

**Introduction**

Given the high morbidity and mortality of stroke, there remains a demand for techniques that provide rapid and safe intervention while improving time to recanalization. The direct aspiration first-pass technique (ADAPT) uses force and aspiration for clot removal without the aid of separators or retrievers. In this study, we compare the force and aspiration qualities of commercially available catheters.

**Methods**

Four different catheters with varying inner diameters were set up in a bench top model to test catheter tip pressure and flow rate. Catheter tip pressure was measured by attaching the catheter to a vacuum pressure gauge and an aspiration pump. The flow rate was calculated by measuring the volume of room temperature water aspirated through each catheter over a given time.

**Results**

The Microvention Sofia catheter generated the greatest tip force (21.32 g), and the Stryker AXS Catalyst 6 catheter generated the smallest tip force (15.88 g). The Penumbra ACE 068 catheter and Medtronic ARC catheter measured 20.87 g and 16.78 g respectively. The ACE 068 had the highest rate of aspiration at 289 mL/min, and the Catalyst 6 catheter had the lowest rate at 214 mL/min. The Microvention Sofia catheter had the second highest rate while the ARC had the third highest rate, measuring 285 mL/min and 256 mL/min, respectively.

**Conclusions**

When using the ADAPT technique, knowledge of the tip force and catheter flow rate of newer catheters with larger distal inner diameters may guide selection of aspiration catheters. While this study demonstrates differences in tip force and flow rate of different commercially available catheters, clinical translation will require further testing and evaluation.

**Learning Objectives**

1. Identify suitable catheters for use in aspiration mechanical thrombectomy for acute stroke.
2. Evaluate differences in flow-dynamic characteristics of commercially available catheters used in aspiration.

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