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Basilar Arteries of the Brain in Wild Boar

TĘTNICE PODSTAWY MÓZGOWIA U DZIKA

Ryszard JABŁOŃSKI, Witold BRUDNICKI & Cezariusz WILAND

Jabłoński R., Brudnicki W. & Wiland C., 1989: Basilar arteries of the brain in wild boar. Acta theriol., 34, 11: 159—162 [With Plates II—III]

The anatomical system of the basilar arteries of the brain was studied in 34 brains of the wild boar, *Sus scrofa* (Linnaeus, 1758). The characteristics of this system in this species were multiple middle cerebral arteries and caudal cerebral arteries, as well as a frequently observed asymetry in the site of origin of the caudal cerebellar arteries.

[Chair of Animal Physiology and Anatomy, Technical Agricultural Academy, ul. Bernadryńska 6, 85-029 Bydgoszcz, Poland].

In the available literature no detailed data were found on the system of the basilar arteries in the brain of wild boars. Only the arteries of the domestic pig (Hofmann, 1900) and their variability (Janke, 1919; Flechsig & Zintsch, 1969; Wiland & Maliński, 1969) have been described. The domestic pig is a domesticated form of various wild boar subspecies. Using available data, the structure and variability of the basilar arteries in the domestic pig was compared with the wild boar.

The observations were carried out on 34 brains of wild boars, *Sus scrofa* (Linnaeus, 1758) of varying age and sex. The cerebral arteries were filled with latex introduced into the common carotid arteries. After fixation of heads in 5% formalin and decalcification of skulls in hydrochloric acid the cranial cavity was opened and the brain was removed. After dissection of the arteries photographic documentation was obtained.

Blood is carried to the brain of the wild boar, as in other mammalian species, by the internal carotid and vertebral arteries. The internal carotid artery in this species is formed from the rostral epidural *rete mirabile*, and after piercing the dura it reaches the base of the brain, immediately behind the posterior border of the optic nerve (Fig. 1.1, Plate II). Its first branches are thin arteries forming branches on the surface of the optic chiasma. The internal carotid artery then divides into the caudal communicating artery running backward (Fig. 1.2, Plate II), and the rostral cerebral artery (Fig. 1.3, Plate II) which forms a small arch passing from the ventrical surface of the optic nerve to its dorsal surface. From this arch the thin rostral choroidal artery branches off, and after a short distance it disappears under the medial border of the piriform area (Fig. 1.4, Plate II).

The rostral cerebral artery runs over the surface of the medial olfactory stria giving off branches to the middle cerebral artery (Fig. 1.5, Plate II). Before reaching the posterior border of the olfactory bulb the rostral cerebral artery divides into the corpus callosum artery (Fig. 1.6, Plate II) and the internal ethmoidal artery (Fig. 1.7, Plate II). The corpus callosum artery bends dorsally and penetrates the medial sagittal fissure where it joins the contralateral artery of the same name to form a single vessel — the common trunk of the corpus callosum artery closing in this way the cerebral arterial circle in its rostral part. In the wild boar also several rostral communicating arteries participate in the closure of the rostral part of this circle (Fig. 1 — sn). These arteries lie between both rostral cerebral arteries. The internal ethmoidal artery runs along the medial border of the olfactory bulb towards the cribriform plate.

The caudal communicating artery sweeps in an arch and reaches together with the contralateral artery of the same name the basilar artery. Caudal cerebral arteries branch off from the caudal communicating artery towards the piriform area (Fig. 1.8). These arteries are described as the anterior, middle and posterior caudal cerebral arteries (Fig. 2 — A, B, C, Plate II). Of the above mentioned vessels the caudal cerebral arteries are the thickest ones.

The vertebral artery (Fig. 1.9) after perforation of the dura passes onto the ventral surface of the medulla oblongata, where it joins the contralateral vertebral artery. These arteries join the ventral spinal artery (Fig. 1.10). The basilar artery is formed by these three arteries (Fig. 1.11) and it runs cephalad along the medulla and the pons. After passing the rostral border of the pons it joins the caudal communicating arteries. The caudal cerebellar arteries branch off from it over the pons and medulla (Fig. 1.12) as well as the branches to the medulla (Fig. 1 are branches of the caudal cerebellar arteries. After passing the rostral — rm) and to the pons (Fig. 1 — rp). The labyrinthine arteries (Fig. 1.13) border of the pons the basilar artery gives off the reostral cerebellar arteries (Fig. 1.14).

The basilar artery showed some variation in the site of origin and in its course. They were as follows: in one animal only the right corpus callosum artery was present (Fig. 3, Plate II). In this case the cerebral arterial circle was open on the rostral side.

The middle cerebral artery was a single artery on one side and a double artery on the other side in 7 (20.7%) animals. Most cerebral arteries on both sides were the middle cerebral arteries (Fig. 5, Plate III). In the remaining 12 animals (25.2%) three such branches were found on one side and two on the contralateral side (Fig. 1, 2).

The caudal cerebral arteries varied also in their site of origin. In 21 brains (61.8%) they were given off as two branches from the caudal comunicating artery. The first one, much broader, was the anterior caudal cerebral artery. A much narrower vessel branching off from it was a common trunk dividing into the middle and posterior cerebral artery (Fig. 1, 3, 5, 6). In the remaining 13 animals (38.2%) from one caudal communicating artery on one side all three caudal cerebral arteries branched off separately (Fig. 2).

The caudal cerebellar arteries arose from the basilar artery symmetrically in 15 animals (44.1%) (Fig. 1, 3). In another 17 animals (50%) they branched off at various levels, at small intervals (Fig. 5, 6), or the site of origin of one artery was shifted cephalad. In such cases the caudal cerebellar artery branched off over the pons lying in front of the abducens nerve (Fig. 2). In two animals the left caudal cerebellar ártery arose in the form of two branches which were fused on the ventral surface of the medulla (Fig. 4). In all animals with an asymetric origin of the caudal cerebellar arteries in the part between their origin deviations from the midsagittal plane were observed in the course of the basilar artery. The vertebral arteries fusing with the ventral spinal artery formed vessel islands of varying size (Fig. 1, 3, 4, 5). At that site in 4 animals (11.7%) more or less complex vessel network was present (Fig. 2, 6).

In the wild boar no significant differences were found in the course of the basilar arteries of the brain as compared to the domestic pig. The results of Wiland and Maliński (1969) seem to show that in the domestic pig the basilar artery is better developed than in the wild boar. Also in the pig, two forms of connection of the vertebral arteries with the ventral spinal artery were found. Besides vessel islands formed by these arteries in some animals cases were found of their direct connection. In the pig an irregular course of the basilar artery was found in 53.3% of the animals, and it was not always produced by an asymetric origin of the caudal cerebellar arteries. According to (Wiland, 1980) this course is frequent in the domestic animals. In the wild boar the abnormal course of the domestic animals. In the wild boar the abnormal course of the basilar artery was always due to an asymmetrical origin of the caudal cerebellar arteries. It was observed in 50% of the studied animals.

In the wild boar in all studied animals the rostral cerebellar arteries branched off from the basilar artery, while in the pig they also originated from the caudal comunicating artery. The caudal cerebellar arteries and the middle cerebral arteries were, as a rule, multiple vessels both in the pig and the wild boar. The diffrences were mainly in the number of separate branches of the middle cerebral artery which was 1-5 in the pig, and 1-3 in the wild boar. Similary, as reported previously by Wiland and Brudnicki (1984), no wild boars were found with the middle cerebral arteries present bilaterally as single vessels.

The comparison shows that in the wild boar and the pig no greater differences were found in the structure of the vascular bed of the basilar arteries. Very characteristic of this vascular system in both animal species were the multiplicity of the middle cerebral arteries and the frequent origin of the caudal cerebellar arteries at various levels.

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EXPLANATION OF PLATES

Plate II

Fig. 1. The structure of the basilar artery in the wild boar, **Sus scrofa** (Linnaeus, 1758). 1 — internal carotid artery, 2 — caudal communicating artery, 3 — rostral cerebral artery, 4 — rostral choroidal artery 5 — middle cerebral artery, 6 — corpus callosum artery, 7 — internal ethmoidal artery, 8 — caudal cerebral artery, 9 — vertebral artery, 10 — ventral spinal artery, 11 — basilar artery, 12 — caudal cerebellar artery, rm — branches to medulla, rp — branches to pons, sn — rostral communicating arteries.

Fig. 2. Separate origin from the caudal communicating artery, of the caudal cerebral arteries: anterior — A, middle — B, posterior — C, and origin of the caudal cerebellar arteries at various levels.

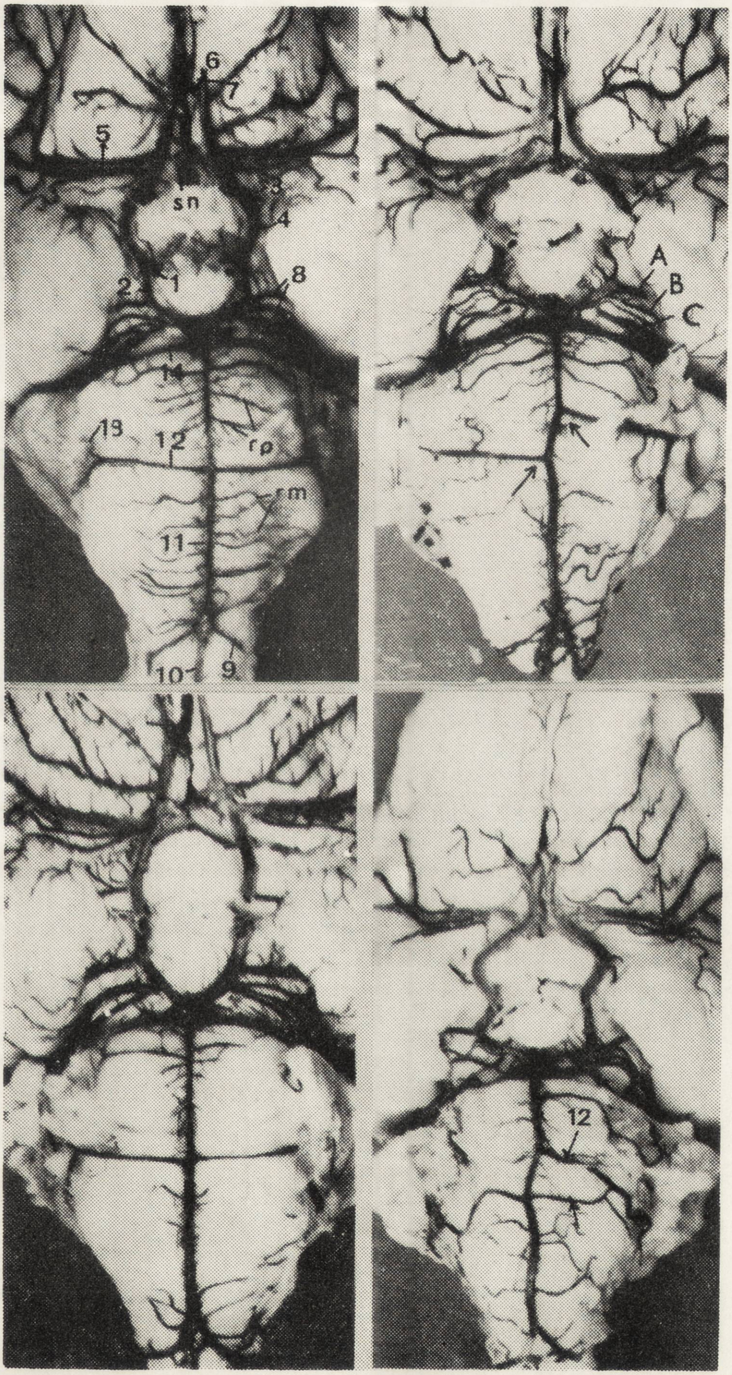
Fig. 3 Unilateral corpus callosum artery in an animal.

Fig. 4. Double origin of the caudal cerebellar artery (12).

Plate III

Fig. 5. Bilateral origin of double middle cerebral arteries (5).

Fig. 6. Presence of vascular network at the site of confluence of the vertebral arteries (9) with the ventral spinal artery (10).



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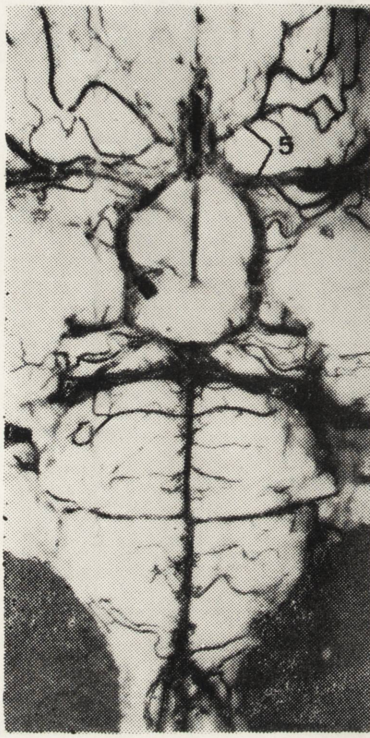

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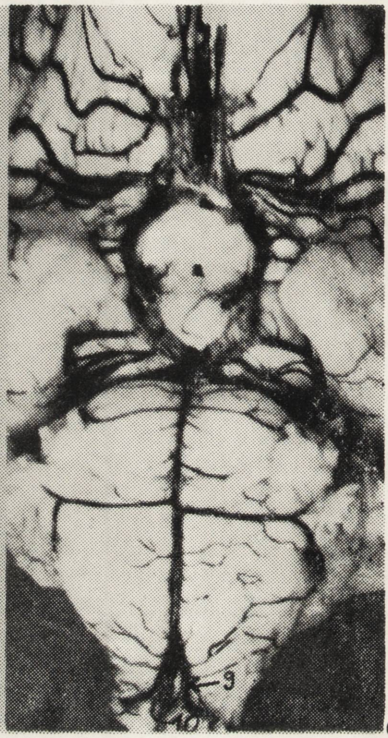

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