Intracranial aneurysm size

Very small intracranial aneurysm (< 3 mm)

Small intracranial aneurysm (< 5 and ≥ 3 mm)

Normal sized intracranial aneurysm (5 and < 12 mm)

Large intracranial aneurysm (12-25 mm)

Giant intracranial aneurysm (> 25 mm).

Maximal size and other morphological parameters of intracranial aneurysms (IAs) are used when deciding if an IA should be treated prophylactically. These parameters are derived from postrupture morphology. As time and rupture may alter the aneurysm geometry, possible morphological predictors of a rupture should be established in prerupture aneurysms.

Twelve IAs that later ruptured were matched 1:2 with 24 control IAs that remained unruptured during a median follow-up time of 4.5 (interquartile range, 3.7-8.2) yr. Morphological parameters were automatically measured on 3-dimensional models constructed from angiograms obtained at time of diagnosis. Cases and controls were matched by aneurysm location and aneurysm size, patient age and sex, and the PHASES score (population, hypertension, age, size of aneurysm, earlier subarachnoid hemorrhage from another aneurysm, and site of aneurysm) did not differ between the 2 groups.

Only inflow angle was significantly different in cases vs controls in univariate analysis (P = .045), and remained significant in multivariable analysis. Maximal size correlated with size ratio in both cases and controls (P = .015 and <.001, respectively). However, maximal size and inflow angle were correlated in cases but not in controls (P = .004. and .87, respectively).

A straighter inflow angle may predispose an aneurysm to changes that further increase risk of rupture. Traditional parameters of aneurysm morphology may be of limited value in predicting IA rupture [1].

For a given geometry, Cebral et al. [2] showed that intracranial aneurysm hemodynamics do not vary significantly with physiological variations of flow rate, blood pressure, and waveform. Therefore, suitable parameters characterizing IA geometry can capture the characteristic hemodynamics and potentially predict rupture risk.

The most ubiquitous parameter is IA size. Although aneurysms exceeding 10 mm in size are considered to be dangerous, several studies have shown that a large percentage of ruptured aneurysms are, in fact, smaller than 10 mm [3] [4] [5] [6] [7] [8] [9].

1)
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