Systematization, distribution and territory of the caudal cerebral artery on the surface of the brain in chinchilla (*Chinchilla lanigera*)

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Abstract

The present study has analyzed thirty chinchilla (*Chinchilla lanigera*) brains, injected with latex, aiming to systematize and describe the distribution and the vascularization territories of the caudal cerebral artery. This artery was originated from the terminal branch of the basilar artery, being a single or a double vessel, and during the trajectory its main axis emitted, as collateral branches, branches to the piriform lobe, the caudal choroideal branch, continuing as caudal interhemispheric artery after the point it started to emit the medial caudal hemispheric branches. Other arteries were systematized, because they complemented the vascularization area of the caudal cerebral artery, as rostral tectal and rostral choroideal arteries, both being branches of the terminal branches of the basilar artery. The vascular territory of the caudal cerebral artery of the chinchilla comprehended the caudal third of the piriform lobe, the rostral colliculi, the pineal body, the medular stria, the habenula, the dorsal surface of the thalamus, the medial and lateral geniculate bodies, the hippocampus, the parahippocampal gyrus, the choroidal plexus of the III ventricle and the lateral ventricle, the corpus callosum's splenium, a territorial part of the medial surface of the cerebral hemisphere and on the convex surface, the limitant border, bordering the transverse fissure of the brain.

Keywords: anatomy, brain, arteries, rodent, chinchilla.

1 Introduction

The research about the central nervous system function has been increasing in the last years, and so it is necessary to improve the knowledge about the cerebral vascularization and for that a lot of work has been developed to supply the lack of this basic knowledge. Tandler's (1898) classical paper regarding the comparative anatomy and the development of the head's arteries history, as well as, the phylogenic and ontogenic study of De Vriese (1905), which classified several animal groups according to their encephalic irrigation, showed a variety of vascular models associated with the philogenetic development of the brain. The present study will discuss about the caudal cerebral artery of chinchilla, *Chinchilla lanigera* (MOLINA, 1782), a small rodent from the Andes Mountains, including Chile, Peru, Bolivia and Argentina, being almost extinct from its natural environment. Due to the lack of information about this species even in the classic literature and in the specialized articles, our results will be compared to the other author's, which were dedicated to other rodents, like Scremin (1995) with *Mus rattus*, Librizzi et al. (1999) and Michalska (1995) with *Guinea pig*, Panesar et al. (2001) with *Chinchilla lanigera*, Reckziegel et al. (2001; 2004) with capybara (*Hydrochoerus hydrochaeris*), Araújo and Campos (2005) with *Chinchilla lanigera* and Azambuja (2006) with nutria (*Myocastor coypus*). In order to understand the philogenetic development of this artery, it will be discussed the occurrence pattern of this vessel together with other species above or bellow in the zoologic scale, and so information about other authors that researched about philogenetic studies on encephalic morphology (BECCARI, 1943) and cerebral vascularization of the opossum (LINDEMANN and CAMPOS, 2002) and of canidae (DEPEDRINI and CAMPOS, 2003; DEPEDRINI and CAMPOS, 2007; NANDA, 1981) will be used. Besides that, the present work has the objective to describe the systematization, distribution and vascularization territory of the caudal cerebral artery on the surface of the brain in chinchilla.

2 Material and methods

For these research thirty brains of *Chinchilla lanigera*, 13 males and 17 females, adults, proceeded from the cities of Santa Maria and Viamão, state of Rio Grande do Sul, Brazil. The animals were heparinized (Heparin, Cristália) with 5000 IU/animal and, after 30 minutes they were sacrificed with 8 mL of 2.5% thiopental per animal (Thiopental, Cristália), both intraperitoneal paths. Subsequently, the thorax was opened, the cardiac apex and the two cranial cava veins were sectioned, the thoracic aorta artery was clamped and the aortic arch cannulated through the left ventricle. The arterial system was washed with chilled 0.9% saline solution and filled with a latex injection (Cola 603, Bertoncini) coloured with red pigment (Suvinil Corante, Basf). The animals stayed for one hour submerged in running water for the latex polymerization, and then the vertebral column was sectioned at the level of the first lumbar vertebrae. The skin was removed and a bone window was opened in the skullcap. The specimens remained immersed in a 20% formaldehyde solution for at least seven days for fixing. After this period, the brains were removed with a spinal cord segment from the skullcap and the vertebral column, the dura mater was removed and the arteries dissected. The material analysis was performed under magnifying glasses (LTS-5X increase and Stemi SV8-Zeiss), and to illustrate the results schematic drawings of the arteries were made in ventral, left and right medial and dorsal views of the encephalic trunk of the cerebral hemisphere. Furthermore, photographic records of all preparations were made for the documentation of the results. For naming the cerebral arteries and their ramifications, Nomina Anatomica Veterinaria (ICVGAN, 2005) was used, adding some terms according to the author's interpretations based on previous reports. For the statistic analysis of the results, percentage calculation was applied.

3 Results

The caudal cerebral artery of chinchilla was, normally, a single vessel, but with great presence of duplicity, being emitted from the terminal branch, right and left, of the basilar artery, when it returned to be rostrally projected at the level of the Oculomotor (III cranial pair) nerve's origin (Figure 1). It was laterodorsally projected bordering the cerebral peduncle reaching the transverse fissure of the brain. It formed a convex arch emitting central branches to the piriform lobe, one caudal choroidal branch to the dorsal surface of the thalamus, hippocampus, pineal gland, medular stria, habenula and the choroideal plexus of the III ventricle and the lateral ventricle. After the emission of the I caudal medial hemispheric branch to the tentorial part of the medial surface of the cerebral hemisphere, the caudal cerebral artery started to form a caudal interhemispheric artery (Figure 2). It ascended ramifying on the medial surface of the cerebral hemisphere, following the parahippocampal gyrus, emitting medial caudal hemispheric branches, and its terminal branch before reaching the caudal pole received an anastomose, which bordered the corpus callosum's splenium, from the terminal branch of the rostral interhemispheric artery, branch of the rostral cerebral artery (Figure 2). In 53.3% to the right and in 63.3% to the left, the caudal cerebral artery was a single vessel; however in 46.7% to the right and in 36.7% to the left, the caudal cerebral artery was double, with the most rostral vessel always being the one with a bigger caliber, and the caudal component was an independent caudal choroidal artery, originated from the terminal homolateral branch of the basilar artery (Figure 1). When the caudal cerebral artery ascended, the lateral surface of the cerebral peduncle emitted thin central branches, which were ventrally distributed on the most caudal third of the piriform lobe (Figure 1). To the right, the emitted branches frequency was: 2 branches in 53.3%, 3 branches in 20%, 4 branches in 16.7%, and 1 branch in 10%. To the left, the frequency of the central branches to the caudal third of the piriform lobe was: 3 branches in 40%, 2 branches in 26.7%, 1 branch in 20% and 4 branches in 13.3%. The caudal choroidal artery was a vessel of thin caliber, being either double or single and originated from two different sources (Figure 3). It was dorsomedially projected vascularizing the hippocampus, ventrally accompanying the fimbria, reaching and running through the terminal stria, emitting branches to the choroid plexuses of the III ventricle and lateral ventricle. In the cases of duplicity, it was observed that either both vessels were emitted as branches of the caudal cerebral artery or a vessel was emitted by it and the other was emitted by the terminal branch of the basilar artery (Figure 3). In the cases of duplicity of the caudal cerebral artery the most caudal vessel and of smaller caliber was a caudal choroidal artery. This component emitted innumerous small branches to the adjacent areas of the thalamus, ending at the level of the III ventricle ceiling. In 46.6% of the cases to the right and in 36.7% to the left the caudal choroidal artery was double, being a branch of the caudal cerebral artery and another branch of the right terminal branch of the basilar artery. In one of these cases to the left, the first branch emitted from the caudal cerebral artery, the caudal choroidal artery presented an atypical trajectory, accompanying the main axis of the caudal cerebral artery, reaching the III ventricle ceiling. But in 26.7% to the right and in 33.3% to the left, the caudal choroidal artery also presented duplicity, being the both vessels sequential branches of the caudal cerebral artery. In one of these findings to the right, the branch emitted from the caudal cerebral artery, the caudal choroidal, presented an atypic trajectory, bordering the dentate gyrus caudally to the main axis of the caudal cerebral artery and caudal interhemispheric artery, arrested by its branches, until it reached the III ventricle ceiling. And the caudal choroidal artery in 26.7% to the right and in 30% to the left was a single vessel emitted from the caudal cerebral artery. The main axis of the caudal cerebral artery continued as caudal interhemispheric artery, its termi-

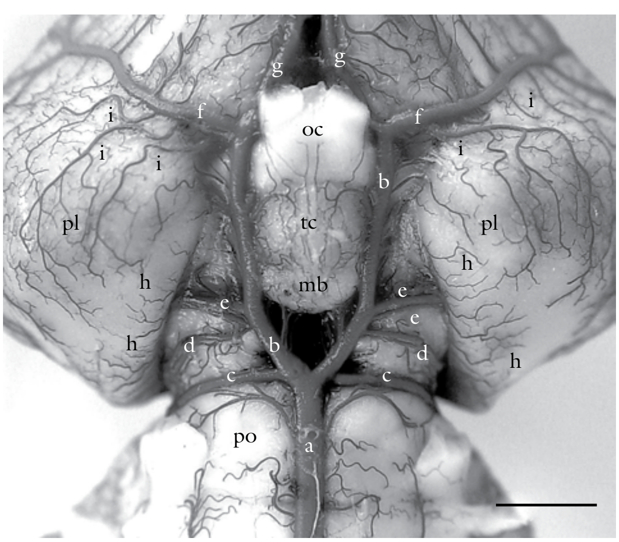

Figure 1. Ventral view (detail) of the brain base in chinchilla. a - basilar artery, b - terminal branches of the basilar artery, c - rostral cerebellar artery, d - tectal rostral artery, e - caudal cerebral artery, f - middle cerebral artery, g - rostral cerebral artery, h - central branches of the caudal cerebral artery to the piriform lobe, i - caudal central branches, oc - optic chiasma, pl - piriform lobe, tc - tuber cinereum, mb - mammillary body, po - pons. Bar = 3 mm.

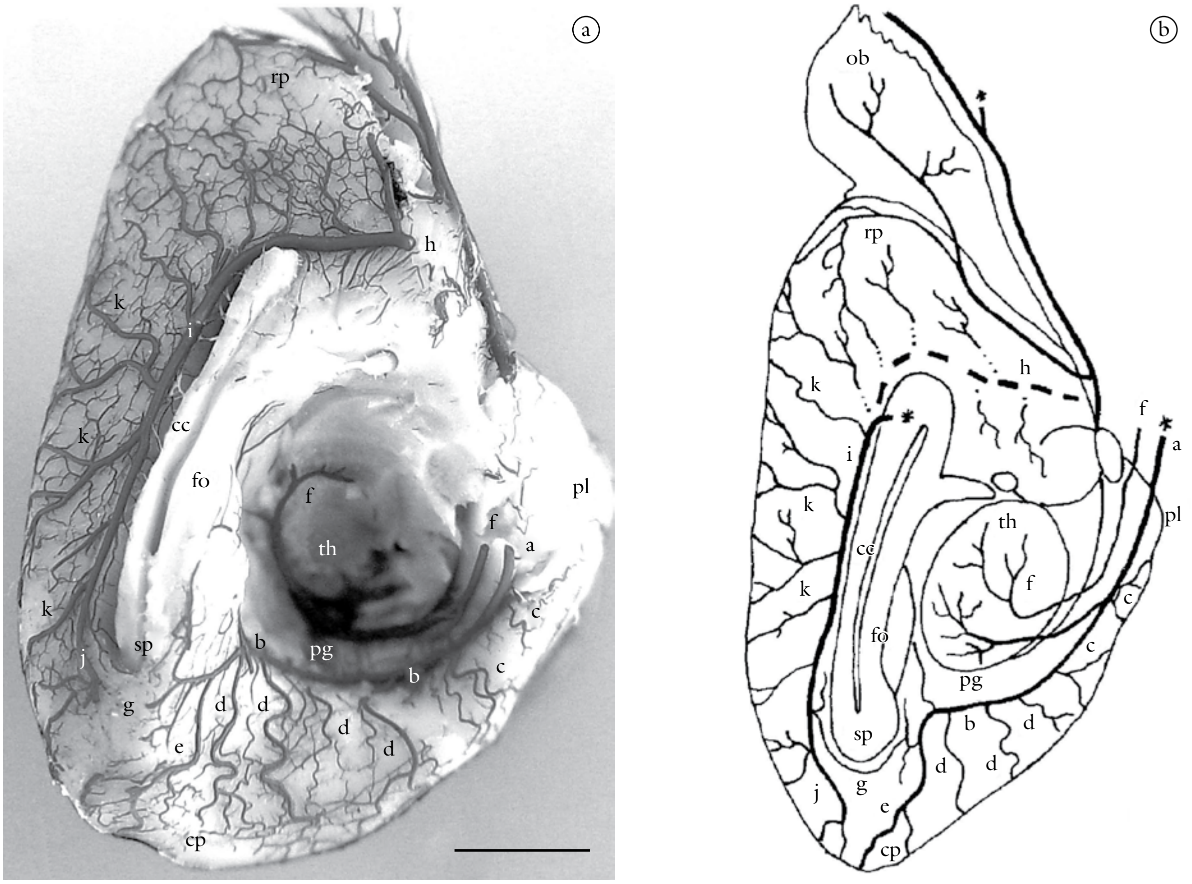

Figure 2. Medial view of the left cerebral hemisphere in the chinchilla, showing pattern distribution of the caudal cerebral artery. a) detail; and b) schematic draw, a - caudal cerebral artery, b - caudal inter-hemispheric artery, c - central branches to the piriform lobe, d - caudal medial hemispheric branches, e - terminal branch of the caudal cerebral artery, f - rostral choroidal artery, g - anastomose of the terminal branch of the rostral (left branch) and caudal inter-hemispheric arteries, h - rostral inter-hemispheric artery, i - left branch of the inter-hemispheric artery, j - terminal branch of the left branch of the rostral inter-hemispheric artery, k - rostral medial hemispheric branches of the left branch of the rostral inter-hemispheric artery, l - caudal choroidal artery, ob - olfactory bulb, rp - rostral pole, pl - piriform lobe, cc - corpus callosum, fo - fornix, sp - splenium of the corpus callosum, th - cut surface of thalamus, pg - parahippocampal gyrus, cp - caudal pole. Bar = 3.6 mm.

nal branch, from the point it started to emit caudal medial hemispheric branches, which supplied the tentorial part of the medial surface of the cerebral hemisphere (Figure 2). Its terminal axis progressed towards the caudal pole of the cerebral hemisphere. During its trajectory, accompanying the border of the parahippocampal gyrus, the interhemispherical artery emitted a variable number of caudal medial hemispheric collateral branches to the narrow tentorial part of the medial surface of the cerebral hemisphere (Figure 2). To the right the frequency of the emitted branches was: 4 branches in 40%, 5 branches in 26.6%, 3 branches in 16.7%, 2 in 6.7%, 6 in 6.7% and 7 branches in 3.3%. To the left, the branches frequency was: 4 branches in 40%, 5 branches in 30%, 6 branches in 13.3%, 2 in 6.7%, 7 branches in 6.7%, 3 branches in 3.3%. The terminal ramifications of the caudal cerebral artery, right and left, made an anastomose with the terminal ramifications of the rostral cerebral artery, right and left, on the medial surface of the cerebral hemisphere at the level of the corpus callosum's splenium and/or next to the caudal pole (Figure 2). In 83.3% to the right and in 76.7% to the left, the terminal branch of the rostral interhemispheric artery emitted a thin anastomotic branch to the terminal branch of the medial branch of the caudal interhemispheric artery, which bordered the corpus callosum's splenium in the callosum sulcus interior. However in 16.7% to the right and in 23.3% to the left, the terminal branch of the rostral interhemispheric artery, of middle caliber, formed a big arch which made an anastomose with the terminal branch of the medial branch of the caudal interhemispheric artery, on the medial surface of the cerebral hemisphere, next to the caudal pole. Were also observed anastomose between the terminal ramifications of the caudal cerebral artery with the terminal ramifications of the middle cerebral artery on the convex surface of the cerebral hemisphere, bordering all the cerebral transverse fissure and on the caudal third of the piriform lobe. Other arteries complemented the vascularization territory of the caudal cerebral artery, such as the rostral tectal and choroideal arteries. The rostral tectal artery was present, in the great majority of the pieces, as a single vessel, laterally emitted by the terminal branches of the basilar artery, right

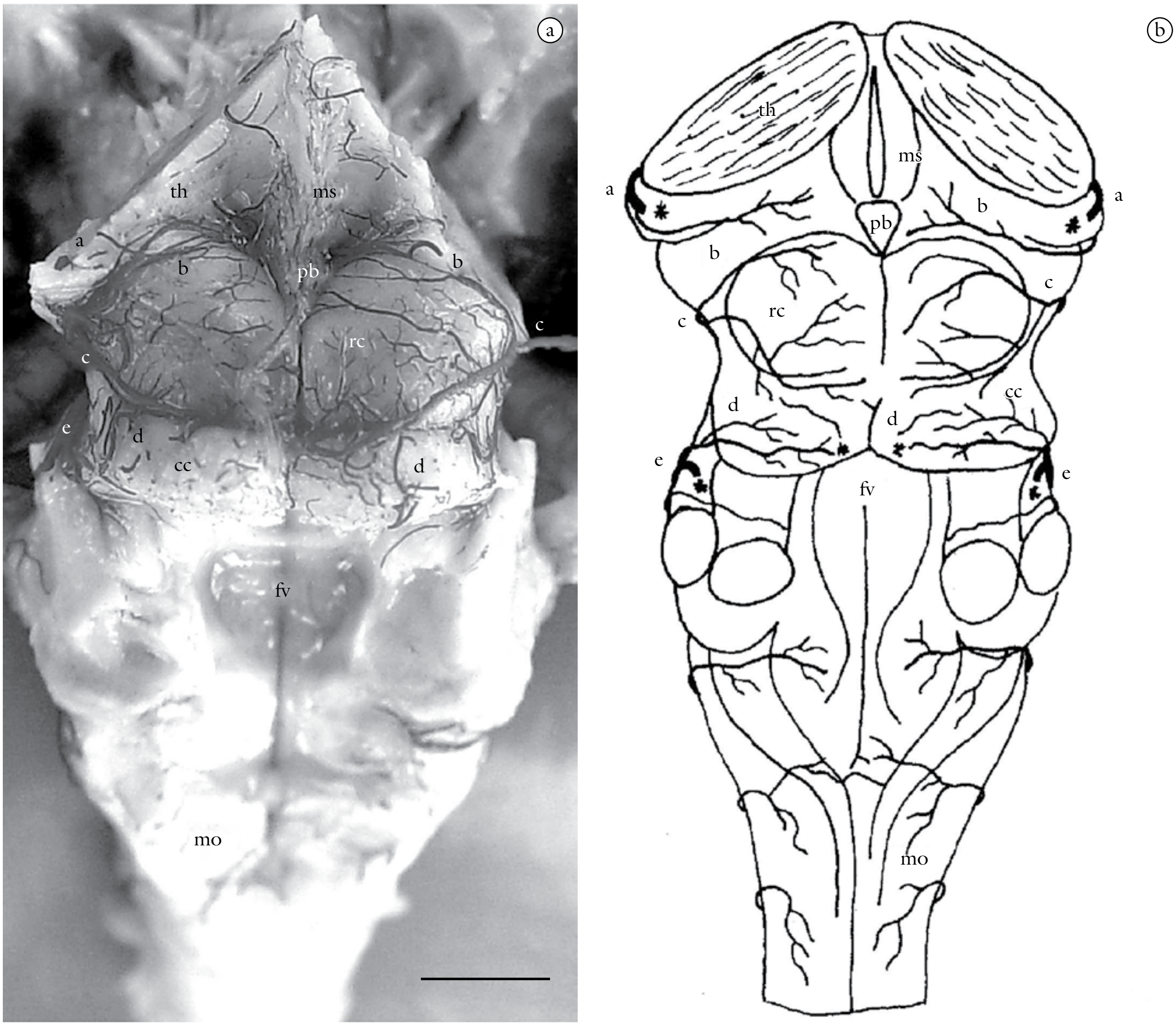

Figure 3. Dorsal view of the brain stem in chinchilla. a) detail; and b) schematic draw, a - caudal cerebral artery, b - caudal choroidal artery, c - rostral tectal artery, d - caudal tectal artery, e - rostral cerebellar artery, th - thalamus, ms - medular stria, pb - pineal body, rc - rostral colliculus, cc - caudal colliculus, mo - medulla oblongata, fv - fourth ventricle floor. Bar = 2.2 mm.

and left, between the caudal cerebral and rostral cerebellar arteries, on the ventral surface of the mesencephalus (Figure 3). It laterodorsally bordered the cerebral peduncle towards the mesencephalic tectus, reaching the rostral colliculi. Its terminal ramifications on the dorsal surface of the mesencephalic tectus made an anastomose with the terminal ramifications of the caudal tectal artery, branch of the rostral cerebellar artery. In 96.7% to the right and in 90% to the left, the rostral tectal artery was a single vessel. However in 3.3% to the right and in 10% to the left, two rostral tectal arteries were emitted from the terminal branches of the basilar artery. The rostral choroidal artery was a single vessel, of thin caliber and emitted from the terminal branch of the basilar artery, right and left, at the level of the optic tracts (Figure 2). It was caudally projected following the optic tract, bordered the cerebral peduncles and penetrated in the transverse fissure of the brain, surpassing the lateral geniculate body, while rostrally running down the fimbria, to the end anastomosing with the caudal choroidal branch of the caudal cerebral artery, forming the choroidal plexus of the III ventricle and penetrating through the interventricullar foramen to form the choroidal plexus of the lateral ventricle. In 100% of the preparations, on both antimeres, the rostral choroidal artery was present as a single vessel. In 93.3% to the right and in 100% to the left, it was a branch of the terminal branch of the basilar artery. But in 6.7% to the right the rostral choroidal artery was substituted by an atypical branch, rostrodorsally projected from the right caudal cerebral artery. The territorial area of the caudal cerebral artery in chinchilla (*Chinchilla lanigera*) comprehended the caudal third of the piriform lobe, the pineal body, the medular stria, the habenula, the dorsal surface of the thalamus, the lateral and medial geniculate bodies, the hippocampus, the choroidal plexus of the III ventricle and the lateral ventricle, the corpus callosum's splenium, the tentorial part of the medial surface of the cerebral hemisphere and on the convex surface, the limitant border, bordering the cerebral transverse fissure (Figure 4).

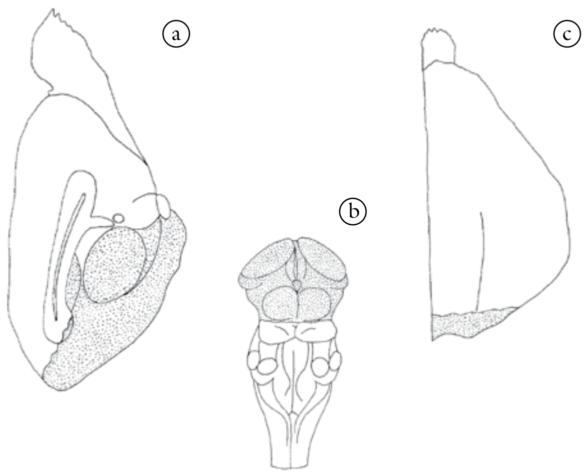

Figure 4. Schematic representation showing the territory of the caudal cerebral artery on the surface of the brain in chinchilla. The stippled area corresponds to the distribution of the branches of the caudal cerebral artery. a) medial view of the left cerebral hemisphere; b) dorsal view of the brain stem; and c) dorsal view of the right cerebral hemisphere.

4 Conclusion

Araújo and Campos (2005) in their systematic work about the arteries of the brain's base in chinchilla concluded that the blood supply to the brain of this species was dependent on a single source constituted by the terminal branches of the vertebral arteries, forming the vertebrobasilar system. They cite that when the vertebral arteries penetrate into the foramen magnum they anastomosed forming the basilar artery (LIBRIZZI, BIELLA, CIMINO et al., 1999; PANESAR, HAMRAHI, HAREL et al., 2001; SCREMIN, 1995). The basilar artery emitted some collateral branches, such as the caudal cerebellar artery (AZAMBUJA, 2006; RECKZIEGEL, LINDEMANN and CAMPOS, 2001), was rostrally directed until the bridge where it was divided into its two terminal branches (AZAMBUJA, 2006; RECKZIEGEL, LINDEMANN and CAMPOS, 2001). As collateral branches of the terminal branches of the basilar artery were systematized the rostral cerebellar, rostral tectal, caudal cerebral arteries, and as the last collateral branch the middle cerebral artery (RECKZIEGEL, LINDEMANN and CAMPOS, 2001). Still for Araújo and Campos (2005), the rostral cerebral artery was the terminal branch of the terminal branches of the basilar artery, being a developed vessel, in the great majority of the pieces, on both antimeres (AZAMBUJA, 2006; RECKZIEGEL, LINDEMANN and CAMPOS, 2001). It presented as collateral branches the arteries rostral interhemispheric, lateral of the olfactory bulb, medial of the olfactory bulb and internal etmoidal, its terminal branch (ARAÚJO and CAMPOS, 2005; AZAMBUJA, 2006).

To Araújo and Campos (2005) in chinchilla, the caudal cerebral artery was emitted from the terminal branch, right and left, of the basilar artery (De VRIESE, 1905), when it started again to be rostrally projected at the level of the Oculomotor nerve (III cranial pair), turning laterodorsally, bordering the cerebral peduncle reaching the cerebral transverse fissure (AZAMBUJA, 2006; RECKZIEGEL, SCHNEIDER, EDELWEISS, et al., 2004). According to Scremin (1995) in rats, the caudal cerebral artery was originated from the initial part of the rostral cerebral artery (terminal branch of the basilar artery when it anastomosed with the caudal communicating artery, branch of the internal carotid artery), however to Librizzi et al. (1999) in *Guinea pig* the caudal communicating artery emitted the caudal cerebral arteries and to Panesar et al. (2001), studying the additive cortex of chinchilla observed that the caudal cerebral artery appeared as caudal communicating branch of the internal carotid artery, at the level of the cerebral peduncles.

To Azambuja (2006) in nutria, the caudal cerebral artery was a single vessel in the great majority of the samples and on both antimeres, having a big similarity with chinchilla on the percentage occurrence. Reckziegel et al. (2001) in capybara observed cases of duplicity of the caudal cerebral artery, and it was also found in chinchilla. However, in chinchilla, the most rostral vessel was always the bigger caliber and, the caudal component was an independent caudal choroidal artery originated from the homolateral terminal branch of the basilar artery. Still for Araújo and Campos (2005) and Reckziegel et al. (2001), the caudal cerebral artery presented cases of triplicity in a few preparations. According to Librizzi et al. (1999), studying the arterial blood supply to the limbic structures in *Guinea pig*, classified the caudal cerebral artery as double, and the rostral vessel supplied the rostral colliculi, the dorsal diencephalus and part of the limbic system, and the caudal vessel was responsible for the vascularization of the cerebellum, the bridge and the mesencephalus (rostral and caudal colliculus).

According to Reckziegel et al. (2004) studying the caudal cerebral artery anatomy on the surface of the brain in capybara, observed that this artery was directed towards the caudal part of the piriform lobe and emitted, as first collateral branch, the rostral tectal artery in a few hemispheres. But in chinchilla the main axis of the caudal cerebral artery emitted central branches to the piriform lobe, but its first collateral branch was the caudal choroidal artery, continuing as caudal interhemispheric artery. To the same authors, the rostral tectal artery was collateral branch of the terminal branch of the basilar artery, in the majority of the hemispheres, being the same found in chinchilla. Also to Reckziegel et al. (2004), the rostral tectal artery was distributed on the mesencephalic tectus including the rostral colliculi and part of the caudal colliculi. However in chinchilla, the rostral tectal artery was a vessel, which complemented the vascularization area of the caudal cerebral artery, irrigating only the rostral colliculus. According to Screminn (1995) the caudal cerebral artery emitted, after its union with the caudal communicating artery, the transverse colliculi artery to the rostral colliculi surface, followed by the longitudinal hippocampal artery and, to the end, the caudal lateral choroidal artery which irrigated the choroidal plexus of the lateral ventricle and the rostral part of the choroidal plexus of the III ventricle. To Reckziegel et al. (2004) in capybara the caudal choroidal artery was collateral branch of the caudal cerebral artery, being single, in the great majority of the pieces, double or absent, contributing for the formation of the choroidal plexus of the III ventricle and lateral ventricle through the anastomosis with the rostral choroidal artery. In chinchilla, the caudal choroidal artery vascularized the same structures described in capybara, besides the hippocampus. According to Michalska (1995) in his study about the cerebral vascularization in *Guinea pig*, the vessels which irrigated the mesencephalus were branches of the arteries caudal cerebral, rostral cerebellar, caudal and choroidal communicating, being these arteries divided in medial, lateral and caudal vessels. The caudal branches irrigated, mainly, the mesencephalic tectus.

Reckziegel et al. (2004) described that the caudal cerebral artery emitted a variable number of cortical branches, which were distributed on the caudal surface of the piriform lobe and on the tentorial surface of the cerebral hemisphere, where they anastomosed with the cortical branches of the middle cerebral artery. In chinchilla these ramifications reached the convex surface of the cerebral hemisphere, to than anastomose with the terminal ramifications of the middle cerebral artery. Other authors like Screminn (1995) denominated as cortical branches the vessels which were dorsolaterally directed reaching the surface of the occipital cortex. And also to Librizzi et al. (1999) and Michalska (1995), both in *Guinea pig*, the caudal cerebral artery also emitted branches to the neocortical, occipital, parietal and temporal areas.

Reckziegel et al. (2004) also described in capybara that after the cortical branches sequence, the terminal branches of the caudal cerebral artery reached the retrosplenium, on the medial surface of the cerebral hemispheres, where it emitted a rostral anastomotic branch to the corpus callosum's artery, terminal branch of the rostral cerebral artery, and these were dorsally projected towards the convex surface until the marginal sulcus level. In chinchilla, there was also the anastomosis among the terminal branches of the rostral and caudal arteries (SCREMIN, 1995), however the terminal branch of the caudal interhemispheric artery presented a progression towards the caudal pole and one of its collateral branches received, at the corpus callosum's splenium level and/or next to the caudal pole, an anastomosis from the terminal branch of the rostral interhemispheric artery, branch of the rostral cerebral artery.

To Azambuja (2006) on his systematization of the arteries of the base of the brain in nutria (*Myocastor coypus*), the rostral choroidal artery was collateral branch of the terminal branch of the basilar artery, emitted at the level of the optical tracts, caudally projected, bordering the cerebral peduncles and penetrating the cerebral transverse fissure, forming the choroidal plexuses of the III ventricle and lateral ventricle, being the same observed in chinchilla.

To make a vascular anatomical comparison of the results found in chinchilla, we searched for references in other animals located bellow or above in the zoological scale, like the opossum, the dog and the pampas fox, in order to try to get some clearance about the philogenetic development on this species.

In the study of the opossum's brain morphology, Beccari (1943) classified this species brains as macrosmotic, without corpus callosum, which presented a huge olfactory bulb with a short and thick peduncle and large olfactory tracts, which distributed their fibers in a big paliopallium area, correspondent to the surface of the olfactory trigone, cerebral lateral fossa and piriform lobe. All this wide area corresponds to the base of the cerebral hemisphere, being extended until the lateral surface where it is limited by the lateral rhinal sulcus. To the author, the neopallial area is not much long and limited between the lateral rhinal and hippocampal sulci, on the convex and medial surfaces of the hemisphere, not presenting sulci or cissures nor gyri, so this animal is considered lissencephalic. According to Lindemann and Campos (2002) in opossum (*Didelphis albiventris*), the caudal cerebral artery was originated from the caudal communicating artery (caudal branch of the internal carotid artery), on the middle third of the cerebral peduncle, turning laterodorsally and bordering the cerebral peduncles to penetrate in the cerebral transverse fissure's interiors. Its main axis completely circled the peduncles, towards the mesencephalic tectus, when was rostromedially projected, passing between the rostral colliculi and the caudolateral portion of the thalamus. Next to the rostral tubercle of the thalamus, the terminal branch was dorsally projected reaching the caudal portion of the medial surface of the cerebral hemisphere, where it anastomosed with the tentorial branch to form the caudal interhemispheric artery in the great majority of the samples, on both antimeres. On the last preparations, the terminal branch of the caudal cerebral artery did not anastomose with its tentorial branch, ending its trajectory on the medular stria and choroidal tela of the III ventricle, so only the tentorial branch of the caudal cerebral artery formed the caudal interhemispheric artery. The caudal interhemispheric artery anastomosed with the rostral interhemispheric artery, branch of the rostral cerebral artery, on the middle third of the medial surface of the cerebral hemisphere. The caudal cerebral artery originated two main collateral branches: the tentorial hemispheric branch and the rostral tectal artery.

The absence of corpus callosum in the opossum seams to have allowed the advance of the caudal cerebral artery and its ramifications on the medial surface of the cerebral hemisphere, while the rostral cerebral artery was limited to a half of this surface. The tentorial branch in the opossum, which emitted the caudal medial hemispheric arteries, seams to correspond to caudal interhemispheric artery of chinchilla, in spite of it had formed a very well developed handle, it did not correspond to the one found in this. But the terminal branch of the caudal cerebral artery of the opossum, very well developed, presented a similar trajectory to a caudal choroidal artery, before anastomose with the tentorial branch.

Referring to the carnivore's brain morphology, Beccari (1943) classified this animal group as macrosmatic, being in an intermediate position between lower mammals and simians, because they present a large olfactory center, a long and pleated neopallium, with corpus callosum, being this last one not much large when compared to the primates, in consequence the rostral and dorsal archipallium (hippocampus) was very reduced. According to Nanda (1981) in his considerations about the blood supply to the dog's brain, the caudal cerebral artery had its origin by the junction of the caudal communicating artery with the mesencephalic artery (terminal branch of the basilar artery), next to the origin of the Oculomotor nerve, laterally bending over the cerebral peduncle to ascend on the rostral colliculi and medial geniculate body. More rostrally it was related to the parahippocampal gyrus and lateral geniculate body at the level of the corpus callosum's splenium, where finalized its trajectory on the caudal third of the callosum sulcus, to anastomose with the rostral cerebral artery. The caudal choroidal branch was originated from the caudal cerebral artery, next to its emission. It was dorsally projected into the cerebral peduncle and reached the caudal part of the lateral geniculate body, rostrally to the rostral colliculi. One or two terminal branches of the caudal choroidal branch continued rostrally in the thalamus and contributed to the blood supply of the choroidal plexus of the III ventricle, pineal body and the associated structures. The caudal cerebral artery, after emitting the branches cited above, was located under the cerebral hemisphere, where it dorsally ran the optical tract, under the parahippocampal gyrus emitting branches which supplied the lateral geniculate body and the dorsal thalamic areas, also contributing for the choroidal plexus of the lateral ventricle and the III ventricle. During this pathway the caudal cerebral artery emitted several cortical branches, which were distributed on the medial surface and on the caudal pole of the cerebral hemisphere, including the caudal part of the piriform lobe.

Depedrini and Campos (2007) in pampas fox (*Pseudalopex gymnocercus*) observed that the caudal cerebral artery was, normally, a single vessel and collateral branch of the caudal branch (caudal communicating artery) of the internal carotid artery. The main axis of the caudal cerebral artery, soon after its origin, emitted a rostral tectal artery, and continued, projecting dorsolaterally bordering the cerebral peduncle, to the cerebral transverse fissure's interiors, forming a convex arch. Before reaching the medial geniculate body it emitted collateral branches to the piriform lobe, one caudal choroidal branch to the dorsal surface of the thalamus and choroidal plexus of the third ventricle, and caudal medial hemispheric branches to the tentorial part of the medial surface of the cerebral hemisphere. Its main axis, the caudal interhemispheric artery, curved under the parahippocampal gyrus, ascending and ramifying on the medial surface of the cerebral hemisphere. Its terminal branch bordered the splenium of the corpus callosum until it reached the caudal pole of the cerebral hemisphere.

According to Beccari (1943) the rodents are macrosmatic animals (present the paliopallial area well developed), generally lissencephalic, that is, do not present gyri nor sulci on the neopallial surface and present a not well developed corpus callosum. The telencephalus is well developed caudally covering the entire mesencephalus's region.

The rostral tectal artery, even in the opossum as in the confronted canidae, was generally, collateral branch of the caudal cerebral artery, meanwhile in the chinchilla as in the great majority of the capybaras, was a branch of the terminal branch of the basilar artery. Because of that this artery was systematized as a vessel, which complemented the territory of the caudal cerebral artery.

In the opossum the medial surface of the cerebral hemisphere was observed, besides the corpus callosum absence, the presence of a big septal area, a rostral and dorsal hippocampus, separated by a hippocampal sulcus of the neopallium of this surface. These structures (rostral and dorsal hippocampus) in chinchilla were atrophied due to the corpus callosum appearance. So it seams to have had a territorial area restriction of the caudal cerebral artery for the tentorial part of the medial surface of the cerebral hemisphere.

The territory of the caudal cerebral artery in dogs and in pampas fox presented a little advance on the non tentorial part of the medial surface of the cerebral hemisphere, what did not happen in chinchilla. This advance was not very big in opossum reaching until the half of this medial surface. However, even in chinchilla as in the canidae, this surface is all neopallium, while in the opossum is dorsal hippocampus (archipallium). Regarding the territorial areas of the caudal cerebral artery, when compared to the territory found in canidae to the same proportional area in chinchilla, it was observed a big increase or advance in the caudal cerebral artery territory on the medial surface of the cerebral hemisphere of this marsupial.

Acknowledgements: This work was supported by grants from CAPES.

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Received April 2, 2008
Accepted June 2, 2008