EFFECT OF DEFINITION AND METHODS ON ESTIMATES OF PREVALENCE OF LARGE VESSEL OCCLUSION IN ACUTE ISCHEMIC STROKE: SYSTEMATIC REVIEW

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Background An accurate estimate of large vessel occlusion (LVO) incidence is critical for planning stroke systems of care and approximating workforce requirements. The purpose of this systematic review was to estimate LVO prevalence among acute ischemic stroke (AIS) patients with emphasis on definitions and methods used by different studies.

Methods Using Medical Subject Headings terms, EMBASE, PubMed, Web of Science, Google Scholar, and the Cochrane Library were searched for prevalence of LVO and AIS from 2000–2018. All articles in the English literature describing the frequency of LVO among AIS patients were included in this review. Studies without consecutive recruitment or without confirmation of LVO with computed tomography angiography or magnetic resonance angiography were excluded. Studies were grouped based on similarities in LVO definition and methods used. Two reviewers independently screened and extracted data. The impact of diameter of the aspiration catheter as well as an adjunctive device such as a balloon guide catheter (BGC). The impact of diameter of the aspiration catheter as well as use of BGC on risk of distal embolization and rate of first pass success was evaluated.

Methods Mechanical thrombectomy was simulated in an in vitro Circle of Willis model. To create a challenging occlusive burden in the MCA, a 20 mm long clot analog was prepared. Direct aspiration was applied via an 0.068 distal access catheter (DAC, FlowGate 2 DAC with a BGC (AXS Vecta 074, Stryker Neurovascular, group: ADAPT074) or 0.068 DAC (AXS Vecta 074, Stryker Neurovascular, group: ADAPT074) or 0.068 DAC with a BGC (FlowGate 2 Balloon Guide Catheter) placed at the cervical ICA (group: ADAPT068-BGC). In both the ADAPT068 and 074 groups, a long 0.091’ sheath was used in conjunction with the DAC. The pump was turned on before the aspiration catheter was advanced proximal to the clot. Each run was assigned a TICI score to assess degree of recanalization. Ten replicates were performed per group, and the maximum thrombectomy attempt was limited to three per run. Distal emboli greater than 200μm were collected and measured using the Coulter Principle.

Results The lowest number of distal emboli was observed when BGC was used in the ADAPT068 group. Collection of visible emboli greater than 1000μm yielded one particle from both the ADAPT068 and ADAPT068-BGC treatment groups, while ADAPT074 followed with four particles (average size 2.25 mm). A total of 34 emboli sized between 200–1000μm were collected from the ADAPT068 group, and the number of emboli was reduced by more than 50% when a BGC was employed in the ADAPT068-BGC group (P>0.05). The highest rate of first pass recanalization was observed in the