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Anatomical variations of the carotid arteries: kinking, coiling, and tortuosity. Anatomical and functional considerations

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This research is part of an ongoing inter-university project regarding the variations of the common and intern carotid arteries.

The anatomical variations of the course of the carotid arteries are not a rare condition and are reported in the literature as tortuosity, coiling and kinking.

"Tortuosity" is described as "S" or "C"-shaped elongation or undulation of the carotid arteries; "coiling" is defined as an elongation or redundancy of the arteries resulting in a circular configuration; and "kinking" is described as an angulation of arteries, and classified according to the severity of the angle between the two segments forming the kink.

These definitions can be confusing and also the etiology of the morphological abnormalities of the carotid arteries is a matter of debate.

Our study covers 326 patients (between January 2006 and March 2010) with carotid pathology that were submitted to imaging diagnostic by duplex scan, digital subtraction angiography or CT-angiography. And it is focused on 35 cases of extracranial carotid abnormalities from which we present: 4 cases of kinking, 2 cases of coiling and 1 case of tortuosity; and also 1 case of carotid kinking discovered during practical dissection which was included in the present study.

As shown the course and length of the carotid arteries present a great variability, that increases with age.

The most variable segment of the arterial axis is located between the carotid artery bifurcation and the posterior belly of the digastric muscle.

Imagistic evaluation is mandatory in discovering this type of morphological abnormalities.

Course variations and angulation of the carotid arteries produce changes in the laminar flow, that lead to swirls which usually evolve all the way to strictures and stenosis. In order to improve the cerebral blood flow, the treatment has to correct the hemodynamic effects of the atherosclerotic carotid disease, and in the same time, the eventual abnormalities in the course of the ICA.

Key words

Carotid arteries, carotid kinking, carotid coiling, anatomical variations