

### Surgical Modality and Symptomatic Vasospasm in Aneurysmal Subarachnoid Hemorrhage at Thomas Jefferson University

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#### Introduction

Subarachnoid hemorrhage (SAH) is a devastating disease with annual incidence of 1:10,000 in the US [1]. Aneurysmal rupture is the most common cause of non-traumatic SAH [1]. Prognosis is poor with only half of patients surviving after six months of SAH and only 58% of surviving patients recovering to their pre-SAH neurological condition [1]. For patients suffering from aneurysmal SAH (aSAH), vasospasm is the major cause of delayed morbidity and mortality [2]. Vasospasm results from contraction of intima media in cerebral blood vessels, causing ischemia in the brain, and increasing burden in an already damaged system.

Ten studies since 1998 have looked at the relationship between surgical modality and vasospasm in aSAH, yet no conclusion has been made as to whether microsurgical clipping (MC) or endovascular treatment (ET) offer more protection [4]. The purpose of this study is to 1) add to available literature on comparative rates of vasospasm for two main surgical modalities and 2) identify other risk factors for vasospasm.

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\*indicates p-value < 0.05.



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p-values < 0.05.

#### Conclusions

This study demonstrates that there is a statistically significant link between surgical modality and vasospasm in patients suffering from aSAH. MC is associated with a higher rate of any angiographic vasospasm, moderate-severe angiographic vasospasm, and intervention. This is in agreement with literature supporting ET as first-line therapy and data from The International Subarachnoid Aneurysm Trial and Barrow Ruptured Aneurysm Trial, which have shown that ET may be a better treatment in terms of mortality [4-5].

#### References

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4. McDougall CG et al. The Barrow Ruptured Aneurysm Trial. J Neurosurg. 2012;116:135-144.

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#### Methods

Retrospective study of patients treated for aSAH at Thomas Jefferson University from 2010-2013. Patient information collected included: age, gender, BMI, smoking status, drug use history, alcohol abuse, diabetes, cardiac history, hypertension history, blood pressure at presentation, fever before surgery, LDL, HDL, cholesterol, triglycerides, calcium, magnesium, vasospasm, severity, location of aneurysm, intervention for aneurysm, Hunt Hess scale, Fisher score, and modified Fisher score. Exclusion crieria: vasospasm prior to or during surgery, treatment with both MC and ET, death within 72 hours after surgery.

#### Results

231 patients met study criteria, 50 (21.6%) underwent MC, 161 (78.4%) underwent ET and there was no significant difference in baseline characteristics (Table 1).

# Table 1. Demographic and General Characteristics of MC vs. ET Table 1. Demographic addressed by the second second

**Results** (continued)

There was no statistical difference in Hunt Hess

(HH), Fisher score, or modified Fisher score

between ET and MC (Table 2). Univariate

analysis shows strong trend toward higher rate

of vasospasm in MC versus ET, however this

was not statistically significant (p = 0.05)

(Table 2). When comparing non-mild and

moderate-severe vasospasm, there was a

significant difference with ET having less (7.7%

v. 20%, p = 0.01) (Table 2). Univariate

predictors of any vasospasm were increasing

Fisher (p = 0.02), increasing modified Fisher (p

= 0.004), and decreasing aneurysm size (p =

0.05) (Table 3). Univariate values predictive of

moderate-severe vasospasm were increasing

modified Fisher (p = 0.009), decreasing

magnesium (p = 0.02), and decreasing

aneurysm size (p = 0.01) (Table 3). ET was a

predictor of decreased risk for moderate-severe

vasospasm (p = 0.015) (Table 3). Multivariate

analysis showed that decreasing aneurysm size

(p = 0.018), increasing systolic blood pressure

(p = 0.039), decreasing LDL levels (p = 0.041),

and increasing modified Fisher (p = 0.01) were

the strongest predictors of any vasospasm

(Table 4).

