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المراكز الليمفاوية للرأس والعنق فى الحمار

عبدالهادى محمد ، أشرف صحى ، على عبدالقادر

- أجريت هذه الدراسة على عشرة حمير بالغة حققت بمادة الإفانز الأزرق بتركيز 1% .
- ولقد وجد أن المراكز الليمفاوية فى الرأس هى الفكىة والنكفية والجاربلعومية وفى العنق هى المراكز الليمفاوية العنقية السطحية والغائرة وكما وجد أن اماكن صرف هذه المراكز تشابه الى حد كبير مثيلاتها فى الخيول .
- هذا ويختلف موقع الغدد الليمفاوية النكفية فى الحمير عنها فى الخيول فى أنها توجد أعلا وأسفل مفصل الفك ، كذلك يوجد حد فاصل واضح بين العقد الجاربلعومية الوحشية والأنسية فى الحمير .

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**LYMPHOCENTERS OF THE HEAD AND NECK OF THE DONKEY
(EQUUS ASINUS)***
(With 3 Figures)

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SUMMARY

The present study was carried out on ten donkeys injected with 1% Evans blue. The drainage area of each lymph node had the same pattern like that of the horse. The lymphocenters of the head include the mandibular, parotid and retropharyngeal. The mandibular lymphocenter of both sides form V-shaped mass. Its efferents end in the medial retropharyngeal and cranial deep cervical lymph nodes. Moreover and unlike that reported in the horse, the parotid lymph nodes are situated ventral and dorsal to the tempromandibular joint. The efferent of the parotid terminates in the lateral retropharyngeal lymph nodes. The efferents of the retropharyngeal lymphocenter join the cranial deep cervical lymph nodes as well as the tracheal trunks.

The lymphocenters of the neck are the superficial and deep cervical. The efferent vessels of the superficial cervical lymphocenter end either in the caudal deep cervical lymph nodes or in the cranial vena cava. The efferent of the cranial deep cervical lymph nodes shares in the formation of the tracheal trunk. The efferent of the caudal deep cervical terminate in the bijugular trunk and the thoracic duct.

The tracheal trunks are formed by the efferents of the cranial deep cervical, retropharyngeal and middle deep cervical lymph nodes. They terminate in the caudal deep cervical lymph nodes.

INTRODUCTION

The lymphatic system of the horse and the other domesticated animals was described by BAUM and TRAUTMANN (1925), BAUM (1927), ZIETZSCHMAN, ACKERKNECHT and GRAU (1943), DOBBERSTEIN and KOCH (1958), SAAR and GETTY (1975) and VOLLMERHAUS (1981).

However, and in the available literature the authors could not find any work on the lymphatic system of the other domesticated members of the family equidae. The donkey plays an unnegligible role as a work and a draught animal in Egypt. This animal is subjected to some infectious diseases affecting the lymphatics as Glandars and Strangles. It becomes now necessary to investigate the characteristic anatomical features of the lymphatic system of this animal.

A.M.A. ALI; et al.**MATERIAL and METHODS**

The present work was carried out on ten donkeys. They were injected by comblene (0.1 ml/kg body weight) intramuscularly as a tranquilizer, followed by intravenous injection of 10% chloralhydrate solution. Several trials were carried out to demonstrate the lymphatic system in domestic animals. Injection of Indian ink, Prussian blue, Berliner blue and Evans blue in different concentrations were experimented.

The injection of 1% solution of Evans blue has proved to be the most suitable method for the demonstration of both the lymph nodes and lymph vessels. The solution was prepared by dissolving one gm Evans blue and one gm sodium chloride in 100 cc distilled water. A dosage of 0.5 cc of the 1% Evans blue was injected into each of the predetermined areas (Fig. 1). The sites of injection were the subcutis, muscles, lips, tongue and eyelids. After injection the animals were allowed to recover and exercise for one hour, before they were bled. The animals were bled after anaesthetized with 10% chloralhydrate and injected with 10% formalin through the common carotid artery.

The length, width and thickness of each lymph node as well as the whole aggregation of nodes were measured. The nomenclature used in this work were that adopted by the Nomina Anatomica Veterinaria (1973).

RESULTS

The lymphocenters of the head of the donkey include the Lymphocentrum parotideum, mandibulare and retropharyngeum.

LYMPHOCENTRUM PAROTIDEUM:

The parotid lymphocenter comprises only the Lymphonodi parotidei.

LYMPHONODI PAROTIDEI (Fig. 2,3):

The parotid lymph nodes are located ventral and dorsal to the temporomandibular joint near the caudal border of the ramus of the mandible undercover or embedded in the parotid salivary gland. The most dorsal group of nodes are related to the superficial temporal vein.

They are 4-10 nodes each of 6-23 mm in length, 2-8 mm in width and 2-5 mm in thickness.

The parotid lymph nodes receive 6-10 afferent vessels which drain the auricular muscles, eyelids, orbital fat, skin and fascia of the frontal, temporal and masseter regions, temporomandibular joint and parotid salivary gland. The efferents are represented by 1-2 vessels which course caudoventrally between the parotid salivary gland and the occipitomandibular muscle to terminate in the lateral and medial retropharyngeal lymph nodes.

LYMPHOCENTRUM MANDIBULARE:

The mandibular lymphocenter includes only the Lymphonodi mandibulares.

LYMPHONODI MANDIBULARES (Fig. 2,3):

The mandibular lymph nodes are situated in the mandibular space at the level of the incisura vasorum facialis where they take a position ventral to the tongue. They are related dorsolaterally to the facial vessels and parotid duct, medial pterygoid muscle and rostral part of the digastric, and medially to the omohyoid and sternohyoid muscles. The mandibular lymph nodes are formed by aggregation of 18-66 nodes arranged in two masses each measures 5-8

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cm long, 1-2 cm wide and 1 cm thick. The measurements of the nodes are 5-12 mm in length, 3-7 mm in width and 1-4 mm in thickness. The nodes of both sides connect together rostrally forming a V-shaped or crescentic structure with its concavity directed caudalwards. However and only in three cases the mandibular lymph nodes of both sides do not join and remain separate masses.

The afferent vessels are 8-12 in number. They enter the lateral dorsal border of each of the mandibular lymph nodes. They drain the skin and fascia of the zygomatic, frontal and masseter regions, nostrils, upper and lower lips, muscles of the face and structure in the mandibular space, omohyoid, geniohyoid, mandibular and parotid salivary glands and gums. The efferent vessels are four in number, two of them pass to the medial retropharyngeal lymph nodes while the other two terminate in the cranial deep cervical lymph nodes.

LYMPHOCENTRUM RETROPHARYNGEUM:

The retropharyngeal lymphocenter is represented by two groups of nodes the medial (Lymphonodi retropharyngei mediales) and the lateral (Lymphonodi retropharyngei laterales).

LYMPHONODI RETROPHARYNGEI MEDIALES (Fig. 2,3):

The medial retropharyngeal lymph nodes comprise 20-30 nodes each of which 3-20 mm long, 1-10 mm wide and 1-6 mm thick. The whole conglomerate measures 6-8 cm in length, 2-3 cm in breadth and 1 cm in thickness. The group of the nodes occupies the place ventral to the level of the wing of the atlas to the dorsolateral aspect of the pharynx where the lower nodes undercover the guttural pouch. The nodes are related laterally to the mandibular salivary gland, stylohyoid muscle, caudal belly of the digastric and partly undercover the jugulomandibular muscle, in one case the cranial laryngeal nerve course within the lower part of the conglomerate.

They drain the fascia and skin of the parotid region by 2-4 vessels. Moreover there are four vessels which drain the structures in the atlantal fossa, the pharynx, larynx, guttural pouch, parotid and mandibular salivary glands. Further more the nodes receive an afferent vessel from the parotid lymph nodes and other two vessels from the mandibular lymph nodes. The efferent vessels are three which accompany the common carotid artery, where two of them end in the cranial deep cervical lymph nodes while the other shares in the formation of the tracheal trunks.

LYMPHONODI RETROPHARYNGEI LATERALES (Fig. 2,4):

The lateral retropharyngeal lymph nodes are 10-20 in number, each of 4-15 mm long, 2-8 mm wide and 1-4 mm thick. The whole aggregation measures 6-8 cm in length, 2-4 cm in width and 1 cm in thickness. The nodes are situated against the lateral aspect of the guttural pouch just caudal to the stylohyoid bone. They are related caudally to the hypoglossal nerve and lingual artery and are covered laterally by the jugulomandibular, caudal belly of the digastric and stylohyoid muscles as well as the mandibular salivary glands.

The nodes drain the skin and fascia of the zygomatic and masseteric regions, masseter, jugulomandibular, caudal part of the digastric and stylohyoid muscles. Furthermore, afferents are received from guttural pouch, pharynx, larynx, tongue, sublingual and mandibular salivary glands. Afferent vessels come also from the mandibular lymph nodes, hard palate, upper teeth, gum, soft palate and caudal portion of the nasal cavity. The efferent vessels are seven, which cross the lingual artery laterally to join the medial retropharyngeal lymph nodes. Another efferent vessel share in the formation of the tracheal trunks.

The lymphocenters of the neck of the donkey comprise Lymphocentrum cervicale superficiale and profundum.

A.M.A. ALI *et al.***LYMPHOCENTRUM CERVICALE SUPERFICIALE (Fig. 2,6):**

The superficial cervical lymph nodes are made up of 35-50 nodes each of 2-20 mm long, 2-12 mm wide and 2-5 mm thick. The whole aggregation measures 10-12 cm in length, 2-3 cm in width and 0.5-1.5 cm in thickness. The nodes are situated a hand-breadth craniodorsal to the level of the shoulder joint. Moreover in two examined cases the nodes formed of a separate dorsal and ventral masses. The dorsal one lies cranial to the subclavius and lateral to the omohyoid muscle where it extends slightly beyond its dorsal border. On the other hand the ventral portion is related to the external jugular vein and common carotid artery. The superficial cervical lymph nodes are covered laterally by the brachiocephalic and cutaneous coli muscles. These nodes drain the muscles at the root of the neck, skin and fascia on the lateral aspect of the shoulder as well as that of the pectoral region by 4-6 vessels which unite in three cases to form a single vessel. Furthermore the superficial cervical lymph nodes receive 3-4 afferents from the thoracic limb as well as the lateral aspect of the thoracic wall. The efferents are represented by 1-3 vessels of considerable size which terminate on the right and left sides in the caudal deep cervical lymph nodes. Moreover, in two cases they terminated in the cranial vena cava.

LYMPHOCENTRUM CERVICALE PROFUNDUM:

The deep cervical lymphocenter of the donkey includes the Lymphonodi cervicales profundi craniales, Lymphonodi cervicales profundi medii and Lymphonodi cervicales caudales.

LYMPHONODI CERVICALES PROFUNDI CRANIALES (Fig. 2,3/5):

The cranial deep cervical lymph nodes comprise 15-30 nodes, each of 3-18 mm long, 2-15 mm wide and 2-10 mm in thickness. The lymph nodes are placed in a close association with the thyroid gland. Most of the nodes aggregate craniodorsal to the thyroid gland where it come in relation with the common carotid artery, and with the most caudal nodes of the medial retropharyngeal.

The afferents are 15-20 vessels which drain the muscles of the ventral and lateral aspect of the neck, cervical vertebrae, trachea, esophagus, larynx, pharynx, thyroid gland and parotid as well as the mandibular salivary glands. In addition afferents come from the mandibular and medial retropharyngeal lymph nodes.

All the efferent vessels of the cranial deep cervical lymph nodes share in part in the formation of the tracheal trunks. In two out of the examined cases a lymph vessel connecting the right and left cranial deep cervical lymph nodes, was observed to run over the isthmus of the thyroid gland. This may show some clinical importance as the infection may transmitted from one side to the other.

LYMPHONODI CERVICALE PROFUNDI MEDII (Fig. 2/5'):

The middle deep cervical lymph nodes comprise 1-8 nodes, their measurements are 1-28 mm long, 3-6 mm wide and 1-3 mm thick. These nodes are situated at the middle part of the trachea where they come in contact with the ventral aspect of the common carotid artery. These lymph nodes are located on the right side (4 cases), or on the left side (3 cases) or on both sides (2 cases) of the trachea. Moreover, only in one case the middle deep cervical lymph nodes were absent. The afferent lymph vessels come from the trachea, esophagus, sternocephalic, sternothyrohyoid and longus coli muscles. The efferents are represented by 3-5 short vessels which join the tracheal trunk of the own side.

LYMPHONODI CERVICALE PROFUNDI CAUDALES (Fig. 2/5'):

The caudal deep cervical lymph nodes comprise 15-25 nodes, each of 4-37 mm long, 2-15 mm wide and 1-5 mm thick. These nodes form an elongated aggregation measuring 60-100

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mm in length, 15-25 mm in width and 5-10 mm in thickness. They are situated just cranial to the first rib, ventral to the trachea and bicarotid trunk. The cranial two-thirds of the caudal deep cervical lymph nodes are situated in the angle formed by the two common carotid arteries. It receives afferent vessels from the trachea, esophagus, muscles of the ventral aspect of the neck. The nodes also drain the head and neck regions through the tracheal trunks. Furthermore they drain the superficial cervical lymph nodes. The efferent vessel ends in the cranial vena cava near the termination of the thoracic duct, this vessel receives radicles from the superficial cervical lymph nodes, axillary lymph nodes of the first rib and cranial mediastinal lymph nodes. Moreover and only in three cases, two additional efferent vessels were found to terminate in the cranial convex aspect of the thoracic duct. However in other two cases the efferent vessels terminated in the cranial vena cava as well as in the cranial mediastinal lymph nodes.

TRUNCUS TRACHEALIS:

The right and left tracheal trunks are formed by the union of the efferents of the cranial deep cervical lymph nodes and two efferent vessels from those of the retropharyngeal lymphocenter. The two trunks course caudoventrally along the dorsolateral aspect of the trachea until they reach the caudal-fourth of the neck where they incline medially to join the caudal deep ~~lymph~~ lymph nodes of the corresponding side. At the middle of the neck the tracheal trunks receive the efferent vessels of the middle deep cervical lymph nodes. Along its course the tracheal trunks divide and join again. Moreover, in three cases the left tracheal trunk was double formed.

DISCUSSION

The description given on the lymphatic system of the head and neck region in the horse by BRADLEY (1923), BAUM (1927), DOBBERSTEIN and KOCH (1958), RAGHAVAN and KACHROO (1964), SAAR and GETTY, 1975 and VOLLMERHAUS, 1981) simulates nearly the results obtained in this investigation. Differences and variations in the number and shape of the compact lymph nodes of the individual lymphocenters and their afferent and efferent vessels in the donkey were recorded in this work.

The lymph nodes forming the lymphocentrum parotideum were found to be located dorsal and ventral to the tempromandibular joint. In case of horse, however, these nodes were described by BRADLEY (1923), DOBBERSTEIN and KOCH (1958), SAAR and GETTY (1975) and VOLLMERHAUS (1981), to be situated only ventral to the tempromandibular joint. On the other hand RAGHAVAN and KACHROO (1964) reported the absence of the parotid lymph nodes in the horse, and added that the parotid lymphocenter may be represented by 2-3 nodes.

The number of the nodes entering in the formation of the mandibular lymph nodes was found to be relatively smaller than that given for the horse (70-150) by VOLLMERHAUS (1981).

The present study shows that the lateral and medial retropharyngeal nodes in donkeys are clearly defined from each other a case which is not described in horse (BRADLEY, 1923; SAAR and GETTY, 1975 and VOLLMERHAUS, 1981). Moreover, the beforementioned authors added that the efferent vessels of the retropharyngeal lymphocenters join the cranial deep cervical lymph nodes. In the case of the donkey, these vessels join also the cranial deep cervical lymph nodes and share in the formation of the tracheal trunk.

The number of the superficial cervical lymph nodes in case of the donkey was found to be 35-50. In case of horse, however, VOLLMERHAUS (1981) gave a great number which ranges from 60-130.

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In two cases, the efferent vessels of these nodes terminate in the left and right deep cervical lymph nodes and the cranial vena cava. In case of horse VOLLMERHAUS (1981) mentioned that the efferent vessels of the superficial cervical lymph nodes join both the deep cervical lymph nodes and the right lymphatic duct.

The middle deep cervical lymph nodes in the donkey are located only at the middle of the neck and do not extend to the level of the cranial and caudal deep cervical lymph nodes as described in horse by SAAR and GETTY (1975) and VOLLMERHAUS (1981). The efferent vessels of the middle deep cervical of the donkey form the tracheal trunk and do not reach the deep cervical lymph nodes as that of the horse (DOBBERSTEIN and KOCH, 1958; SAAR and GETTY, 1975 and VOLLMERHAUS, 1981).

The present study shows that the right and left tracheal trunks of the donkey pass along the dorsolateral aspect of the trachea and terminate in the caudal deep cervical lymph nodes. In case of the horse however, the right and left tracheal trunks were described to pass ventromedial to the trachea (SAAR and GETTY, 1975).

Moreover, DOBBERSTEIN and KOCH (1958) mentioned that the right trunk terminates in the jugular trunk while the left joins the thoracic duct.

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 4. Lymphonodi retropharyngei laterales.
 5. Lymphonodi cervicales profundi craniales.
 - 5' Lymphonodi cervicales profundi medii.
 - 5'' Lymphonodi cervicales profundi caudales.
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 2. Lymphocentrum parotideum.
 3. Lymphonodi retropharyngei laterale.
 4. Lymphonodi retropharyngei mediale.
 5. Lymphonodi cervicales profundi craniales.

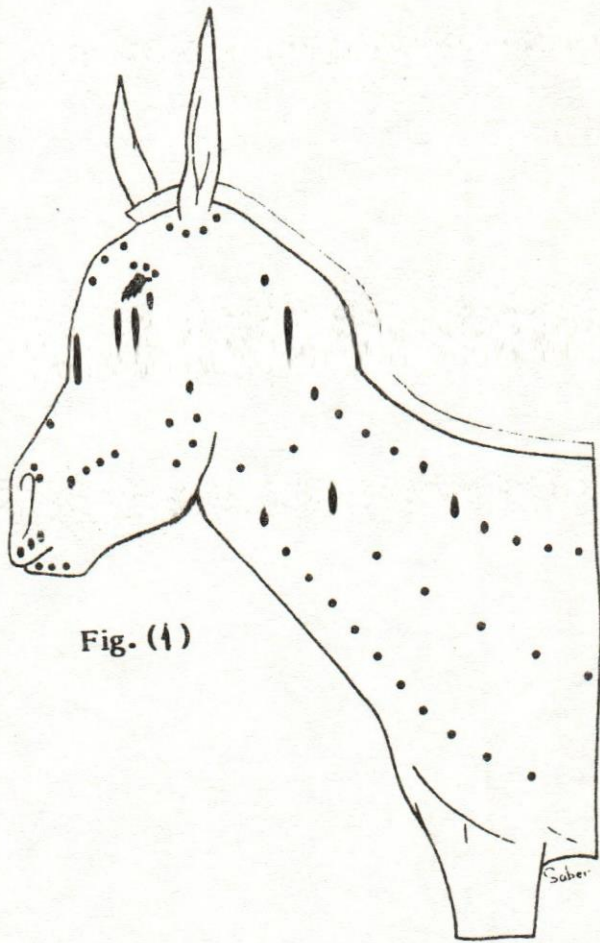


Fig. (1)

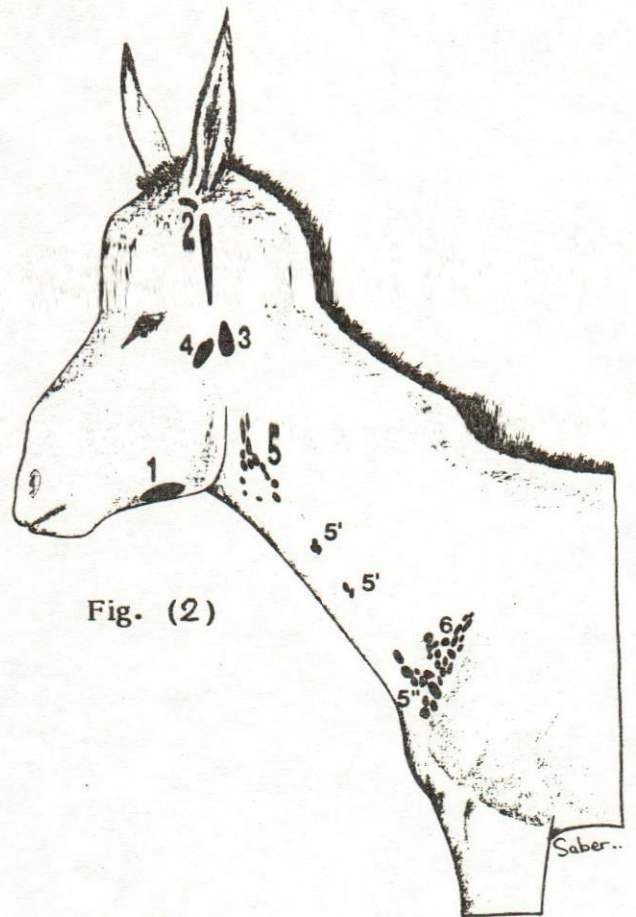


Fig. (2)

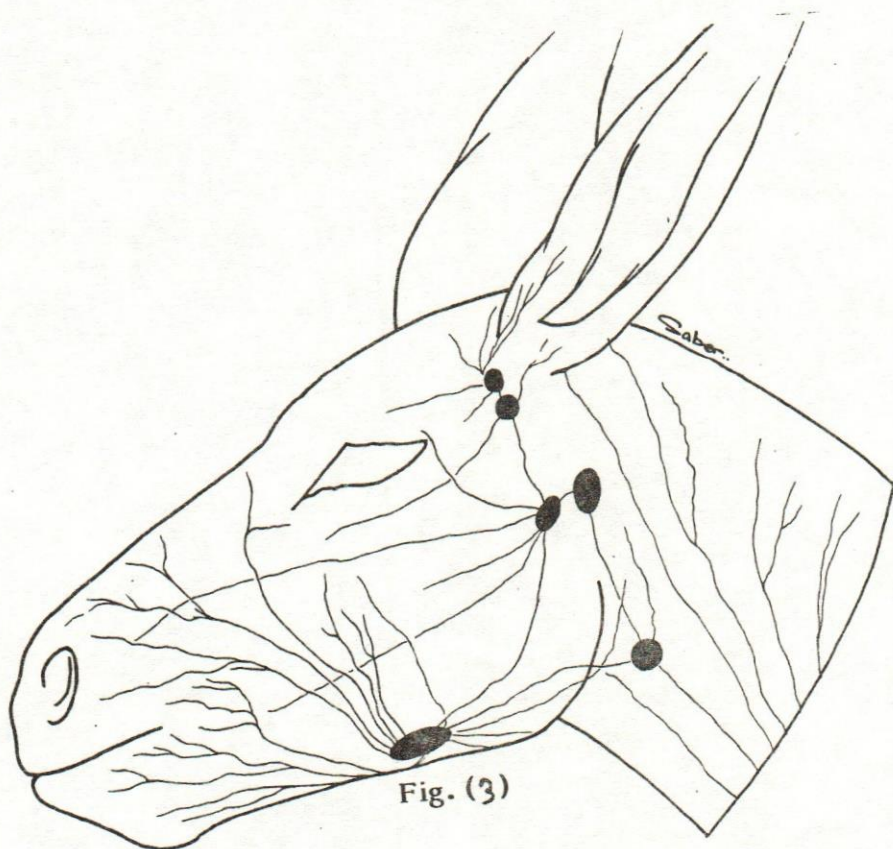


Fig. (3)