Follow-up of Large Intracranial Aneurysms Indicates Growth Frequency Varies According to Location and Size

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Background: Although treatment is recommended for unrepaired large aneurysms (>7mm), which have higher rupture risk, in practice some aneurysms remain under observation.[1] Detailed data about aneurysm growth during follow-up is limited.[2] In this study, we aim to investigate growth in large aneurysms by reviewing the unrepaired aneurysm cases which were followed in our center.

Hypothesis: The growth of large unrepaired aneurysms varies according to aneurysm characteristics and patient medical history.

Method: A retrospective review of patient records based on unrepaired aneurysms diagnosed in the UCLA Medical Center from 2005 to 2015 was performed. Large unrepaired aneurysms which had more than one CTA examination separated by at least 3 months were included. Aneurysm characteristics, patient information, and medical history were recorded. Univariate and multivariate logistic regression were used to analyze aneurysm growth.

Retrospective review of unrepaired intracranial aneurysms (UIAs) diagnosed in our center (2005-2015):
- Of a total of 410 CTA-followed UIAs, more than 12% are large aneurysms.

Results:
- From a total of 410 unrepaired aneurysms followed in our center, 50 large aneurysms (41 females, 9 males; age 67±12.6 years) were included: 42 aneurysms with initial size ≥7.29 mm, 7 aneurysms 13-23.9 mm, and 1 aneurysm ≥24 mm. During the average 25.6-month follow-up, 15 (30%) aneurysms enlarged and 36 (70%) were unchanged. The growth frequency of aneurysms located in ICA, MCA, ACA, BA was 40%, 23%, 20%, and 17%, respectively. The growth frequency of aneurysms of sizes 7.29-13.29 mm and ≥24 mm was 13.8%, 7.1% and 0%, respectively. Using univariate logistic regression analysis, duration of follow-up (P=0.023), and history of ischemic stroke (P=0.027) were associated with growth. Multivariate logistic regression showed only duration of follow-up as a risk factor for growth (OR, 1.056 per month; 95% CI 1.001 to 1.104; P=0.036). Only one aneurysm (ICA) ruptured in the follow-up (6 months), resulting in a rupture rate of 6.7% (1/15) enlarged aneurysms (0/15 unchanged aneurysms).

Large UIA growth rate:
- Growth rate (per year): 1.056 per month
- Percentage growth rate (per year): 0.005 per month

Aneurysm location:
- ICA: 1.056 per month
- MCA: 0.005 per month
- ACA: 0.005 per month
- BA: 0.005 per month

I Management of UIAs:
- CTAs were performed at initial diagnosis and periodically thereafter to assess growth.

C Control of UIAs:
- Transcranial Doppler (TCD) monitoring was performed to assess flow through the aneurysm.
- Communication with patients and family members on the potential risks and benefits of different treatment options.

T Treatment options:
- Observation
- Surgical intervention
- Endovascular treatment

H Hypothesis:
- The growth of large unrepaired aneurysms varies according to aneurysm characteristics and patient medical history.

Summary:
- A large percentage of aneurysms selected for observation grew, and growth frequency varied according to aneurysm location and size.
- A larger, future prospective study may identify additional factors associated with growth, including ones specific to aneurysm characteristics like location and initial size.
- Quantitative measurements of aneurysm shape changes [3] may be beneficial to help monitor large UIA's growth.

References: