

Introduction

In the current era of acute stroke intervention (ASI), successful vessel access and revascularization are paramount to obtain favorable clinical outcomes in patients with large vessel occlusion and decrease the long-term socioeconomic burden of stroke. Despite recent advances in catheter and device technology, failed revascularization due to the inability to obtain access to the lesion remains a problem.

Methods

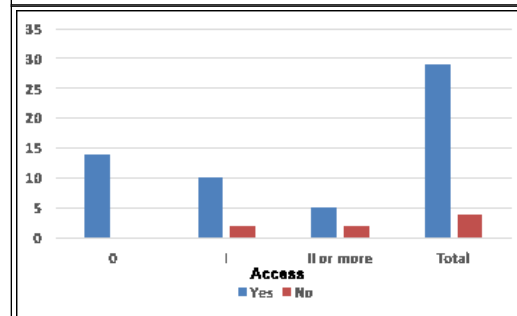
The current study was a retrospective analysis of our experience with patients undergoing mechanical thrombectomy for acute large vessel occlusion (ICA, M1 and M2) during a 2-year period. Patients demographic information, clinical data, lesion characteristics, and technical details were analyzed to determine variables associated with increased odds of failed revascularization. In our study, failed revascularization was defined as complete inability to reach the lesion with balloon-guided devices.

Results

A total of 33 patients were studied. The mean age was 69.6 years (\pm 16 years, range 26-95). Twelve patients (36.3%) presented with ICA occlusion, 18 (54.5%) with M1, and 3 (9.2%) with M2 occlusion, respectively. The mean NIHSS was 16 (\pm 4.2, range 4-24). The rate of failed revascularization due to failed access with balloon-guide catheter was 12.1% (4/33) and in another 4 patients a favorable TIC1 score (2b or 3) could not be obtained despite successful access. In all instances of failed access, the patients were noted to have either an aortic arch type III, a bovine arch, or an acute bend ($>$ 90 degrees) in the common carotid artery. When these factors were entered into a scoring system where one point was given to each anatomical variant, scores of 0 were associated with 100% successful access and revascularization, scores of I had 66% successful access and revascularization, and scores of II had 57% successful access and 42% successful revascularization. Higher scores (II or more) had a statistically significant increased failure rate ($p=0.03$ for access, $p=0.01$ for revascularization). Patients older than 80 were also more likely to pose access challenges (scores II) and failed revascularization compared to younger patients, although the difference was not statistically significant (41% versus 14%, $p=0.06$).



55 year-old female with a left M1 occlusion. During balloon-guided access we were unable to reach the lesion due to the complexity of the aortic arch and acute bend in the proximal common carotid artery (Score II)



Scoring of high-risk anatomical features for failed revascularization

Conclusions

Vascular anatomy and age play an important role in the likelihood of successful balloon-guide access and revascularization after large vessel occlusion. We propose a scoring system that can help clinicians identify potential poor candidates for conventional mechanical thrombectomy.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Identify potential anatomical and demographic characteristics associated with failed mechanical thrombectomy, 2) Discuss potential strategies to overcome problems with stroke intervention, 3) Identify future areas of research to improve access to patients with complex anatomy and higher odds of failure.