Medical management after endovascular stroke therapy

Alejandro A. Rabinstein, MD
Professor of Neurology
Mayo Clinic
USA

Rabinstein.alejandro@mayo.edu
Disclosures

• None
Learning Objectives

• Appraise the factors that should be considered to optimize BP parameters after EVT

• Recognize the most common causes of neurological decline after EVT

• Diagnose the main site access complications after EVT
Outline

• Blood pressure management
• Other general aspects of care
• Neurological decline
  - Reperfusion injury / hemorrhage
  - Delayed arterial reocclusion
• Access site complications
Blood pressure

• Not sufficiently studied

• 2018 AHA Guidelines: <180/105 mmHg for the 24 hours following the procedure is reasonable

• Practices vary across centers

• Individualization of BP parameters based on degree of recanalization makes sense
Decreases in Blood Pressure During Thrombectomy Are Associated With Larger Infarct Volumes and Worse Functional Outcome

Nils H. Petersen, MD†; Santiago Ortega-Gutierrez, MD§; Anson Wang; Sumita Strander, BA; Sreeja Kodali, BS; Andrew Silverman, ScB; Sudeepa Dandapat, MD; Lauren H. Sansing, MD; Joseph M. Safar, MD; Guido J. Falcone, MD; Emily J. Gilmore, MD; Hardik Amin, MD; Ryan M. Hebert, MD; Charles Matouk, MD†; Kevin N. Sheth, MD

Background and Purpose—After large-vessel intracranial occlusion, the fate of the ischemic penumbra, and ultimately final infarct volume, largely depends on tissue perfusion. In this study, we evaluated whether blood pressure reduction and sustained relative hypotension during endovascular thrombectomy are associated with infarct progression and functional outcome.

Methods—We identified consecutive patients with large-vessel intracranial occlusion ischemic stroke who underwent mechanical thrombectomy at 2 comprehensive stroke centers. Intraprocedural mean arterial pressure (MAP) was monitored throughout the procedure. ΔMAP was calculated as the difference between admission MAP and lowest MAP during endovascular thrombectomy until recanalization. Sustained hypotension was measured as the area between admission MAP and continuous measurements of intraprocedural MAP (aMAP). Final infarct volume was measured using magnetic resonance imaging at 24 hours, and functional outcome was assessed using the modified Rankin Scale at discharge and 90 days. Associations with outcome were analyzed using linear and ordinal multivariable logistic regression.

Results—Three hundred ninety patients (mean age 71±14 years, mean National Institutes of Health Stroke Scale score of 17) were included in the study; of these, 280 (72%) achieved Thrombolysis in Cerebral Infarction 2B/3 reperfusion. Eighty-seven percent of patients experienced MAP reductions during endovascular thrombectomy (mean 31±20 mm Hg). ΔMAP was associated with greater infarct growth (P=0.036) and final infarct volume (P=0.035). Mean ΔMAP among patients with favorable outcomes (modified Rankin Scale score, 0–2) was 20±21 mm Hg compared with 30±24 mm Hg among patients with poor outcome (P=0.002). In the multivariable analysis, ΔMAP was independently associated with higher (worse) modified Rankin Scale scores at discharge (adjusted odds ratio per 10 mm Hg, 1.17; 95% CI, 1.04–1.32; P=0.009) and at 90 days (adjusted odds ratio per 10 mm Hg, 1.22; 95% CI, 1.07–1.38; P=0.003). The association between aMAP and outcome was also significant at discharge (P=0.002) and 90 days (P=0.001).

Conclusions—Blood pressure reduction before recanalization is associated with larger infarct volumes and worse functional outcomes for patients affected by large-vessel intracranial occlusion stroke. These results underscore the importance of BP management during endovascular thrombectomy and highlight the need for further investigation of blood pressure management after large-vessel intracranial occlusion stroke. (Stroke. 2019;50:1797-1804. DOI: 10.1161/STROKEAHA.118.024286.)
Study of 65 pts post-EVT

Time of MAP exceeding ULA was associated with HT and worse outcomes

Petersen et al JAMA Neurol 2019
Other aspects of care

- Ensure adequate ventilation and oxygenation
- Blood sugar control (100-180 mg/dL)
- Treat fever
- Close neurological assessments (especially the first 12 hours)
Reperfusion injury

• Most commonly manifested with edema and hemorrhage

• Main risk factors
  - Higher baseline NIHSS
  - Lower baseline ASPECTS
  - Better reperfusion
  - Older age, high glucose, IV rtPA, low platelets, high INR

• Avoid severe HTN and major BP fluctuations
DECT changed the diagnosis to contrast only in 34% of cases
Dual-energy CT scan

A: Plain CT
B: Water-weighted CT
C: Iodine-weighted CT

Almqvist et al Neurology 2019
Management of reperfusion hemorrhage

- Strict BP control (SBP 140 mmHg or lower)
- If recent IV rtPA: TXA, cryoprecipitate
- If mass effect: HTS or mannitol
- Consider surgery for evacuation and decompression
- Greater risk for seizures: consider AED
Delayed arterial reocclusion

- Insufficiently studied
- Estimated to occur in around 3.5% of cases after mechanical thrombectomy
- Possible mechanisms: endothelial damage, plaque disruption, focal dissection
- Treatment may include drugs (e.g. IA IIbIIIa agents) and repeat mechanical thrombectomy
Access site complications

• Most prevalent problem after EVT (reported in 1.2% to 7% of cases)
• Most are minor but some can be severe and even life-threatening
• Possible complications:
  - Groin hematoma
  - Femoral artery pseudoaneurysm
  - Arterial occlusion $\rightarrow$ leg ischemia
  - Retroperitoneal hematoma
  - Femoral neuropathy
Key Messages

• Optimal BP after EVT not well studied but individualizing is most reasonable
• Neurological decline post-EVT are usually due to reperfusion injury or delayed arterial reocclusion
• If suspected hemorrhage after EVT, best to get dual-energy CT scan
• Always check for access site complications
Thank You