Wall Enhancement in Unruptured Aneurysms is Associated with Symptomatic Presentation and Size

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Introduction

Current rupture risk models are based largely on aneurysm size and location. These models are imperfect as reflected in the aneurysm paradox– the observation that most ruptured aneurysms are small, but that small, incidentally discovered, unruptured aneurysms harbor the lowest rupture risk. It is difficult to determine which incidentally found aneurysms warrant elective treatment to prevent future rupture. Newer imaging strategies, including high-resolution magnetic resonance vessel wall imaging (MR-VWI) for the first time give us an indirect view of the vessel wall in our aneurysm patients. MR-VWI has already proven to be a potent biomarker of aneurysm rupture, and may also be useful in subcategorizing unruptured aneurysms for further risk stratification (1-6).

Methods

A prospectively maintained database of unruptured aneurysms imaged with MR-VWI was retrospectively reviewed (Chart1). Demographic information, medical comorbidities, and aneurysm properties were obtained (Table1). Two expert, blinded reviewers scored aneurysms for degree of wall enhancement (none or thin vs thick) (Fig1). A multivariate logistic regression model was built to assess factors that predicted aneurysm wall enhancement.

Results

Of the 94 unruptured aneurysms included in the final analysis, 64% had none or thin enhancement, and 36% had thick enhancement (inter-rater kappa 0.86, 95% CI=0.76-0.96). Symptomatic presentation (both suspicious headache and cranial nerve palsy) was strongly associated with thick aneurysm wall enhancement (suspicious headache OR=8.6, 95% CI=1.9-45.7; cranial nerve palsy OR=219, 95% CI=13.6-13764). Larger aneurysm size was also independently associated with aneurysm wall enhancement (OR=1.26/mm, 95% CI=1.1-1.5) (Table2).

Conclusions

Symptomatic presentation (suspicious headache, or cranial nerve palsy) and larger aneurysm size were independent predictors for thick aneurysm wall enhancement. This is the first study to determine a relationship between suspicious headache without evidence of overt SAH and aneurysm wall enhancement. This finding provides further evidence that aneurysm wall enhancement may be a useful biomarker to further risk stratify unruptured saccular intracranial aneurysms.

Learning Objectives

By the conclusion of this session, participants should be able to:

1) Recognize vessel wall enhancement of intracranial aneurysms

2) Describe the potential implications of enhancing intracranial aneurysms

3) Understand the limitations of vessel wall imaging in evaluating intracranial aneurysms

References

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