Internal carotid artery C4 segment

C4 (cavernous): covered by vascular membrane lining sinus, still surrounded by PGSNs. Passes anteriorly then supero-medially, bends posteriorly (medial loop of ICA), travels horizontally, and bends anteriorly (part of anterior loop of ICA) to anterior clinoid process. Ends at the proximal dural ring (incompletely encircles ICA), which is formed by the medial and inferior periosteum of the anterior clinoid process. The cavernous segment is surrounded by the cavernous sinus.

In this part of its course, the artery is situated between the layers of the dura mater forming the cavernous sinus, but covered by the lining membrane of the sinus. It at first ascends toward the posterior clinoid process, then passes forward by the side of the body of the sphenoid bone, and again curves upward on the medial side of the anterior clinoid process, and perforates the dura mater forming the roof of the sinus. The curve in the cavernous segment is called the carotid siphon. This portion of the artery is surrounded by filaments of the sympathetic trunk and on its lateral side is the abducent nerve, or cranial nerve VI.

The named branches of the cavernous segment are:

the meningohypophyseal artery

the inferolateral trunk

The cavernous segment also gives rise to small capsular arteries that supply the wall of the cavernous sinus.

Supraclinoid portion

The clinoid segment of the internal carotid artery (ICA) is the portion that abuts the clinoid process. This portion of the ICA can be directly observed only after removal of the clinoid process. The dura of the cavernous sinus roof separates to enclose the clinoid process. The clinoid segment of the ICA exists only where this separation of dural layers is present. Because the clinoid process does not completely enclose the ICA in most cases, the clinoid segment is shaped more like a wedge than a cylinder. The outer layer of the dura (dura propria) is a thick membrane that fuses with the adventitia of the ICA to form a competent ring that separates the intradural ICA from the extradural ICA. The thin inner membranous layer of the dura loosely surrounds the ICA throughout the entire length of its clinoid segment. The most proximal aspect of this membrane defines the proximal dural ring. The proximal ring is incompetent and admits a variable number of veins from the cavernous plexus that accompany the ICA throughout its clinoid segment.

The narrow space between the inner dural layer and the clinoid ICA is continuous with the cavernous sinus via an incompetent proximal dural ring. This space between the clinoid ICA and the inner dural layer contains a variable number of veins that directly communicate with the cavernous plexus. Given the inconstancy of the venous plexus surrounding the clinoid ICA, we think that categorical labeling of the clinoid ICA as intracavernous or extracavernous cannot be justified [1)].

The C4 portion was divided into three segments based on the origin of its major branches: the ophthalmic segment extended from the origin of the ophthalmic artery to the origin of the posterior communicating artery (PCoA); the communicating segment extended from the origin of the PCoA to the origin of the anterior choroidal artery (AChA); and the choroidal segment extended from the origin

of the AChA to the bifurcation of the carotid artery. Each segment gave off a series of perforating branches with a relatively constant site of termination. The perforating branches arising from the ophthalmic segment passed to the optic nerve and chiasm, infundibulum, and the floor of the third ventricle. The perforating branches arising from the communicating segment passed to the optic tract and the floor of the third ventricle. The perforating branches arises from the choroidal segment passed upward and entered the brain through the anterior perforated substance. The anatomy of the ophthalmic, posterior communicating, anterior choroidal, and superior hypophyseal branches of the C4 portion was also examined [2].

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2)
Gibo H, Lenkey C, Rhoton AL Jr. Microsurgical anatomy of the supraclinoid portion of the internal carotid artery. J Neurosurg. 1981 Oct;55(4):560-74. PubMed PMID: 7277004.