

Long-term Efficacy of Microsurgical Clipping Versus Endovascular Coiling of Intracranial Aneurysms: A Systematic Review and Meta-Analysis

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Introduction

Since the paradigm shift in treatment preference of intracranial aneurysms towards the endovascular modality, the long-term efficacy of coiling has been a subject of debate. The aim of this meta-analysis was to evaluate which approach offered the best long-term outcomes with respect to rates of recurrence, retreatment, and re-bleeding when comparing endovascular coiling to microsurgical clipping.

Methods

A meta-analysis was conducted in accordance with the PRISMA guidelines using Pubmed and Embase. Cohort studies and randomized controlled trials (RCTs) with a surgical and an endovascular arm of at least 10 patients each and a median follow-up of at least 3 years were included. Pooled effect estimates for the reported outcomes were calculated using the fixed-effects and random-effects models for efficacy outcomes.

Results

Out of the 4876 articles from the search strategy, 11 studies met the inclusion criteria of which three reported on RCTs. Comparing endovascular coiling to microsurgical clipping, the overall relative risk using the fixed effect model was 9.3 for recurrence (95% confidence interval (CI) = 5.7, 15.1; I2= 0%; P-heterogeneity=0.87; ;7 studies), 2.5 for rebleeding (95% CI = 1.1, 4.0; I2= 0%; P-heterogeneity=0,74; 6 studies), and 4.6 for retreatment (95% CI = 3.5, 6.1; I2=0%; P-heterogeneity= 0,94; 8 studies). In the random effects model, similar results were found for all outcomes. Metaregression on length of follow-up, patient age, mean aneurysm size, ruptured vs. unruptured aneurysms, or posterior vs. anterior location did not yield significant results (all P-interaction ≥ 0.05). No significant publication bias was identified for any of the outcomes.

Conclusions

The results of this study suggested that microsurgical clipping as primary treatment of intracranial aneurysms was associated with better long-term efficacy in terms of recurrence, rebleed, and retreatment.

Learning Objectives

To better understand the long term efficacy of microsurgical and endovascular treatment of intracranial aneurysm.

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