

Introduction

De novo aneurysms are rare entities periodically discovered during follow up imaging. Little is known regarding the frequency and time course at which de novo aneurysms form. We performed a systematic review and meta-analysis to calculate the overall prevalence and cumulative incidence of these entities as well as to determine risk factors for de novo aneurysm formation.

Methods

We performed a literature search for studies of patients with unruptured and ruptured aneurysms describing the rate of de novo aneurysm formation. The primary outcome was incidence of de novo aneurysm formation. A meta-analysis was performed using a random-effects model by using data from included studies. We also examined the associations of multiple aneurysms, prior subarachnoid hemorrhage, smoking, and hypertension with de novo aneurysm formation.

Results

Our meta-analysis including nearly 14968 aneurysm patients who received imaging follow-up for evaluation of de novo aneurysm formation from 35 studies. The overall rate de novo aneurysm formation was 2% (95%CI=2%-3%) with the estimated annualized rate being 0.3%/patient-year. We found no difference in rates of de novo aneurysm formation among patients with ruptured and unruptured aneurysms. The mean time to de novo aneurysm formation was 8.3 years. In 8 studies, 11.2% of de novo aneurysms were found in patients with ≤ 5 years of follow-up and 88.8% were found at > 5 years. Mean time to rupture for de novo aneurysms was 10 years.

Conclusions

Our study found that formation of de novo aneurysms is rare. Overall, routine screening for de novo aneurysms is likely of low yield and could be performed at time intervals of at least 5 to 10 years.

Learning Objectives

Identify the incidence and rate of de novo aneurysms.

Identify the risks factors associated with the formation of de novo aneurysms

Learn the mean time to de novo aneurysm formation and the mean time to rupture