RESEARCH LETTER

Acute Coronary Syndrome and Ischemic Stroke Discharges in the United States During the COVID-19 Pandemic

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Following the rise of coronavirus disease 2019 (COVID-19) infections, reports have suggested a decrease in hospital encounters for acute coronary syndrome (ACS) and ischemic stroke (IS). However, data are not yet available for the months after the initial phase of the COVID-19 pandemic in a broad sample across the United States.

METHODS
We performed a retrospective analysis using the Vizient Clinical Database—a health care analytics platform used by participating US hospitals for benchmarking clinical performance, costs, and outcomes. Institutional review board approval was not required to use this deidentified data set. Because of the sensitive nature of the data collected for this study, requests to access the data set from qualified researchers trained in human subject confidentiality protocols may be sent to Vizient at vizientsupport@vizientinc.com. The primary outcome is monthly counts of ACS and IS discharges in nonelective hospital discharges, identified using the International Classification of Diseases, Tenth Revision, codes (ACS: I20.0, I21.x, I24.x; IS: I63.x, H34.1), and monthly counts of interventional ACS and IS procedures identified with relevant procedural codes. To examine changes in ACS and IS discharges and procedures, we graphed the monthly trends and compared the April and July 2020 counts to the monthly counts in 2019 using mixed-effects (random intercept) regression models with the hospital identifier as a random effect. The mixed-effects model estimates a separate intercept for each hospital to account for between hospital differences, such as region or case volume. We also performed our mixed-effects model after stratification by hospital bed size and Census region.

RESULTS
For the ACS and IS counts, we included data from 89 nonfederal US hospitals with complete patient-level discharge data from January 1, 2019, to July 31, 2020, of which 59 of 89 (66.3%) were teaching hospitals and 6 of 89 (6.7%) were rural in location. There were 14 hospitals in the Northeast Census region, 26 in the Midwest, 24 in the South, and 25 in the West. Hospital size was well distributed with 34 hospitals having ≤150 beds, 13 having 151 to 250 beds, 20 having 251 to 500 beds, and 22 having ≥500 beds. For counts of percutaneous coronary intervention (PCI) in ACS and mechanical thrombectomy (MT) in IS, we included data from 73 to 40 hospitals, respectively. There were a total of 109,112 patients with ACS, of whom 63.1% were ≥75 years of age, 58.4% were men, and 65.8% were White, and a total of 55,896 patients with IS, of whom 63.7% were ≥75 years of age, 51.7% were men, and 63.2% were White.

The trends in ACS, PCI, IS, and MT are shown in the Figure. In 2019, the average monthly counts for ACS, PCI, IS, and MT were 5672, 833, 3001, and 195 patients, respectively. In April 2020, the percentage reduction from the 2019 average was −6.0%, −27.5%, −25.2%, and −5.1%, respectively. In the mixed-effects model, these reductions were all highly significant (P<0.01), apart from MT (P=0.559). In July 2020, neither IS nor MT had a significant change in counts compared with 2019.
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(P > 0.1), while ACS volume was 6.6% higher than 2019 (P = 0.002) and PCI volume was 8.1% lower than 2019 (P = 0.015). These results were not meaningfully different after stratification by hospital bed size or Census region (data not shown).

DISCUSSION

In summary, after an initial decline in April 2020, the monthly counts of ACS and IS have returned to normal or above 2019 in a geographically diverse sample of US hospitals. The 2020 counts of MT did not differ compared with 2019, and PCI remains below the average monthly count of 2019. Our study has several important limitations, including that it is not a fully representative national sample and that case identification with administrative and billing codes has bias.

The reduction in ACS and IS in April 2020 raised concern in the medical community that patients were not seeking medical care because of concern about acquiring COVID-19 infection. This triggered nationwide efforts, such as the AHA’s "Don’t Die of Doubt" campaign and individual media campaigns, to encourage patients with acute cardiovascular or neurological symptoms to seek urgent medical attention. Our data suggest that there has been a gradual increase in ACS and IS hospital discharges since May 2020, which could be a response to the awareness efforts or a natural easing of public fears surrounding hospital care. Other potential explanations are that state-wide restrictions on socialization, business, and elective medical procedures were variable across the United States, with some ending during the study period. Additional studies are needed to further explore this phenomenon as more data become available.

ARTICLE INFORMATION

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Figure. Monthly trends of discharges.
Shown for acute coronary syndrome (A), ischemic stroke (B), percutaneous coronary intervention for acute coronary syndrome (C), and mechanical thrombectomy for ischemic stroke (D).
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