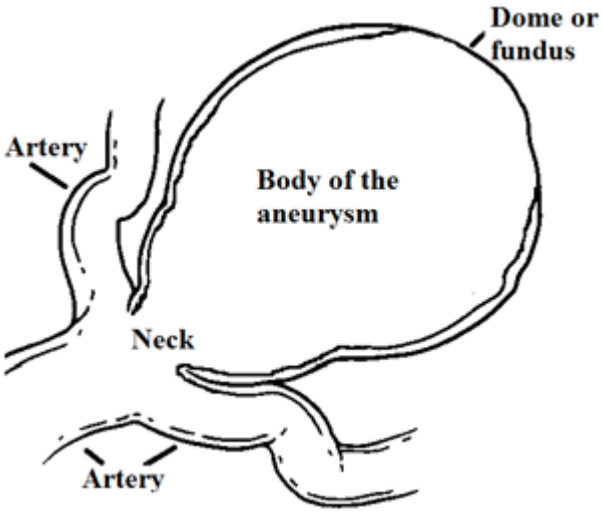
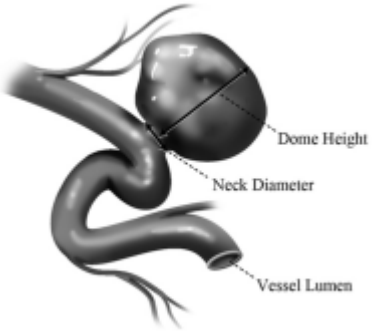
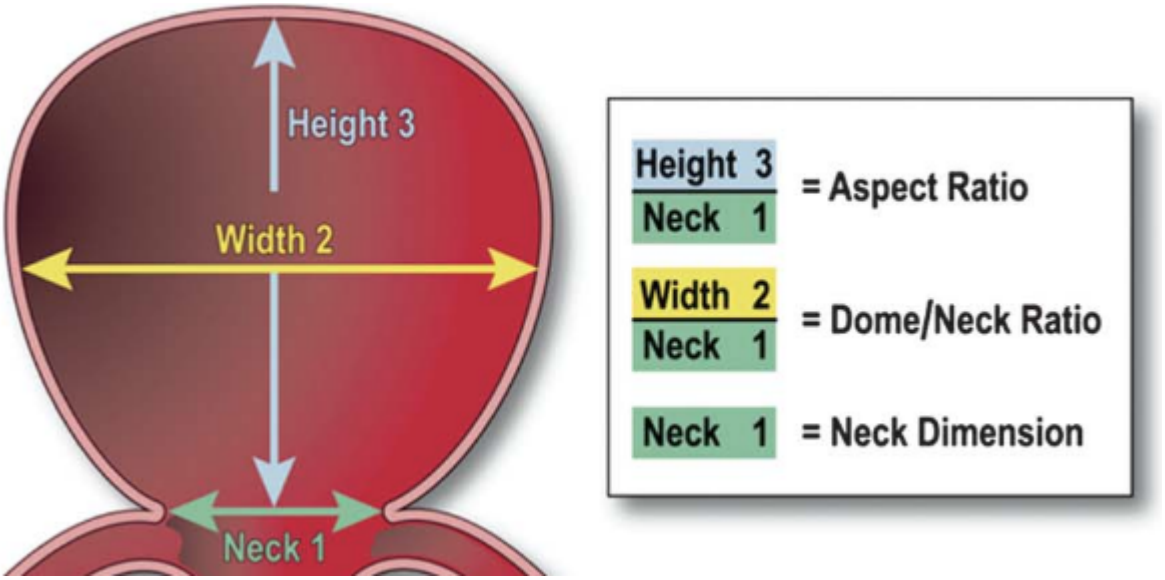
Aneurysm dome







Fifty unruptured middle cerebral artery aneurysms were analyzed. Spatial and temporal maximum pressure (Pmax) areas were determined with a fluid-flow formula under pulsatile blood flow conditions. Intraoperatively, thin walled regions (TWRs) of aneurysm domes were identified as reddish areas relative to the healthy normal middle cerebral arteries; 5 neurosurgeons evaluated and divided these regions according to Pmax area and TWR correspondence. Pressure difference (PD) was defined as the degree of pressure elevation on the aneurysmal wall at Pmax and was calculated by subtracting the average pressure from the Pmax and dividing by the dynamic pressure at the aneurysm inlet side for normalization.

In 41 of the 50 cases (82.0%), the Pmax areas and TWRs corresponded. PD values were significantly higher in the correspondence group than in the noncorrespondence group (P = .008). A receiver-operating characteristic curve demonstrated that PD accurately predicted TWRs at Pmax areas (area under the curve, 0.764; 95% confidence interval, 0.574-0.955; cutoff value, 0.607; sensitivity, 66.7%; specificity, 82.9%).

A high PD may be a key parameter for predicting TWRs in unruptured cerebral aneurysms [1].

1)
Suzuki T, Takao H, Suzuki T, Kambayashi Y, Watanabe M, Sakamoto H, Kan I, Nishimura K, Kaku S, Ishibashi T, Ikeuchi S, Yamamoto M, Fujii Y, Murayama Y. Determining the Presence of Thin-Walled Regions at High-Pressure Areas in Unruptured Cerebral Aneurysms by Using Computational Fluid Dynamics. Neurosurgery. 2016 Oct;79(4):589-95. doi: 10.1227/NEU.0000000000001232. PubMed PMID: 27028475.