Structural organization of the vertebral artery in the giraffe (Giraffa camelopardalis)

Kimani, JK

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Abstract:

Vertebral arteries in the giraffe were removed and their structural organization was studied with light microscopy. It has been shown that the caudal segment of the vertebral artery extending to the level of the seventh cervical vertebra has a largely elastic structure, while the cranial segment has a muscular structure. The transition of the arterial wall normally occurs between the seventh and fifth cervical vertebral levels, and involves diminution of elastic tissue in the luminal portion of the tunica media and simultaneous increase of the smooth muscle content. The smooth muscle cells in the cranial portion show a clustered arrangement consisting of several smooth muscle fibres. The individual clusters are separated by connective tissue septa from which finer strands extend to surround individual muscle fibres. It is suggested that the vertebral and carotid arteries though found in the neck have a different structural organization, which, in turn, may imply that the two blood vessels are subjected to different haemodynamic demands. The findings of this study therefore render further support to the statement that the largely muscular structure of the common carotid artery in the giraffe may be related to the unique cerebral haemodynamics of this animal, rather than being a common feature of the blood vessels situated in the neck. A corollary to this suggestion is the fact that, in the giraffe, as in most other Artiodactyls, the vertebral blood does not participate in the supply of cephalic structures because it is confined to the cervical region by the pressure barrier in the carotid-vertebral anastomosis