AJNR

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AJNR Am J Neuroradiol 2006, 27 (6) 1161
http://www.ajnr.org/content/27/6/1161.2

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Purkayastha et al[1] reported 3 cases of proatlantal intersegmental arteries of external carotid artery origin associated with Galen's vein malformation; however, because of their configuration, I believe that the 3 cases do not demonstrate this rare arterial variation, but rather show collateral blood flow from the occipital artery (OA) to the vertebral artery (VA). In patients with a vein of Galen malformation, the intra-arterial blood pressure in the VA is lower than that in the OA because of blood steal phenomenon at the malformation. It is well known that there is a cervical arterial collateral network between OA, VA, and the deep cervical artery arising from the subclavian artery.[2] If one of these arteries is occluded, the remaining arteries and their branches are dilated and supply the distal segment of the occluded artery. The 3 cases reported by Purkayastha et al have a similar condition to proximal VA occlusion and therefore should not be considered proatlantal arteries.

References

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2. Bosniak MA. **Cervical arterial pathways associated with brachiocephalic occlusive disease.** *AJR Am J Roentgenol* 1964;91:1232–44

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Reply:

The proatlantal artery of external carotid artery origin ascends lateral to the transverse processes of the first cervical vertebra in the neck up to the medial aspect of the mastoid process to join the vertebral artery as seen in the anteroposterior view. In the lateral view, it ascends obliquely posterosuperiorly and passes at the level of the foramen transversarium of the atlas. The type II proatlantal artery arising from the external carotid artery was also described as the first cervical intersegmental artery, which joins the vertebral artery before entering the foramen magnum. Proatlantal arteries also give rise to the occipital arteries. The proatlantal arteries of external carotid artery origin have a similar course to that of the occipital artery. It is doubtful whether the proatlantal artery of external carotid artery origin is merely a hypertrophied collateral occipital artery. This happens when the vertebral artery is hypoplastic. In our patients, however, in the presence of normal bilateral vertebral arteries it is the proatlantal arteries that gave rise to the occipital arteries on both sides. These occipital arteries are smaller in caliber than the proatlantal arteries. This finding also supports the view suggested by Lasjaunias et al[1] that the distal part of the occipital artery might be derived from the proatlantal artery.

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1. Lasjaunias P, Theron J, Moret J. **The occipital artery.** *Neuroradiology* 1978;15:31–37

Age and Gender Effects on Normal Regional Cerebral Blood Flow

We read with great interest the article of Takahashi et al.[1] The article points out the use of 3D stereotactic surface projections (3D-SSP) to study the age-effect on regional cerebral blood flow (rCBF). The greatest rCBF reduction observed was in the bilateral anterior cingulate. Although we generally agree with the conclusions, we would like to emphasize some methodologic issues that may have had an impact on the obtained results.

In the study, 31 healthy volunteers between 50 and 79 years were classified in 3 different age classes (50–59, 60–69, and 70–79 years). Statistical analysis was performed 2 by 2 by using unpaired Student *t* test. Rather than considering age as a discrete variable, the analysis would have been strengthened by performing a multivariate analysis based on the general linear model with regions as intrasubject factor and sex as intersubject factor. The sex should also have been considered as a covariate, because rCBF has been shown to be sex dependent in a second order.

In 2004, we presented a similar analysis by using 3D-SSP[2] of a previously published normal data base constituted of 89 healthy volunteers (46 women and 43 men; age range, 21–81 years) acquired on a triple-head camera.[3] By using the previously described multivariate analysis, both age and sex had significant interaction with rCBF. Like Takahashi et al, we found a significant age-related decline ($P < .001$) in the anterior cingulated gyrus and left frontal association cortex, as well as in the left insula and peri-insular cortex. Moreover, we found also a significant relative increased perfusion in the bilateral occipital association and left primary visual cortex. Concerning the sex effect, women showed higher uptake in parietal ($P = .001$) and right sensorimotor cortex ($P = .002$) and a lower uptake in the left temporal associative cortex ($P = .002$). An age-by-sex interaction ($P < .01$) was found only in the left medial frontal cortex, in line with a known higher vulnerability of the left frontal lobe in men compared with women.

Of major importance, although 3D-SSP seems to be better for the analysis of atrophied brain than other analysis methods, it cannot be stated that the partial volume effect can be totally excluded. It is known that the anterior cingulate shows a marked age-related regional atrophy (eg, based on voxel-based morphometry studies).[4] In the latter study, it was shown that in the anterior cingulate and other regions the changes of perfusion with aging fully paralleled underlying atrophy effects. Therefore, in our opinion, it should be acknowledged that atrophy is not fully taken into account by 3D-SSP and that a direct comparison between partial-volume corrected and uncorrected data should be made to assess to what extent the effect of atrophy on a 3D-SSP analysis is less than other voxel-based techniques such as statistical parametric mapping.

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