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دراسات مورفولوجية على المدد الشريانى للمخ
فى الحممار فى مصر

على أحمد ، حسن أنيس ، صلاح مصطفى

نظرا لما للمخ من أهمية كبرى للكائن الحى فانه يحتاج الى مدد دموى كبير وقد درس توزيع المدد الدموى فى المخ فى الحيوانات المسأتأنسه وفى معظم الأبحاث التى ظهرت أوردت الحصان والحميلار تحت الفصيلة الخيلية دىن التميز بينهما وقد أجرى البحث لأستظهار أية فروق بين التوزيع الشريانى فى مخ الحممار عنه فى الحصان فى محاولة للتعرف على الفروق الجوهرية بين هذين الحيوانين وقد تم حقن ١٠ عشرة رؤس للحممار فى مصر حقنت عن طريق الشريان الفقارى والشريان السباتى الداخلى بالمطاط السائل ٦٠٪ الملون بالكارمين بعد غسلها بمحلول الملح المتعادل ثم تثبيت العينات بالطرق المعتاده وتم تشريحها بكل دقة .

MORPHOLOGICAL STUDIES ON THE ARTERIAL SUPPLY OF THE BRAIN OF THE DONKEY IN EGYPT
(With One Figure)

By

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SUMMARY

- 1- Ten heads were used in this work.
- 2- They were prepared in the ordinary way for studying blood vessels.
- 3- Careful dissection was carried out and the results simulated that of the horse with the exception of:
 - a- The absence of the carotico-basilar artery.
 - b- The anterior meningeal artery is given from the ethmoidal instead from the anterior cerebral in the horse.
- 4- Discussion of the results with other domestic animals was also given in the text.
- 5- A diagram for the arteries of the brain was also plotted out.

INTRODUCTION

The brain, as a vital organ for the living organism, needs a well organised supply of blood. In most domestic animals, the arterial blood distribution for the brain has been studied. In Equidae, most investigators gave a detailed description on the arterial blood supply of the brain without differentiating between animals falling under this group. The distribution of the arteries in the brain of the donkey have not been previously studied and the aim of the present investigation is to detect any difference between both animals in an attempt to give an idea about the arteries in such an animal.

MATERIAL AND METHODS

Work was carried on ten fresh heads of healthy adult donkeys. The vertebral and internal carotid arteries were cannulated, thoroughly washed with warm normal saline solution and injected with 60% latex coloured red with carmine using a rubber piston syringe. The specimens were fixed using 10% formaline, 4% phenol and 1% glycerine and dissected after about 7 days. The brain with its meninges were carefully extracted out of the cranial cavity and the arteries were carefully dissected.

The arteries were named after the N.A.V. (1973) and its annex (1975).

RESULTS

The basilar and the internal carotid arteries constitute the main arterial supply of the brain. The former proceeds forward on the basilar part of the occipital bone to enter the cranial cavity. It lies ventral to the medulla oblongata. Immediately it crosses the pons, it performs an undifferentiated rete (Fig.1/11) in the caudal part of the interpeduncular fossa from the lateral aspect of which is given the anterior cerebellar artery on both sides. Anteriorly, the so named rete continues as the posterior cerebral arteries that join the posterior communicating branch of the internal carotid artery. It gives the following:

1. Rami medullares (Fig. 1/6); number 8-10 are given to the medulla oblongata.
2. A. cerebelli caudalis (Fig. 1/7); runs laterally caudal to the corpus trapezoideum where it turns around the medulla oblongata to supply the caudal part of the cerebellum and the choroid plexus of the fourth ventricle. Before it turns, it gives the internal auditory artery (A.labyrinthi) (Fig. 1/8) which reaches the internal ear in accompany with the vestibulo-cochlear n.via the internal acoustic meatus.
3. From one to three fine branches (Fig. 1/9) from both sides are given to the pons (Rami and pontem).

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4. A. cerebelli rostralis (Fig. 1/10); is given just cranial to the pons crosses obliquely the cerebral peduncles to gain the caudal aspect of the cerebrum where it ramifies on the rostral cerebellar surface.
5. From the dorsal aspect of the undifferentiated rete mirabile cerebri are given fine innumerable cerebral branches which enter through the posterior perforating substance to the brain itself.
6. A. cerebri caudalis (Fig. 1/12); are the two terminal branches of the basilar artery. Each proceeds along the lateral aspect of the interpeduncular fossa and unites with the corresponding posterior communicating artery of the internal carotid. They supply the caudal part of the cerebral hemispheres.
7. A. cerebri profunda (Fig. 1/13); results from the union of the posterior communicating branch of the internal carotid and the posterior cerebral arteries. It proceeds laterally to gain the deep face of the cerebral hemispheres around the cerebral peduncles.

A. Carotis Interna (Fig. 1/14):

Reaches the base of the brain as usual by traversing the cavernous sinuses. It is connected by a posterior intercarotid artery with its fellow through the posterior intercavernous sinus. It proceeds forward, crosses the optic tract, and on a level of the olfactory tubercle it divides into an A. cerebri rostralis and A. cerebri media. The former branch (Fig. 1/18) of both sides proceed medialwards and unite with each other rostral to the optic chiasma resulting in the artery of the corpus callosum (Fig. 1/20). The latter gains the dorsal longitudinal fissure and is distributed to both medial surfaces of the cerebral hemispheres.

The A. ophthalmica interna (Fig. 1/19); is a small artery given from the anterior cerebral artery before its union with its fellow of the opposite side. It follows the optic nerve and leaves the cranium through the optic canal, anastomoses with a branch of the external ophthalmic artery in the orbit. The internal carotid artery gives the following:

1. At its initial part it gives a caudal branch known as the A. communicans caudalis (Fig. 1/15) which anastomoses with the posterior cerebral artery resulting in the deep cerebral artery previously mentioned.
2. A. chorioidea rostralis (Fig. 1/16) proceeds laterally, insinuates itself between the piriform lobe and the optic tract to gain the lateral ventricle of the brain where it forms its choroid plexus.
3. A. cerebri media (Fig. 1/17), the largest collateral branch runs laterally crossing the ventral aspect of the brain at the level of the olfactory tubercle where it reaches the fossa lateralis at which it divides into a rostral and a caudal branch. Both run dorsolaterally on the external surface of the cerebral hemispheres, the former rostrally while the latter caudally and give cortical branches to the corresponding portion of the hemispheres. In addition several rami centrales are given off from the A. cerebri media along its course which pierce the brain.

DISCUSSION

The arterial supply of the brain in the donkey simulates to a great extent that of the horse but the ortho-basillar artery reported by GETTY (1975) is absent in the donkey. On the other hand the anterior meningeal artery arises from the anterior cerebral in the horse (BRADLEY, 1946; SISSON and GROSSMAN, 1969 and GETTY, 1975), while in the present investigation it is given from the A. ethmoidalis. The formation of the basilar artery in the buffalo (EL AYAT, 1977) by the union of caudal communicating branch of the internal carotid arteries due to the absence of the cerebrospinal artery of the occipital in ruminants is not observed in the donkey but it is formed as in the horse (BRADLEY, 1947 and SISSON and GROSSMAN, 1969) and camel (KENAWI, 1973) in which case it resulted from the vertebral artery. The termination of the rostral choroid artery in the lateral ventricle in the donkey simulates that in the ox (GETTY, 1975) and buffalo (EL AYAT, 1977), while in camel terminated in the third ventricle (KENAWI, 1973).

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FIGURE (1)

Ventral Aspect Of The Brain Showing The Cerebral Arteries

- 1- A. vertebralis.
- 2- Ramus spinalis.
- 3- A. spinalis ventralis.
- 4- Ramus cerebralis.
- 5- A. basilaris.
- 6- Rami medullares.
- 7- A. cerebelli caudalis.
- 8- A. auditiva interna (A. labyrinthi).
- 9- Rami ad pontem.
- 10- A. cerebelli rostralis.
- 11- Rete mirabile cerebri (undifferentiated).
- 12- A. cerebri caudalis.
- 13- A. cerebri profunda.
- 14- A. carotis interna.
- 15- A. communicans caudalis.
- 16- A. chorioidea rostralis.
- 17- A. cerebri media.
- 18- A. cerebri rostralis.
- 19- A. ophthalmica interna.
- 20- A. corporis callosi.



