statin therapy. *Am J Cardiol* 2016;117:1928–1933. Available at: http://dx.doi.org/10.1016/j.amjcard.2016.03.043.
4. Ballantyne CM, Banach M, Mancini GBJ, Lepor NE, Hanselman JC, Zhao X, Leiter LA. Efficacy and safety of bempedoic acid added to ezetimibe in statin-intolerant patients with hypercholesterolemia: a randomized, placebo-controlled study. *Atherosclerosis* 2018;277:195–203. Available at: https://doi.org/10.1016/j.atherosclerosis.2018.06.002.
5. Ballantyne CM, Davidson MH, MacDougall DE, Bays HE, Dicarlo LA, Rosenberg NL, Margulies J, Newton RS. Efficacy and safety of a novel dual modulator of adenosine triphosphate-citrate lyase and adenosine monophosphate-activated protein kinase in patients with hypercholesterolemia: Results of a multicenter, randomized, double-blind, placebo-controlled, paral. *J Am Coll Cardiol* 2013;62:1154–1162.
6. Ballantyne CM, Laufs U, Ray KK, Leiter LA, Bays HE, Goldberg AC, Stroes ESG, MacDougall D, Zhao X, Catapano AL. Bempedoic acid plus ezetimibe fixed-dose combination in patients with hypercholesterolemia and high CVD risk treated with maximally tolerated statin therapy. *Eur J Prev Cardiol* 2020;27:593–603.
7. Thompson PD, Rubino J, Janik MJ, Macdougall DE, McBride SJ, Margulies JR, Newton RS. Use of ETC-1002 to treat hypercholesterolemia in patients with statin intolerance. *J Clin Lipidol* 2015;9:295–304. Available at: http://dx.doi.org/10.1016/j.jacl.2015.03.003.
8. Goldberg AC, Leiter LA, Stroes ESG, Baum SJ, Hanselman JC, Bloedon LAT, Lalwani ND, Patel PM, Zhao X, Barton Duell P. Effect of bempedoic acid vs placebo added to maximally tolerated statins on low-density lipoprotein cholesterol in patients at high risk for cardiovascular disease: the Clear wisdom randomized clinical trial. *JAMA - J Am Med Assoc* 2019;322:1780–1788.
9. Gutierrez MJ, Rosenberg NL, Macdougall DE, Hanselman JC, Margulies JR, Strange P, Milad MA, Mcbride SJ, Newton RS. Efficacy and safety of ETC-1002, a novel investigational low-density lipoprotein-cholesterol-lowering therapy for the treatment of patients with hypercholesterolemia and type 2 diabetes mellitus. *Arterioscler Thromb Vasc Biol* 2014;34:676–683.
10. Laufs U, Banach M, Mancini GBJ, Gaudet D, Bloedon LAT, Sterling LR, Kelly S, Stroes ESG. Efficacy and safety of bempedoic acid in patients with hypercholesterolemia and statin intolerance. *J Am Heart Assoc* 2019;8:e011662.
11. Lalwani ND, Hanselman JC, MacDougall DE, Sterling LR, Cramer CT. Complementary low-density lipoprotein-cholesterol lowering and pharmacokinetics of adding bempedoic acid (ETC-1002) to high-dose atorvastatin background therapy in hypercholesterolemic patients: a randomized placebo-controlled trial. *J Clin Lipidol* 2019;13:568–579. Available at: http://www.sciencedirect.com/science/article/pii/S1933287419301783.
12. Moher D, Liberati A, Tetzlaff J, Altman DG. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *Ann Intern Med* 2009;151:264–269.

https://doi.org/10.1016/j.amjcard.2020.06.028

Assessment of ST-Segment Elevation Myocardial Infarction Volume Trends During The COVID-19 Pandemic

Routine inpatient and outpatient health care has been greatly disrupted by the COVID-19 pandemic and both equipment and personnel have been redeployed in order to manage the crisis (https://www.cms.gov/newsroom/press-releases/cms-releases-recommendations-adult-elective-surgeries-non-essential-medical-surgical-and-dental). There have been anecdotal accounts (https://www.nytimes.com/2020/04/06/well/live/coronavirus-doctors-hospitals-emergency-care-heart-attack-stroke.html) and a publication [1] discussing the decrease in the number of ST-segment elevation myocardial infarction (STEMI) activiations. One explanation proposed for the decrease includes patients not seeking medical attention for ischemic symptoms due to fear of becoming infected by the coronavirus or presenting to the hospital late in their STEMI course.

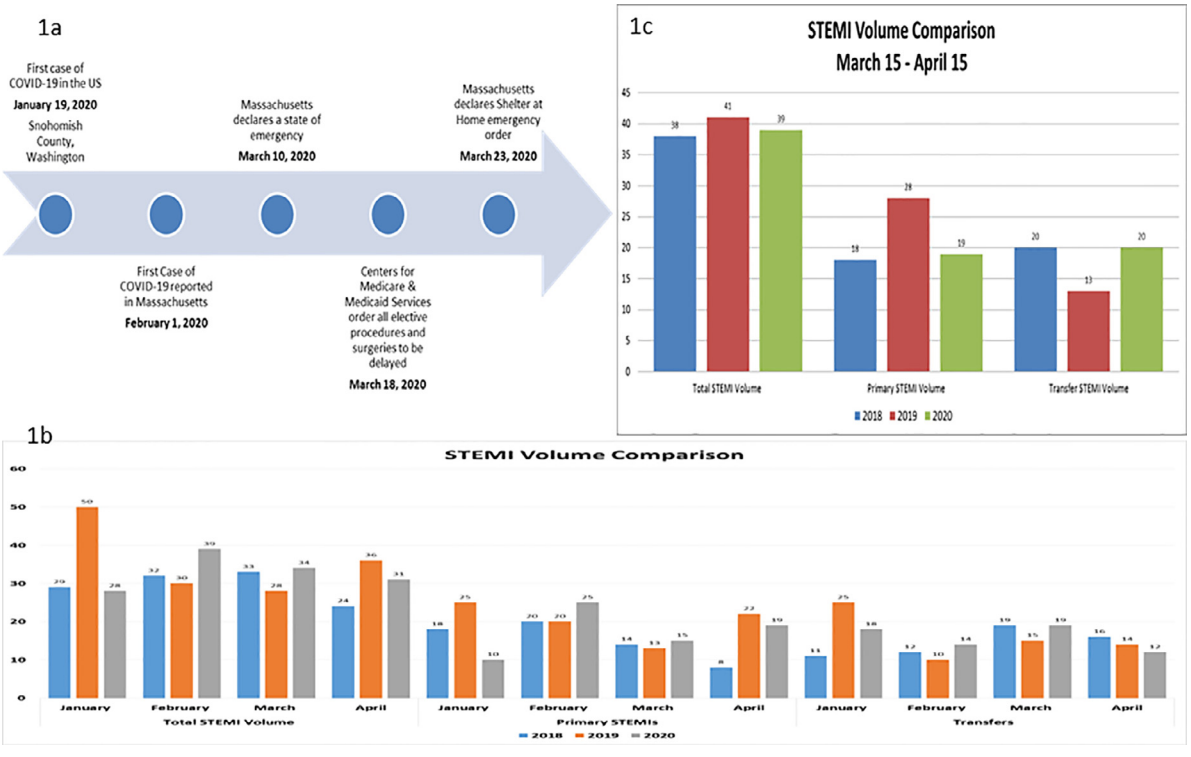

Figure 1. (1a) Timeline of the COVID-19 pandemic in the United States and Massachusetts. (1b) ST STEMI volume January through April 2020 compared to January through April 2018 and 2019. (1c) STEMI volume for March 15 through April 15, 2020 compared to March 15 through April 15, 2018 and 2019.

Massachusetts ranks third in total number of COVID-19 cases and fourth in total number of COVID-19 deaths in the United States. (https://www.cdc.gov/coronavirus/2019-ncov/cases-updates/cases-in-us.html) To determine if there has been a decrease in STEMI volume during the COVID-19 timespan (Figure 1a), we analyzed our January through April 2020 STEMI volume in comparison to January through April 2018 and 2019 (Figure 1b). We also analyzed STEMI volume for March 15 through April 15, 2018 and 19 in comparison to 2020 (Figure 1c). Baystate Medical Center is a tertiary hospital located in Western Massachusetts serving more than 10 referral hospitals with >350 STEMI cases per year. The STEMI volume includes patients presenting to Baystate Medical Center and transfers from referral centers.

Our preliminary analysis during the early phase of the pandemic demonstrates no significant reduction in STEMI volume during the COVID-19 pandemic. One difference between Garcia et al.[1] and our findings is the fact that we evaluated STEMI volume rather than STEMI activations. STEMI activations during the COVID-19 pandemic could be reduced due to the fact that emergency department personnel, due to concerns for infection, may consult interventional cardiology directly rather than activate the cardiac catheterization laboratory in order to limit exposure and decrease false activation.

In conclusion, in a high-volume STEMI center in the Commonwealth of Massachusetts, with high volumes of reported COVID-19 cases, there was no significant change in STEMI volume during the COVID-19 timespan.

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1. Garcia S, Albaghdadi MS, Meraj PM, Schmidt C, Garberich R, Jaffer FA, Dixon S, Rade JJ, Tannenbaum M, Chambers J, Huang PP, Henry TD. Reduction in ST-segment elevation cardiac catheterization laboratory activations in the United States during COVID-19 Pandemic. *J Am Coll Cardiol.* S0735-1097(20)34913-34915.
https://doi.org/10.1016/j.amjcard.2020.06.029

No Reduction of ST-segment Elevation Myocardial Infarction Admission in Taiwan During Coronavirus Pandemic

Recently, a significant reduction in ST-elevation myocardial infarction (STEMI) admission was reported from the United States and Europe where the coronavirus disease (COVID-19) caused a public health crisis.[1,2] The door-to-device time of primary percutaneous coronary intervention (PPCI) was also delayed.[3] The COVID-19 pandemic has a much less impact in Taiwan because early actions to prevent community outbreak were taken from January 2020 when mystery pneumonia in Wuhan, China was found.[4] As to May 2020, there were only 443 confirmed cases in 23 million population in Taiwan and most patients were imported cases from February to April, 2020. The public health response in Taiwan became a role model to flatten the infection curve of COVID-19.

We conducted a multicenter, observational, nationwide survey to collect data of STEMI cases from February 1 to April 30, 2020 (COVID-19 pandemic period) and compared the data with the same period in 2019. The following data were collected: (1) the number of patients admitted for STEMI, (2) symptom onset-to-door time, (3) door-to-device time of PPCI, and (4) use of fibrinolytic therapy. Symptom onset-to-door time is defined as the time between first patient- or family-reported symptom onset and patients' arrival at the hospitals. Door-to-device time is defined as the time between patients' arrival at the hospitals and successful wire crossing or balloon inflation during PPCI. Data were presented with mean ± standard deviation for average case number or medians and interquartile ranges for times. Comparisons were performed by paired Student *t* test for case number and Wilcoxon rank sum test for times. Overall, 42 major hospitals with 24-hour primary PCI service participated the survey and 40 (95.2%) provided the data for analysis. Compared with February to April, 2019 (n = 1,092), there was no significant reduction of admission for STEMI in 2020 (n = 1,038) with COVID-19 pandemic (average case number per hospital, 27.3 ± 18.4 vs 26.0 ± 16.7, p = 0.27). The door-to-device time was similar between 2019 and 2020, but there was a significant increase of symptom onset-to-door time in 2020 (142 [75 to 338] vs 180 [84 to 460] min, p <0.01; Table 1). In 2020 with COVID-19 pandemic, none of the hospitals used fibrinolytic therapy and 9 out of 40 (22.5%) hospitals had experiences of wearing personal protective equipment to perform PCI for suspected cases with COVID-19.

In Taiwan, adequate public health strategy diminished the impact of COVID-19 pandemic on healthcare system. There was no significant influence on admission and care quality of STEMI. Registry data in Taiwan showed the median door-to-device time was 96 minutes in 2010 and 71 minutes in 2015.[5] The time was continuously decreased to 66 minutes in 2020 even in the COVID-19 pandemic. However, there was a significant delay of seeking medical help. The symptom onset-to-door time increased by 27% in 2020 compared with the equivalent months in 2019. There were no in-hospital transmission and healthcare personnel infection of COVID-19 in Taiwan. It is likely that the impression of virus spread from hospitalized patients with COVID-19 made patients reluctant to go to hospitals and delay in seeking care. In Italy, a similar reduction of STEMI admission was found in central and south parts

Table 1
The case number and primary PCI for STEMI before and after COVID-19 outbreak in Taiwan

	2019 (Feb to Apr) (n = 1,092)	2020 (Feb to Apr) (n = 1,038)	p value
STEMI case number/hospital	27.3 ± 18.4	26.0 ± 16.7	0.27
Symptom onset-to-door time (min)	142 (75-338)	180 (84-460)	<0.01
Door-to-device time (min)	65 (50-81)	66 (52-81)	0.20

COVID-19 = coronavirus disease 2019; PCI = percutaneous coronary intervention; STEMI = ST-segment elevation myocardial infarction.