

Predictors of Posterior Circulation Aneurysms in Patients with Subarachnoid Hemorrhage Michael Maurice McDowell BS; Christopher P. Kellner MD; Eric S Sussman; Zong Zhuang; Samuel S. Bruce BA; Rachel Bruce; Peter Yang BS; Stephan A. Mayer MD; E. Sander Connolly MD

Introduction

Aneurysms developing the anterior or posterior cerebrovascular circulation appear to have different natural histories and outcomes, but little is known about the role of genetic and environmental factors in the development of posterior aneurysms. We sought to assess the predictors of posterior circulation aneurysms among patients presenting with subarachnoid hemorrhage (SAH).

Methods

Patients presenting to the Columbia University Medical Center Neurological ICU due to aneurysmal SAH were prospectively enrolled from 1996-2012. Patients were assessed for clinical and radiographic characteristics that were associated (p<0.2) with the presence of at least one posterior aneurysm or exclusively posterior aneurysms using univariate comparisons. Multiple logistic regressions were performed on associated factors.

Results

Of 1277 patients, 275 patients had at least one posterior circulation aneurysm and 189 had exclusively posterior aneurysms. Independent predictors of exclusively posterior circulation aneurysms included a lower BMI (OR:1.022; p=0.0173), whereas patients of black (OR:0.33; p=0.045) and hispanic (OR: 0.32; p=0.029) ethnicity were found to be less likely to present with posterior circulation aneurysms only. A history of hypercholesterolemia trended towards being predictive (OR:1.6; p=0.055). Factors found to be predictive of the presence of any posterior circulation aneurysms included confirmed peripheral arterial disease (OR:2.8; p=0.045) and a history of polycystic kidney disease (OR:5.65; p=0.033). Hispanic ethnicity was found to be protective (OR:0.27; p=0.0087).

Conclusions

The development of posterior circulation aneurysms may be influenced by environmental factors such as BMI and the presence of significant atherosclerosis, which is known to frequently deposit in the basilar and vertebral arteries. The role of ethnicity in the development of aneurysms suggests that genetic differences in inflammation or hemodynamic flow and integrity may predispose patients to develop aneurysms in certain locations, whereas the predictive value of polycystic kidney disease highlights a general weakness of vascular integrity. Of note, gender was not associated with the location of aneurysmal development.

Learning Objectives

1) To learn about the differences in natural history of anterior and posterior intracranial aneurysms

2) To assess the data regarding atherosclerosis and medium vessel aneurysmal development.

3) To understand the potential role of genetics in the development of aneurysmal location.

References

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