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# Growth and Rupture Risk of Small Unruptured Intracranial Aneurysms: A Systematic Review

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## Abstract

**Background:** Small unruptured intracranial aneurysms (UIAs) are increasingly diagnosed. Management depends on growth and rupture risks, which may vary by aneurysm size.

**Purpose:** To summarize evidence about the growth and rupture risk of UIAs 7 mm and smaller and to explore differences in growth and rupture risks of very small ( $\leq 3$  mm) and small ( $\leq 5$  mm) aneurysms.

**Data Sources:** MEDLINE, EMBASE, Scopus, and the Cochrane Library from inception to 2017 (with no language restrictions).

**Study Selection:** Published case series and observational studies that reported natural history data on UIAs 7 mm and smaller.

**Data Extraction:** 2 reviewers abstracted study information, evaluated study quality, and graded strength of evidence.

**Data Synthesis:** Of 26 studies, 5, 10, and 8 described the growth rate of aneurysms 3 mm and smaller, 5 mm and smaller, and 7 mm and smaller, respectively, whereas rupture rates were reported in 7, 11, and 13 studies for aneurysms 3 mm and smaller, 5 mm and smaller, and 7 mm and smaller, respectively. The annualized growth rate was less than 3% in all but 1 study for all 3 size categories. The annualized rupture rate was 0%, less than 0.5%, and less than 1% for the 3 size categories, respectively. Strength of evidence was very low quality for growth rates and low quality for rupture rates.

**Limitation:** Heterogeneous definitions of growth; heterogeneous and selective treatment and follow-up methods,

particularly in high-risk patients.

**Conclusion:** Poor-quality evidence suggests that small UIAs have low growth and rupture rates and very small UIAs have little or no risk for rupture.

**Primary Funding Source:** None.

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