# INPLASY PROTOCOL

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**Support:** **None.**

**Review Stage at time of this submission:** **Data analysis.**

**Conflicts of interest:**
**None declared.**

# Meta-analysis of risk factors for postoperative hemorrhagic complications after treatment of intracranial aneurysms with flow-diversion devices

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**Review question / Objective:** **Risk factors for postoperative hemorrhagic complications after treatment of intracranial aneurysms with flow-diversion devices.**
**Condition being studied:** **Intracranial aneurysm; Flow diversion device; Hemorrhagic complications; Risk factors; Meta analysis.**
**Information sources:** **A systematic electronic search was conducted for all published articles in PubMed, Embase, Cochrane Library, and Web Of Science as Of March 2021, and the citation catalogs Of relevant literatures were manually reviewed.**

**INPLASY registration number:** This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 24 April 2021 and was last updated on 24 April 2021 (registration number INPLASY202140122).

## INTRODUCTION

**Review question / Objective:** **Risk factors for postoperative hemorrhagic complications after treatment of intracranial aneurysms with flow-diversion devices.**

**Condition being studied:** **Intracranial aneurysm; Flow diversion device; Hemorrhagic complications; Risk factors; Meta analysis**

## METHODS

**Participant or population:** Literature that met the following criteria were included: (1) design type of case-control study or cohort study; (2) Patients were from single treatment center or multiple centers, and the number of follow-up observation cases was ≥10; (3) Literature published at home and abroad as of March 31, 2021, involving one or more risk factors for postoperative hemorrhagic complications after FDD treatment; (4) Data provided in the study results that can be converted into OR value, 95%CI and standard error (SE).Exclusion criteria for any of the following are ruled out: (1) the repetition of published literature; (2) Literature from the same region in the same year; (3) Insufficient basic information of patients; (4) Insufficient research data OR no OR value extraction and 95%CI; (5) Serious research loss of follow-up; (6) Reviews, case reports and animal experiments.

**Intervention:** Patients with bleeding complications after treatment with flow-diversion devices

**Comparator:** Patients without complications after treatment with flow-diversion devices

**Study designs to be included:** All the included studies were observational.

**Eligibility criteria:** (1) The design type was case-control study or cohort study; (2) Patients were from single treatment center or multiple centers, and the number of follow-up observation cases was ≥10; (3) Literature published at home and abroad as of March 31, 2021, involving one or more risk factors for postoperative hemorrhagic complications after FDD treatment; (4) Data provided in the study results that can be converted into OR value, 95%CI and standard error (SE).

**Information sources:** A systematic electronic search was conducted for all published articles in PubMed, Embase, Cochrane Library, and Web Of Science as Of March 2021, and the citation catalogs Of relevant literatures were manually reviewed.

**Main outcome(s):** Whether anterior communicating aneurysm, history of subarachnoid hemorrhage, number of flow-diversion devices (FDD) (≥2), aneurysm size, and P2Y12 response unit (PRU) are independent risk factors for hemorrhagic complications after flow-directed device treatment of intracranial aneurysms.

**Quality assessment / Risk of bias analysis:** Observational studies used the Newcastle-Ottawa Scale (NOS) to evaluate the quality of literature.

**Strategy of data synthesis:** The statistical analysis was performed using Review Manager 5.3 software, and the Cochrane Q test was used to analyze the heterogeneity among the studies, and I2 was used to evaluate the magnitude of heterogeneity among the included studies. When P > 0. 1 and I2 < 50%, it indicated that there was no statistical heterogeneity among the studies and a fixed-effect model was used; if the cause of heterogeneity was unknown and the degree of heterogeneity was within an acceptable range, a random-effect model was selected. Sensitivity analysis was performed by single exclusion of one study and exclusion of low-quality studies. Publication bias was evaluated visually using funnel plots. p<0.05 indicates a statistical difference.

**Subgroup analysis:** If subgroup analysis is performed, depending on data results.

**Sensitivity analysis:** Sensitivity analysis was carried out by excluding one study at a time and excluding low-quality studies.

**Country(ies) involved:** China.

**Keywords:** Intracranial aneurysm; Flow diversion device; Hemorrhagic complications; Risk factors; Meta analysis.

**Contributions of each author:**

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