Elevated D-dimer levels predicts mortality in COVID-19 with stroke: Analysis of multi-center electronic health record data

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Introduction Coronavirus disease (COVID-19) has been associated with coagulopathy, and D-dimer levels have been implicated as predictors of disease severity. In this study, we examined whether D-dimer remains useful to predict mortality in COVID-19 patients presenting with acute ischemic stroke (AIS).

Methods We conducted a retrospective cohort study using the Optum® de-identified COVID-19 Electronic Health Record (EHR) dataset. Patients were included if they were 18 and older, were hospitalized within 7 days of confirmed COVID-19 from March 1, 2020 - November 30, 2020, and were tested for D-dimer during their hospitalization. ICD-9 and 10 diagnostic codes were used to identify AIS and comorbidities. D-dimer level was evaluated using receiver-operator curve analysis for the optimal threshold to predict in-hospital mortality and Kaplan-Meier survival curves were constructed.

Risks of in-hospital mortality were compared between patients with D-dimer levels below and above the cut-off and risk ratios (RRs) were estimated adjusting for baseline characteristics and clinical variables.

Results Among 15,250 patients hospitalized with COVID-19 positivity, 285 presented with AIS at admission (2%). Patients with AIS were older (median age 70 [60-79] vs 64 [52-75]) and had higher prevalence of congestive heart failure, hypertension, diabetes, vascular disease and atrial fibrillation. D-dimer levels at admission were greater for patients presenting with AIS (median [IQR], 1.42 [0.76-3.96] µg/ml feu) compared to those without AIS (0.94 [0.55-1.81] µg/ml feu) and peak levels were also greater for patients with AIS (3.86 [1.23-15.58] vs 1.42 [0.76-3.96] µg/ml feu). Peak D-dimer level was a good predictor of in-hospital mortality among all patients (c-statistic 0.774 [95% CI 0.764-0.784]) and among patients with AIS (c-statistic 0.751 [95% CI 0.691-0.810]). The optimum cutoff threshold was identified as 2.07 µg/ml feu with 72% sensitivity and 70% specificity, and elevated peak D-dimer level above this cut-off was associated with almost 3 times increased mortality (adjusted RR 2.89 [95% CI 1.87-4.47]).

Conclusions Peak D-dimer levels above 5.15 µg/ml feu are associated with increased mortality in COVID-19 patients with AIS.

Non-definitive surgical clipping of cerebral aneurysms: a meta-analysis of wrapping, residual, and recurrence rates

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Introduction Microsurgery for cerebral aneurysms is called definitive, yet some patients undergo a craniotomy that results in incomplete treatment. Three types of incomplete treatment are: aneurysm wrapping, post-clipping remnants, and late regrowth of obliterated aneurysms. Each of these is associated with increased risk of subarachnoid hemorrhage. This was a systematic review and meta-analysis to quantify the overall rate of non-definitive open surgery for cerebral aneurysms.

Methods A comprehensive literature review using MEDLINE and Cochrane Library databases up to February of 2021 was completed. The following search terms were used: (Intracranial Aneurysm) AND (Clip) AND (residual), (Intracranial Aneurysm) AND (Clip) AND (recurrence), (Intracranial Aneurysm) AND (Wrapping), (Intracranial Aneurysm) AND (Regrowth). Articles were screened based on specific inclusion criteria for each respective analysis. We included studies of aneurysms in a single location (e.g. middle cerebral artery) but excluded studies limited to morphological sub-types or sizes (e.g. fusiform or giant aneurysms). Pooled rates of aneurysm wrapping, residua confirmed by imaging, and regrowth following confirmed total occlusion were subsequently calculated along with corresponding confidence intervals using a random effects model. An assessment of statistical heterogeneity and publication bias among the included studies for each analysis was also completed with resultant I² and Egger’s test P-values.

Results A total of 812 unique studies were identified by literature review and 65 studies met inclusion criteria for final analysis. In 43 studies that met inclusion criteria, 573/15,715 aneurysms were wrapped for a rate of 3.3% (95% CI 2.7% to 4.0%). In 44 studies, 912/14,045 aneurysms had residual neck or dome filling for a rate of 6.3% (95% CI 5.1% to 7.5%). In 43 studies that met inclusion criteria, 573/15,715 aneurysms were wrapped for a rate of 3.3% (95% CI 2.7% to 4.0%). In 44 studies, 912/14,045 aneurysms had residual neck or dome filling for a rate of 6.3% (95% CI 5.1% to 7.5%). In 15 studies, 712/2,568 originally occluded aneurysms showed regrowth for a rate of 2.1% (95% CI 1.2% to 3.1%). Together, there was a total rate of non-definitive treatment of 11.7% (95% CI 11.1% to 12.3%) for open surgery of cerebral aneurysms. I² values for the wrapping, residual, and regrowth analyses were 88%, 93%, and 58%, respectively, indicating significant heterogeneity among the included studies. Egger’s test P-value for the wrapping, residual, and regrowth analyses were 0.55, 0.24, and 0.13, respectively, suggesting no significant publication bias among the included studies. Sub-analyses revealed that the rate of aneurysm wrapping has decreased over time based on publication date, while rates of residua and regrowth have not