Ischemic Stroke Clot Removal using Aspirator and Filter from Carotid Artery Entry Point
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Clinical Need

- Strokes are 5\textsuperscript{th} leading cause of death in the America\textsuperscript{2}.
  - 795,000 cases per year in the United States\textsuperscript{4}
  - Ischemic strokes = 87\% of all strokes\textsuperscript{1}
  - Many ischemic stroke patients > 60 years old\textsuperscript{1}
- Immediate medical treatment critical to recovery/rehabilitation for stroke patients
- Current treatment methods (tPA, stent retrievers) can effectively remove/destroy clot and restore blood flow\textsuperscript{6,7}
  - drawback: pieces of clot can break off and travel to other areas of the brain
  - Increased risk of thromboembolism and stroke

Device Design

- Aspiration catheter:
  - Description: long flexible tube able to be passed through the vessels to the location of the clot
  - Specifications: 30 cm length, 6 Fr diameter
  - Materials: PTFE
- Filter
  - Description: an umbrella-like basket deployed downstream of the clot to catch clot fragments broken off during aspiration
  - Specifications: 200 \textmu m mesh pore size to catch clots, but allow blood flow
  - Materials: Nitinol, mesh

Device Functionality

- Comparison of aspiration with femoral length (120 cm) and carotid length (30 cm) catheters shows:
  - Comparable percentages of total clot removed (Fig. 2)
  - Comparable blood vessel pressure drops from catheter (Fig. 3)
  - Blood flow pressure drop through filter: \textasciitilde146 Pa
- Retention capacity of filter: 50 \mu l

Cost and Market Analysis

- Reimbursement: Proposed device will be covered
  - Current mechanical thrombolysis techniques covered by most private insurers and Medicare/Medicaid
- Market segmentation: 110,000 death/yr = high demand\textsuperscript{4}
  - Customers: healthcare providers
  - Payers: insurance companies and medical device companies
  - Users: surgeons operating on patients with acute ischemic stroke– end users less than number of stroke patients
  - Total units sold dependent on system; filter is single use
- Savings: Device is similar in price to current systems but will reduce rehabilitation costs due to higher efficacy

Acknowledgements

The authors would like to thank Dr. Conrad Zapanta for serving as the instructor for this project, Dr. Mark Wholey for his clinical expertise and guidance, and Angela Lai for mentoring the group. The authors would like to thank the BME Department and SURG donors for their financial support.