

Angioplasty for Intracranial Atherosclerotic Disease Involving Posterior Circulation: A Meta-Analysis of All Cases Reported in the Literature

Hussain Shallwani MBBS; Kunal Vakharia MD; Jason Davies MD PhD; Adnan Hussain Siddiqui MD, PhD University at Buffalo, Neurosurgery



Introduction

Intracranial atherosclerotic disease (ICAD) is one of the common causes of ischemic stroke worldwide. Notably, the risk of recurrent stroke is also higher in patients with ICAD, as compared to stroke due to other causes. It is therefore imperative to address and treat the underlying ICAD, in order to decrease the risk of subsequent transient ischemic attack (TIA) and strokes. Posterior circulation stroke and stenosis is associated with 2.5-15% stroke risk per year and 33% in the first month after symptoms are noticed in some studies with best medical management.

Methods

Medical literature databases were searched, along with bibliographies of selected articles. Studies were selected for inclusion based on detailed analysis of article title, abstract, and body text to determine whether stand-alone angioplasty treatments were performed for posterior circulation ICAD and if data for those cases could be separated from overall statistical results of the study.

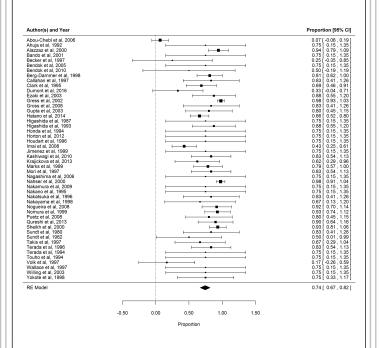
Out of the total 189 eligible abstracts and full-length papers, 68 studies met our inclusion criteria and the data from these studies were included in our meta-analysis. A total of 602 subjects and 614 lesions were identified that underwent angioplasty for the treatment of posterior circulation ICAD.

Results

This data of available literature suggests that angioplasty for symptomatic ICAD may be able to dilate the vessel and achieve technical success (defined as <50% stenosis) in approximately 74% (confidence interval [CI]67%-82%) of cases (Figure 1). The rate of peri-procedural complications was defined as the occurrence of dissection, vasospasm, TIA, stroke, hemorrhage or death within 30-days of the procedure. The rate of peri-procedural complications is 26% (CI 20%-33%) (Figure 2) in our results, however, a significant portion can be attributed to

dissection of the vessel (9%) (CI 6%-13%). The rates of 30-day and 1-year ischemic complications were 4% (CI 1%-7%) and 4% (CI 1%-6%), respectively.

Figure 1: Technical success (<50% residual stenosis)



Forrest plot for technical success: among 48 studies, the overall success rate was 74%

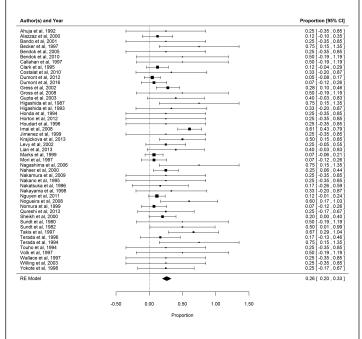
Conclusions

Angioplasty techniques and devices have drastically changed over the years, with some studies showing the technical success rates over 90% and 30-day major complication rates below 6%. Submaximal angioplasty, providing higher success rates and lower peri-procedural complication rates, may be considered the next step for these patients to prevent recurrent ischemic complications. Further randomized trials are needed for better assessment of this procedure in patients with posterior circulation ICAD.

Learning Objectives

- the natural history of posterior circulation ICAD
- the problems with treatment of posterior circulation ICAD
- the utility of standalone angioplasty in treatement of posterior circulation ICAD and possible future directions

Figure 2: Periprocedural complications



Forrest plot for periprocedural complications: among 47 studies, the overall rate of periprocedural complications was 26%

References

Available up on request. Contact hshallwani@ubns.com