

International COVID-19 registry uncovers increased incidence of clotting in heart attack patients with COVID-19

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CENTRAL ILLUSTRATION: Acute Myocardial Infarction Risk Model for In-Hospital Mortality: Risk Score and Validation

A. Risk Score Calculator

Age	Pts	SBP	Pts	CrCl	Pts	Cardiac Arrest	Pts	Shock	Pts	Heart Rate	Pts	Heart Failure	Pts	STEMI	Pts	Troponin	Pts								
<40	0	>200	0	≥90	0	No	0	No	0	≤40	0	No	0	No	0	<10	0								
40-49	3	181-200	3	60-<90	4	Yes	14	Yes	13	41-60	1	Yes	5	Yes	5	10-<20	1								
										61-70	2					20-<30	2								
										71-80	3					≥30	3								
50-59	7	171-180	5	45-<60	8					81-100	4					101-110	5								
										111-130	7					131-150	8								
										151-160	9					>150	9								
60-69	10	151-160	9	30-<45	11					Yes	14					Yes	13	111-120	15	<30 or Dialysis	15				
																		131-150	11	91-110	16				
70-79	13	121-130	13	<30 or Dialysis	15													Yes	14	Yes	13	111-120	15	91-110	16
						91-110	16																		
80-89	17	111-120	15	<30 or Dialysis	15	Yes	14	Yes	13			111-120	15	91-110	16										
												91-110	16												
≥90	20	≤90	19	<30 or Dialysis	15							Yes	14	Yes	13							111-120	15	91-110	16
																						91-110	16		

B. Observed In-hospital Mortality for the Validation Cohorts by Risk Score Subgroups

Central Illustration. Acute Myocardial Infarction Risk Model for In-Hospital Mortality: Risk Score and Validation Using data from the ACTION (Acute Coronary Treatment and Intervention Outcomes Network) Registry–GWTG (Get With the Guidelines) database, a multivariate hierarchical logistic regression model was developed to predict in-hospital mortality in patients presenting with acute myocardial infarction (AMI), with points assigned for each

value for each parameter (A). Observed in-hospital mortality rates for the validation cohort varied substantially by risk score (B), ranging from as low as 0.4% in the lowest risk group (score 59). CrCl = creatinine clearance; Pts = points; SBP = systolic blood pressure; STEMI = ST-segment elevation myocardial infarction. Credit: *Journal of the American College of Cardiology* (2016). DOI: 10.1016/j.jacc.2016.05.049

The latest analysis from The North American COVID-19 STEMI (NACMI) was presented today as late-breaking clinical research at the Society for Cardiovascular Angiography & Interventions ([SCAI](#)) 2023 Scientific Sessions. The findings show patients with an ST-elevated myocardial infarction, or STEMI, and COVID-19 had a significant amount of clotting in their arteries both before and after intervention. Importantly, clots were seen in multiple arteries in close to 30% of patients, a phenomenon observed in less than 5% of patients with heart attacks who do not have COVID-19.

In the United States, someone experiences a [heart attack](#) every 40 seconds (CDC). Of these patients, more than 25% will experience a more severe type of heart attack, an ST-elevated [myocardial infarction](#), or STEMI caused by the sudden, total blockage of a coronary artery. Pre-COVID-19 mortality in STEMI patients was below 5%. Previous NACMI research has shown that mortality jumps to 20% to 25% in patients who present with COVID-19 and a heart attack.

In this blinded angiographic analysis, sites were invited to send angiograms to the Cardiovascular Imaging Research Core Lab (Vancouver, CA). Quantitative coronary angiography percent diameter stenosis (DS), thrombolysis in myocardial infarction (TIMI) flow, myocardial blush grade (MBG) and thrombus grade burden (TGB) were assessed. Percutaneous coronary intervention (PCI) was classified as

unsuccessful if there was residual DS>50% and/or 0 and DS > 50% in > 2 arteries, respectively.

Angiograms of 234 patients from 17 sites (12 US, 5 CAN) were analyzed. High TGB was observed in 74% of all patients pre-intervention and 29% of patients post intervention. A high proportion of patients (19%) did not have culprit lesions (locations inside the arteries readily identified by treating physicians) suggesting other mechanisms for heart attack maybe at play in this patient population. Core lab identified stent thrombosis (clotting of previously placed stents) in 12% of the entire cohort—a frequency that has never been observed in other STEMI cohorts. Of the 49 patients Core lab identified PCI failure rates were 34% which a high complication rate of 23%, mostly related to thrombus.

"COVID-19 is a pro-inflammatory, clot forming disease and we now see its effect in the coronary arteries," said Payam Dehghani, MD, FRCPC, FACC, FSCAI, Co-Director of Prairie Vascular Research Inc and Associate Professor at the University of Saskatchewan, Canada. "These new insights point to the need for clinicians to be meticulous with blood thinning strategies, early interventions and patient follow-up."

The NACMI registry is a collaboration between SCAI, the American College of Cardiology and the Canadian Association of Interventional Cardiology. The registry was established in 2020 with the aim to define baseline characteristics and management strategies and outcome data for COVID-19 [patients](#) presenting with STEMI. More than 60 medical centers across North America and Canada contributed data to the registry.

Researchers note that further investigation is needed to better understand the impact of COVID-19 and heart attacks related vaccination as well as long-term outcomes.

Provided by Society for Cardiovascular Angiography and Interventions

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