

The Growth of Small, Asymptomatic, Unruptured Intracranial Aneurysms with no History of SAH

-Different Risk Factors Associated with Single and Multiple Aneurysms

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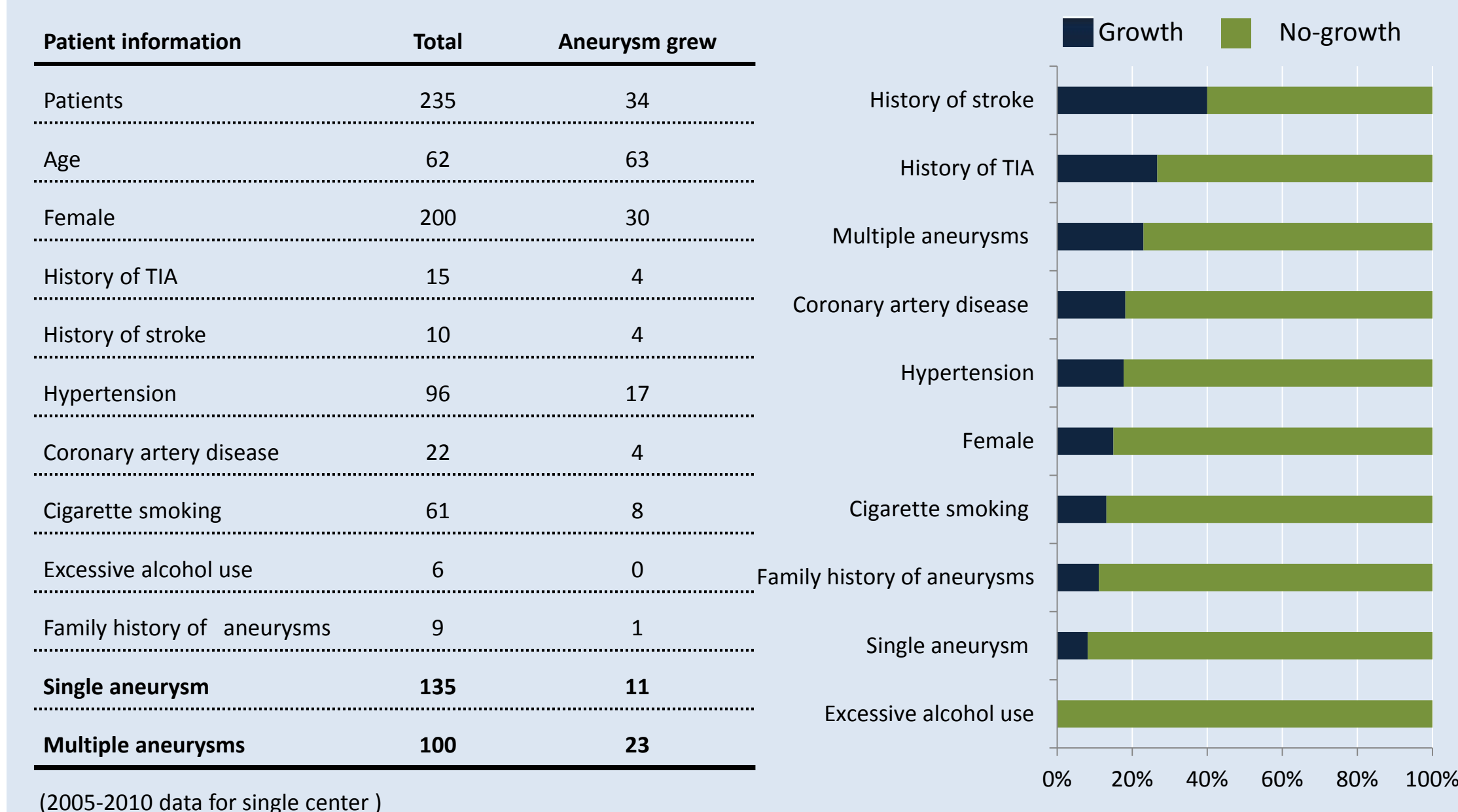


Introduction: The International Study on Unruptured Intracranial Aneurysms suggests that small (<7mm), asymptomatic, unruptured intracranial aneurysms (UIA) in patients with no history of subarachnoid hemorrhage (SAH) should be managed conservatively.[1] Recent research has independently shown considerable variation in the rupture risk of small UIA. As enlargement may indicate increased risk of rupture, the factors related to UIA growth may also influence rupture risk. Information about small UIA growth is limited and heterogeneous due to limited follow-up data.[2]

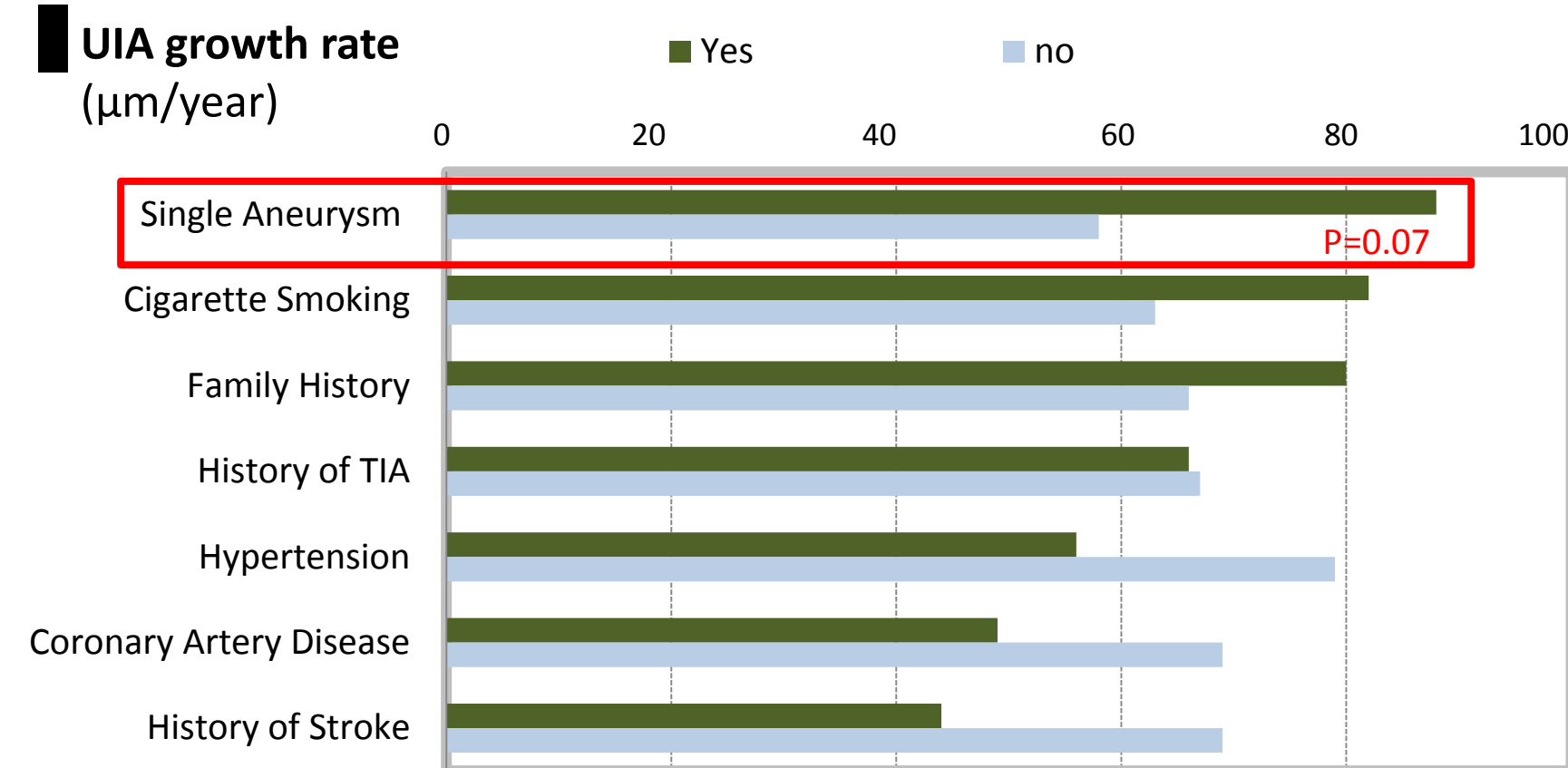
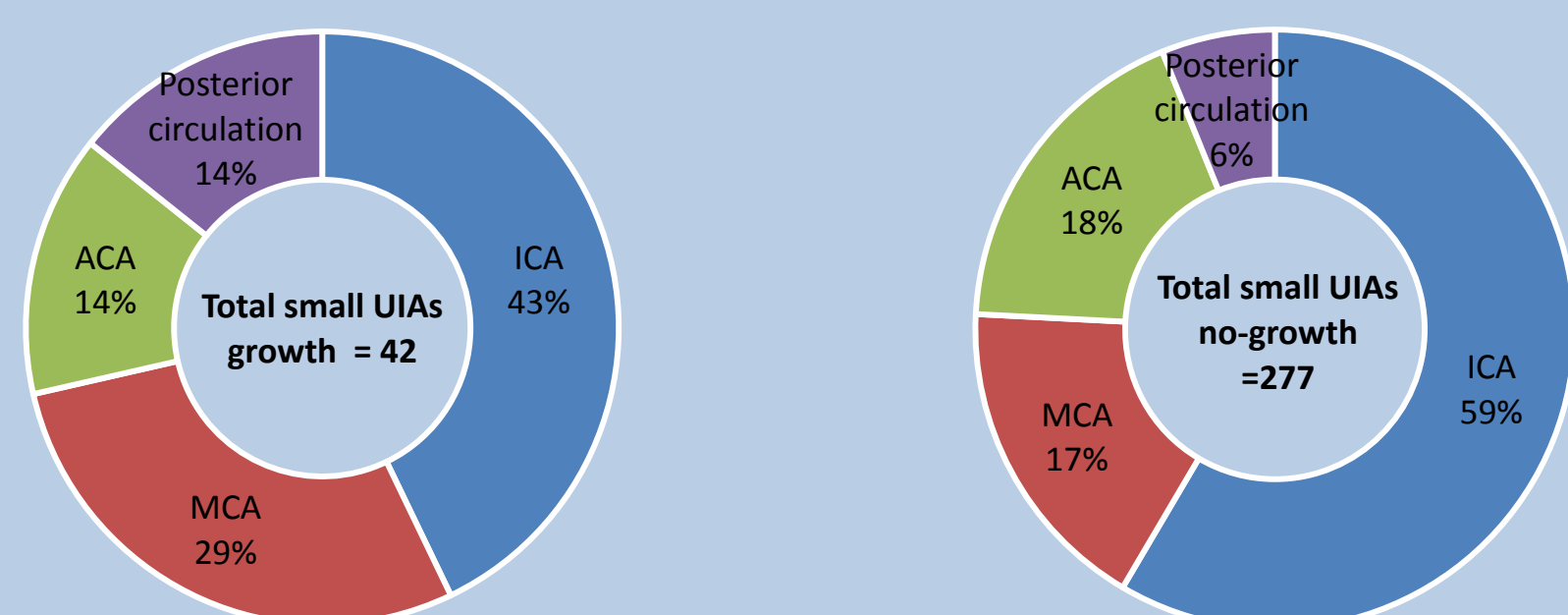
Hypothesis: Growth factors for small UIA with no history of SAH may vary between subset groups.

Methods: A retrospective study was performed based on a total of 508 patients diagnosed with UIA from 2005-2010 in our center. 235 patients with asymptomatic, small UIA and no history of SAH were monitored with high resolution 3D CTA. Patient medical history and aneurysm characteristics (size, growth, location and multiplicity) were analyzed. Multiple logistic regression analysis and the Hosmer-Lemeshow statistic were used to identify the factors associated with growth. The Student's t-test was applied to compare the aneurysm growth rate between subset groups. Statistical significance level set at $p < 0.05$.

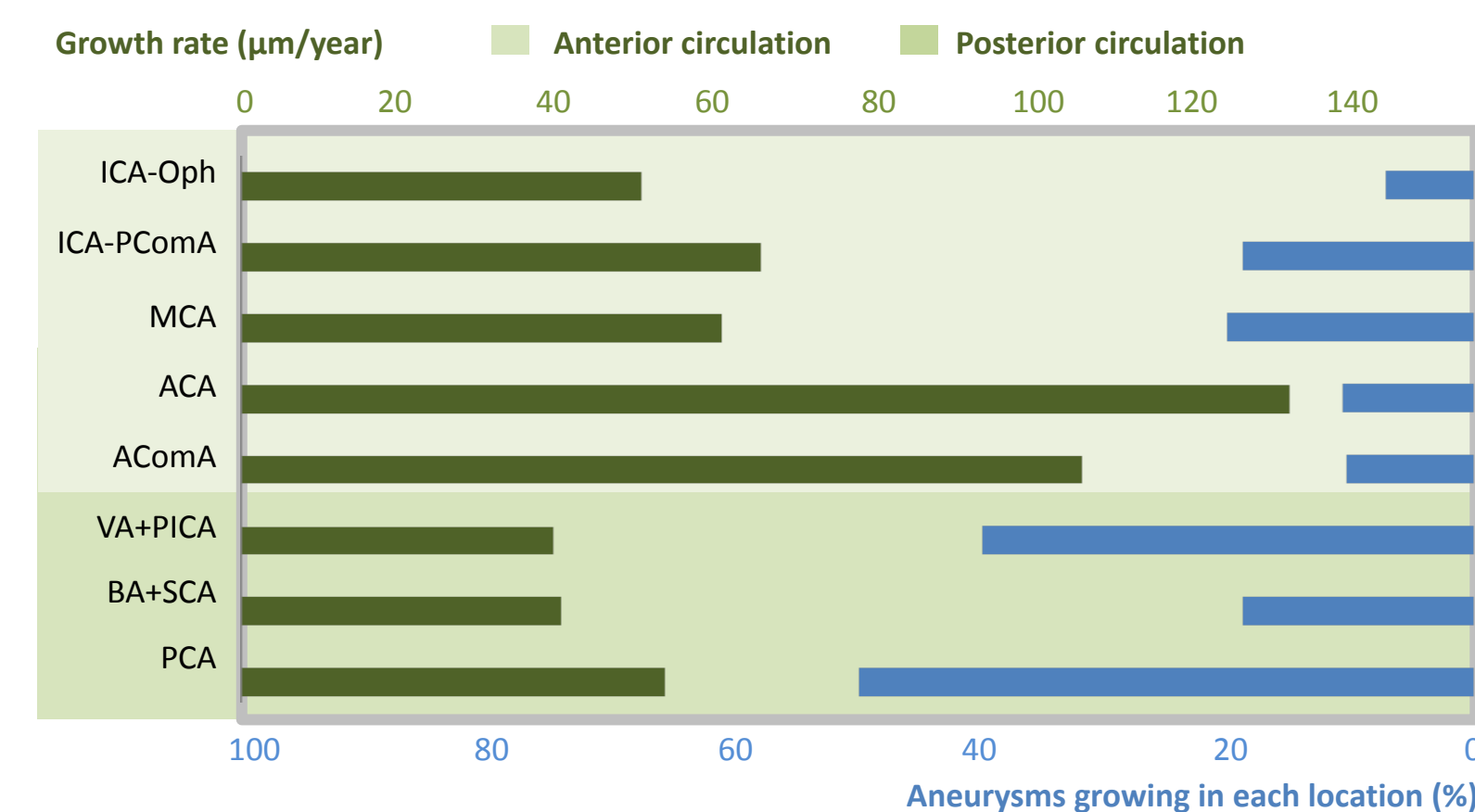
Growth of asymptomatic, small UIA in 235 patients with no history of SAH



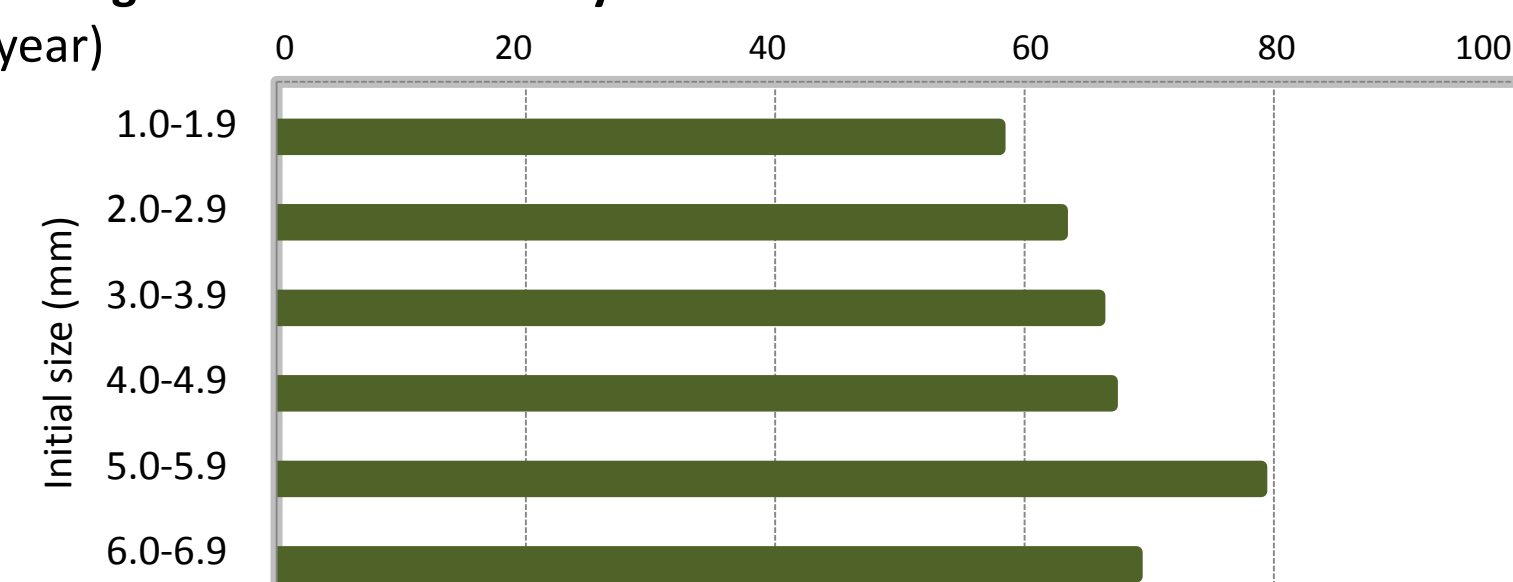
Locations of small UIAs



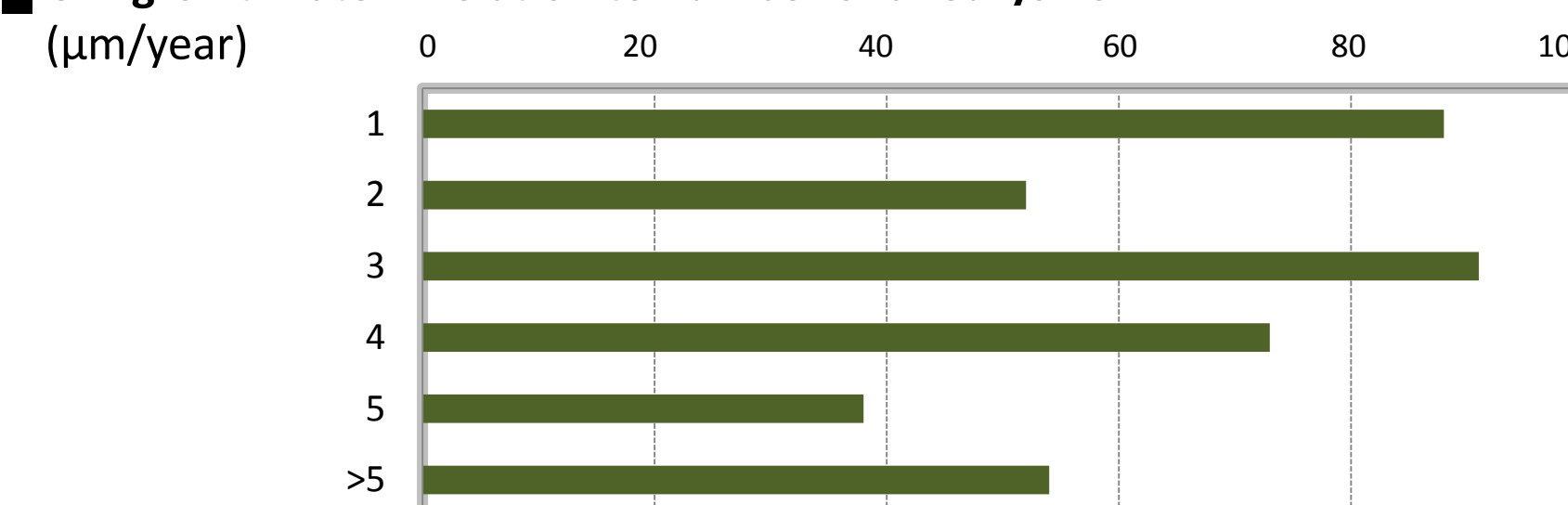
UIA growth in relation to aneurysm location



Small UIA growth rate for aneurysms of different initial size

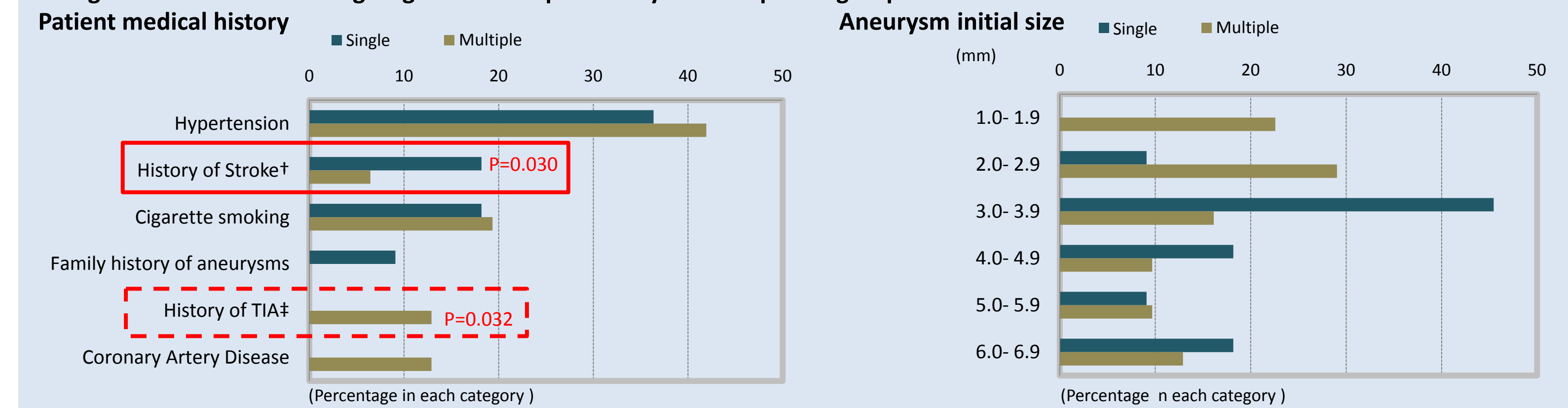


UIA growth rate in relation to number of aneurysms

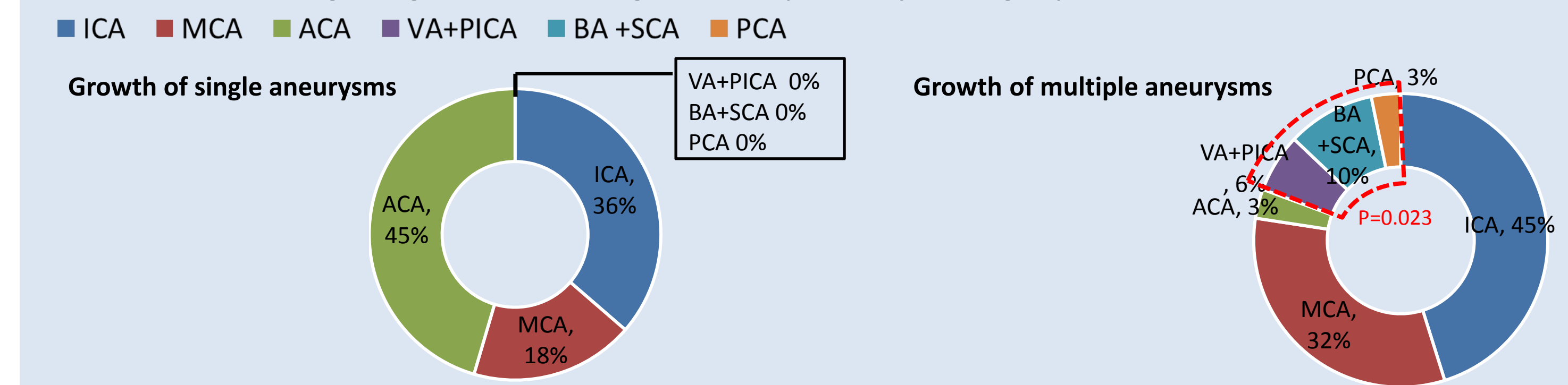


Results: A total of 319 UIA were included with follow-up durations of 29.2±20.0 months. 42 UIA increased in size during the follow-up. 5 UIA grew to become ≥ 7 mm (within 38.2±18.3 months). A trend of higher growth rates was found in single aneurysms than in multiple aneurysms ($P=0.07$). **History of stroke** was the only factor associated with single aneurysm growth ($P=0.03$). The **number of aneurysms** ($P=0.014$), aneurysms located within the **posterior circulation** ($P=0.023$), and patient **history of transient ischemic attack (TIA)** ($P=0.032$) were related to multiple aneurysm growth. **Summary:** We found that multiple small aneurysms were more likely to grow, especially those at posterior circulation. Although single aneurysms have a lower risk of growth, a trend of higher growth rates was found.

UIA growth when considering single and multiple aneurysms in separate groups



Location distribution of growing small UIAs for single and multiple aneurysm sub-groups



Summary:

Based on our single center experience, our data showed that in the group of **small, asymptomatic, unruptured UIAs with no history of SAH**,

- I. 13% of small aneurysms grew; different risk factors relate to single and multiple UIAs.
- II. Multiple small aneurysms were more likely to grow: risk factors include number of aneurysms, posterior circulation and history of TIA.
- III. Although single aneurysms were less likely to grow and history of stroke was the only significant factor, a trend of higher growth rate per year was noticed.

This suggests that different follow-up strategies for single and multiple aneurysms may be beneficial to monitor these group of aneurysms.

References

- [1] DO Wiebers, JP Whisnant, J Huston et al, "Unruptured intracranial aneurysms: natural history, clinical outcome, and risks of surgical and endovascular treatment"; Lancet (2003)362:103-110.
- [2] M Chmayssani, JG Rebeiz, TJ Rebeiz et al, "Relationship of growth to aneurysm rupture in asymptomatic aneurysms ≤ 7 mm: a systematic analysis of the literature"; Neurosurgery (2011) 68:1164-1171.