



## Original Investigation | Neurology

# Submaximal Balloon Angioplasty and Long-Term Stroke Recurrence Rate for Patients with Intracranial Atherosclerotic Stenosis: A Systematic Review

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### Key Points

#### Question:

Does submaximal balloon angioplasty reduce stenosis and stroke recurrence in patients with intracranial atherosclerotic stenosis (ICAS)?

#### Findings:

Mean pre-procedural stenosis was 82.9%, reduced to 36% post-angioplasty. Annual stroke rate was 1.5%, with a mortality rate of 2.11%. Submaximal angioplasty is safer and more effective than aggressive medical therapy or stenting.

#### Meaning:

Submaximal balloon angioplasty is a promising, safe, and effective intervention to reduce recurrent stroke risk in ICAS patients, with low mortality rates.

### Abstract

#### Importance:

Intracranial atherosclerotic stenosis (ICAS) is a common cause of stroke worldwide with a higher incidence of recurrence. There are various management methods available for ICAS which include medical, surgical and endovascular treatments. According to recent studies, Submaximal Angioplasty among other endovascular treatments, offers considerable benefits compared to aggressive medical therapy and stenting procedures promising safer and simple intervention effective in preventing recurrent strokes.

#### Objective:

The aim of this study was to measure the pre-procedural and post-procedure stenosis rate and to calculate the mean of mortality associated with Submaximal Balloon Angioplasty in patients with ICAS.

#### Evidence Review:

Following the PRISMA 2020 guidelines, a comprehensive data search was conducted across PubMed, Google Scholar and Cochrane. The MeSH terms used included 'submaximal balloon angioplasty ICAS,' 'intracranial angioplasty without stenting,' and 'intracranial atherosclerosis surgical treatment.' A total of 345 articles were imported into Rayyan software, with 36 duplicates manually removed. 16 eligible articles were included in the review. The inclusion criteria were: (1) studies with patients undergoing submaximal angioplasty alone and reporting pre procedural and post procedural stenosis following the intervention and (2) studies with data on annual stroke rates with mortality were extracted.

#### Findings:

According to data assessed from various studies, submaximal angioplasty was done in patients of average age 68 years. The mean pre procedural stenosis rate was 82.9% and post submaximal angioplasty the mean residual stenosis was reduced to 36% hence signifying the importance of this procedure. The annual stroke rate was found to be 1.5% with a mortality rate of 2.11%.

#### Conclusions and Relevance:

Submaximal Balloon Angioplasty has demonstrated safety and effectiveness as a surgical treatment for patients with severely stenotic arteries. It has also shown to significantly reduce the risk of recurrent strokes, with a low perioperative mortality rate. The long-term implications and potential future are yet to be fully explored, however at present it is an effective method to decrease the global burden of stroke.

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