% formaline. Here they were kept till the time of dissection. The postion, relation and the course of the esophagus were studied by performing lateral, ventral dissection and cross sections. All the measurements of the esophagus were taken from fixed specimens.

RESULTS

The measurments include the length of the esophagus and also the length of its cervical and thoracic parts are shown in Table (1). Furthemore the diameter was taken at the level of the 4th cervical verterbra, at the thoracic inlet, at the base of the heart and the level cranial to the esophagualhiatus and shown in Table (2).

Regarding the position of the esophagus, there are practical no changes during the early and late phases of each pre and postnatal periods. In all developmenal stages, the inital part of the esophagus is found over the larynx then after that the trachea and continued in this course caudally to the level of the 5th cervical vertebra, where the esophagus is found dorsolaterl to the trachea (Fig. 1 & 2). And lastly towards thethoracic inlet, we found it completlly shifted to the left of the median plan and the trachea(Fig. 3). Within the thoracic mediastinum its thoracic part (Fig. 4) passes dorsally and forming by this course a curvature, the convixity of which is directed dorsally, then the esophagus curves ventrally and caudally to reach the the Hiats esophagus at the level of 10th thoracic vertabra.

The esophagus in the cranial third of the neck is related dorsally to the retropharygeal space and longus colli muscle and laterally to the carotic vagina and the thymus. In the middle third of the neck it is related dorsally to the retropharyngeal space and longus colli muscle, laterally to the carotic vagina and thymus ventro-laterally to the trachea (Fig. 1-2).

At the thoracic inlet the esophagus is dorsally related to the left longus colli muscle; medially to the trachea, laterally to the left carotic vagina and ventrally to the thymus.

The thoracic part of the esophagus coursing in the mediastinum, and pases dorsally over the base of the heart and the bifurcation of the trachea, forming the thoracic curvature which is convex it crosses the right faceof the aortic arch then passes straight back in the caudal mediastinum, ventral to the aortic, and accompnied by the dorsal and ventral esophageal vagal nerve trunks and is related dorsally to the caudal mediastinal lymph nodes.

The abdominal part of the esophagus is absent in the camel fetus and adult camel.

The present study reveals the esophagus of the camel has three curvatures. Thefirst one is the ephalo-cervical curvature, which is slightly dorsally convex, the second one is the cervicothoracic curvature, which extends form the 6th cervical vertebra to the 2nd thoracic vertebra, it is concave dorsally. The third one is at the base of the heart (Thoracic curvature) and is dorsally convex.

DISSCUSSION

The present study gives us a comprehensive survey and also some idea on the morphology of the esophagus in the camel embryologically and gross anatomically, it can be confirmed that also the growth of the esophagus follows the known principales of development. With increasing age, the esophaguous increasing in length, (Table 1). This is importance for the applied anatomy, because we can conclude from this the length of the stomach tube to be applied by the practitioners for the treatment of the gastro-intestinal disorders in young and adult camel.

There is lack of comparble measurments in the available literature, but individual data were given by LESBRE (1903). He described the absolute length of the esophagus of the twohumped camel (Camelus bactrianus) as to be 200 cm while the present result was 175 cm. In comparison to the buffalo, one can observed the esophagus of the camel as nearly two times the esophagus of the buffalo in length. The length of the esophagus in the Egytion water buffalo equal 96 cm (ENANY, 1980), in indian buffalo 98.72 $\pm$ 0.92 cm (SENGER and SINGH, 1971) and in ox 90-10% cm (HABEL, 1975).

The present result revealed that (Table 1) the relation between thecervical part to the thoracic part in all developmental stages nearly takes ratio of 2:1.

Concerning the diameter of the esophagus, (Table 2) over the larynx proved to be the widest part of the esophagus during the pre and postnatal development (1.2 mm in theCVRL 22 cm stage to 28.34 mm in the adult camel) after this the esophagus narrowes in diameter gradully in caudal direction. These data may be benificial for the guesing of the diameter of instrument being applied in the esophagus by clinicians. The diameter of the adult camel's esophagus has nearly the same results in Egyptian water buffalo in which it is about 20.4-28.3 (ENANY 1980).

In agreement with OMAR (1980) the esophagus is complety found on the left side of the trachea at the thoracic inlet.

However HEGAZI (1945) reported that the esophagus becomes completely on the side of the trachea at the junction of the upper and middle thirds of the neck.

The course and the relation of the esophagus in the thoracic part resemble those of the other ruminants (WLLKENS and ROSENBERGR, 1957, RAGHVAN and KACHROO, 1964, KOCH, 1970, DYCE and WENSING, 1971, HABEL, 1975, FUKAYA, et al. 1979, ENANY, 1980).

The abdominal part of the esophagus is absent in the camel fetus and camel. Similar resultes recorded in the late prenatal and postnatal periods of the bovine esophagus (MULLERB OTHA, 1962, HABEL, 1975, and ENANY' 1980).

The esophagus of camel has cephalocervical, cervicothoracic and thoracic curvatures as in other Ruminants (NICKEL et al. 1973, and ENANY, 1980).

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TABLE (1)

Length of the esophagus and its individual parts

	CVRL/ year	Total length	Cervical part	Thoracic part
Camel fetus	22 cm	12 cm	7.0 cm	5.0 cm
" "	30 cm	15 cm	9.0 cm	6.0 cm
" "	40 cm	23 cm	14.5 cm	8.5 cm
" "	55 cm	26 cm	16.6 cm	9.4 cm
" "	62 cm	33 cm	21.2 cm	11.8 cm
" "	70 cm	36 cm	22.5 cm	13.5 cm
" "	80 cm	41 cm	23.6 cm	17.4 cm
" "	100 cm	52 cm	32.3 cm	19.7 cm
young camel	1.5 year	127 cm	83.5 cm	93.5 cm
adult "	5 year	155 cm	99.5 cm	55.5 cm
" "	6 year	175 cm	115.0 cm	60.0 cm

TABLE (2)

Diameter of the esophagus in its individual portions

(Completely isolated, relaxed and not extended esophagus)

	CVRL/ years	Over the larynx	At the middle of the neck	At the thoracic inlet	Over the base of the heart	Just cranial to the Hiatus esophageus
Camel fetus	22 cm	1.20 cm	0.64 mm	0.48 mm	0.48 mm	0.48 mm
" "	30 cm	2.20 mm	1.60 mm	0.95 mm	0.95 mm	0.95 mm
" "	40 cm	3.18 mm	2.20 mm	1.60 mm	1.60 mm	1.60 mm
" "	55 cm	4.14 mm	2.80 mm	2.20 mm	2.20 mm	2.20 mm
" "	62 cm	5.09 mm	3.50 mm	2.80 mm	2.70 mm	2.80 mm
" "	70 cm	5.70 mm	3.82 mm	3.18 mm	2.80 mm	3.18 mm
" "	80 cm	7.30 mm	4.70 mm	4.14 mm	3.82 mm	3.82 mm
" "	100 cm	9.23 mm	7.00 mm	6.36 mm	5.70 mm	6.05 mm
young camel	1.5 year	20.70 mm	16.87 mm	13.37 mm	13.37 mm	13.69 mm
adult "	5 years	26.40 mm	19.30 mm	15.65 mm	15.30 mm	15.42 mm
" "	6 years	28.34 mm	22.60 mm	20.70 mm	20.38 mm	21.00 mm

LEGENDS

Fig. (1): Cross-section of the level of the3rd cervical vertebra. Diagramatic, Cranial view. CVRL 80 cm.
a- Cutis, b- superficial cervical fascia.
c- Funiculus ruchae, d- M. complexus,
e- M. nultifidus cervicis, f- M. longissinus cervicis,
g- M. longissinus attantis,
h and i- MM. intertransversarü, j- M. omohyoideus,
k- M. sternomastoideus, l- M. longus colli, m- M. sternothyroideus,
n- M. sternohyoideus.
1- Truncus vago sympatheticus. 2- A. carotis communis. 3- V.jugularis externa.
4- Esophagus. 5- Recurrent laryngeal nerve. 6- Trachea 7- Thymus.
8- extension of the retropharyngeal space. 9- Body of the 3rd cervical ventebra.
10- Spinal cord. 11- V. jugularis interna.

Fig. (2): Cross-section at the level of 5th cervical vertebra, Diagramatic, crarial view.
a- Skin, b- Superficial cervical fascia. c- Funiculus nuchae. d- Lamina nuchae, e- M.complexus, f- M. multifidus cervicis, 9- M. longissimus cervicis, h- M. Serratus ventralis cervicis, i- M. scalenus dersalis, j- Mm intertransversus, k- M. longus colli. l- M. sternomastoideus, m- M. sternothyrohyoideus.
1- T. vagosympathicus. 2- A. carotis communis. 3- V. jugularis externa.
4- esophagus. 5- recurrent laryngeal n. 6- Trachea. 7- Thymus.
8- body of the vertebra. 9- spinal cord. 10- V. jugularis interna.

Fig. (3): Gross-section at the level of the Thoracic inlet, diagramatic cranial view.
a- cutis, b- Superlicial cervical fascia, c- Funiculus nuchae, d- lamina nuchae, e- M. Trapezius, f- M. serratus ventralis cervicis. h- M. multifidus, i- M.mastoido humeralis, j- M. longissimus cervicis. k- M. scalenus, l- Mm. intertransversarii, m- M. longus coll, n- M. sternothyrohyoideus, o- M. sterno ;astoideus.
1- T. vagosy;pathicus. 2- A. Carotis communis. 3- V. jugulavis externa.
4- esophagus.
5- Recurrent largngeal n. 6- Trachea. 7- Thymus.
8- spinal cord. 9- V. jugularis intena.

Fig. (4): Cross-section at the level of the 5th rib. Diagramatic, cranial view CVRL 80 cm.
a- Cutis, b- Fuscia Trunci superficialis, c- M. Trapezius,
d- M. supraspinatus, e- M. infraspinatus, f- Scapula, 9- M. serratus ventralis Thoracis, h- Funiculus nuchae, i- Lamina nuchae, j- M. complexus,
K-M. multifidus, 1- 5th rib, m- Mm intercostalis, n- m. latissimus dorsi,
o- M. pectoralis transversus, p- M. Transversus thoracis.
1- Aorta thoracica. 2- esophagus. 3- Root of the lung. 4- lung. 5- heart.
6- pleura parietalis. 7- spinal cord. 8- sternum. 9- Dorsal branch of the vagus. 10- Ventral branch of the vagus.

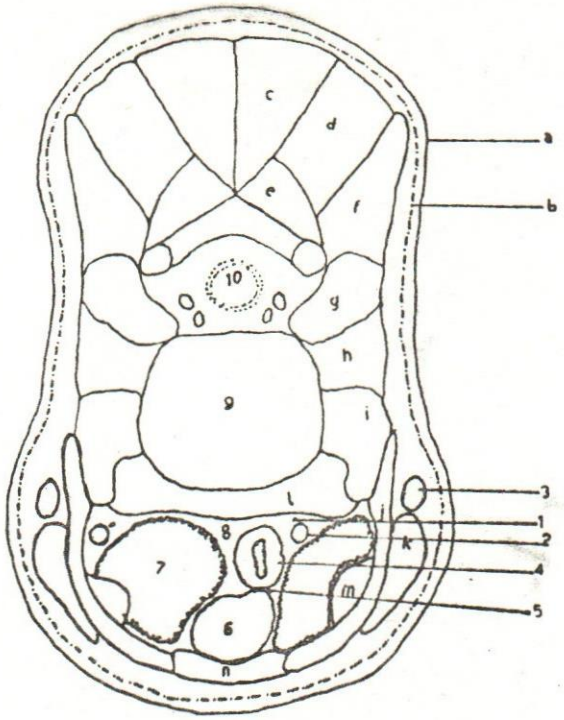

Fig. (1)

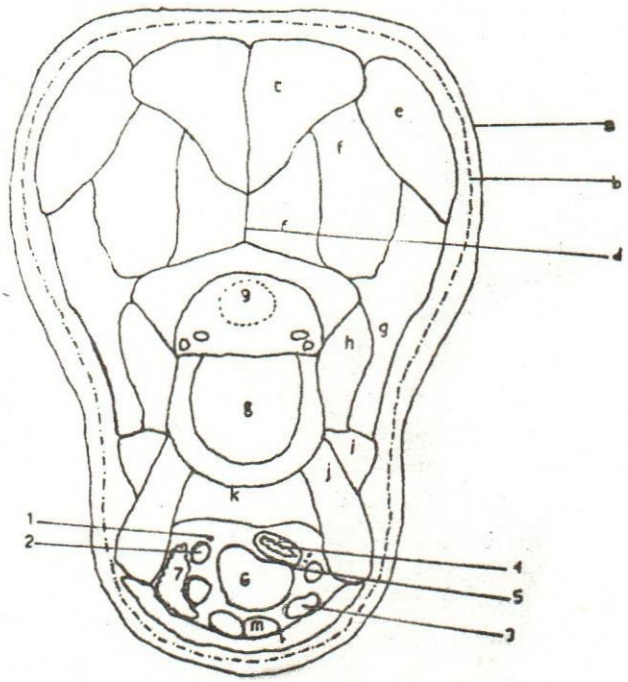

Fig. (2)

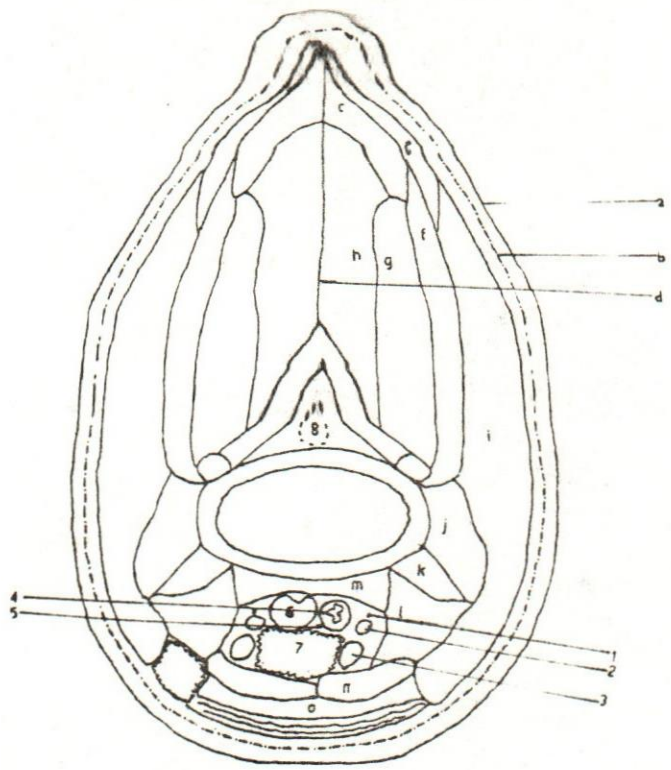
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Fig. (3)

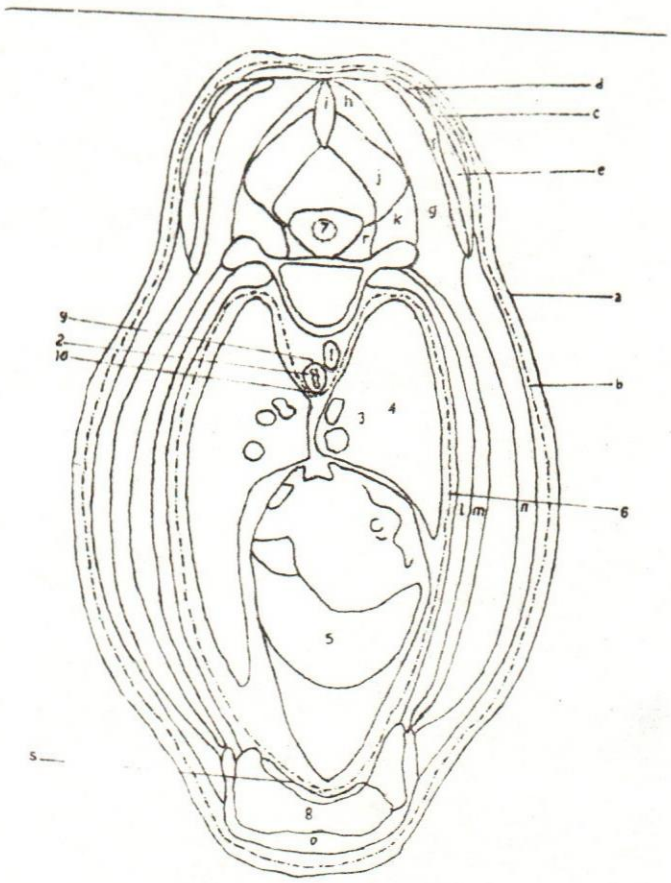
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Fig. (4)