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# CRT-101.10 Outcomes of Underlying Infiltrative Cardiomyopathy in Percutaneous Coronary Intervention

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**BACKGROUND** When patients presented with acute coronary syndrome (ACS), they could have developed new severe lesions or their pre-existing lesions progressed to higher severity within a short period of time. For patients >80 with ACS, what is the pathological mechanism causing ischemia? In the past 5 years, our research team applied the practice of hydraulic to coronary flow in which laminar flow was considered to preserve equipment life while turbulent flow damaged the inner surface of pipes and components of pumps. Could we use coronary flow dynamic to explain the mechanism causing ACS in patients >80?

**METHODS** Patients aged >80 with ACS were enrolled and underwent a new dynamic angiogram. At first, contrast was injected until the coronary arteries were completely opacified. As the injection stopped, the blood in white color moved in and displaced the contrast in black color. The coronary flows in white color were identified, recorded at 15 images per second, saved on power point slides so each image could be inspected at slow speed suitable for human visual inspection. At the same time, Machine Learning algorithms program had 2 models built on Python. Model 1 was based on U-net and Densenet-121 for vessel segmentation. Model 2 was used for classification and movement of flow. Model 2 was trained based on the convolutional neural network. The main measurements by human reviewers or machine learning programs were the laminar or turbulent flow, the central or peripheral flow, the calculation of the arterial phase (time of beginning blood flow at the coronary ostium until all contrast disappeared from distal vasculature in millisecond [msec]).

**RESULTS** 30 patients aged >80-95 were enrolled. The main abnormalities were (1) 80% had slow flow with prolonged arterial phase, (>36msec) (2) 90% had thick peripheral layers at the mid and beginning of distal segment due to friction with calcified wall, (3) Only 10% had severe lesions. Slow flow as evidenced by prolonged arterial phase caused ischemia by slow renewal of high oxygen blood (less new blood arriving to distal myocardium per minute). The thick peripheral layers prevented the intimal cells to absorb oxygen directly from the blood aggravating the aging process of the intima however calcified wall prevented the development or growth of the soft cover of a plaque so not many severe lesions were developed.

**CONCLUSION** In patients >80 with ACS, the main abnormalities were slow flow with prolonged arterial phase and thick peripheral layers. Very few severe lesions. Larger studies are needed to confirm the above findings.

### CRT-101.02

#### Mortality and Cost by Delirium and Frailty in STEMI and PCI: Machine Learning and Propensity Score Cardio-Oncology Nationally Representative Analysis

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**BACKGROUND** The prevalence, co-prevalence, and impact on mortality and cost of delirium and frailty are unknown in STEMI and PCI, despite the aging global population and growing burden of cardio-oncology disease.

**METHODS** This is the first known nationally representative analysis (including with machine learning and propensity score analysis) of the above relationships. It utilized Machine Learning-augmented modified Propensity Score multivariable regression (ML-PSr) and the National Inpatient Sample spanning over 4,400 hospitals in the United States.

**RESULTS** Of the 90,869,382 adult hospitalizations from 2016-2018, 862,710 (0.95%) had STEMI and age >=65 years old, of whom 202,815 (23.51%) received PCI, and of whom 555 (0.27%) had frailty and 30 (0.01%) had both frailty and delirium. In STEMI and at least 65 years old, there was a co-prevalence of 7.12% of frailty and delirium, while PCI was significantly less likely for frailty (13.17% versus 23.56%) and much less likely for delirium (5.37% versus 24.99%) (both p<0.001). In ML-PS multivariable regression controlling for clinical confounders, delirium significantly reduced the odds of PCI being performed (OR 0.40, 95%CI 0.35-0.47, p<0.001) but frailty and its interaction with delirium did not. None of the above three predictors significantly increased post-PCI inpatient mortality. These relationships held when stratified by the presence and absence of active cancer. Additionally, when adjusting for length of stay in PCI, frailty and its interaction with delirium did not significantly increase cost but delirium did ($14,342.60, 95% CI 2,386.95-26,298.26, p=0.019).

**CONCLUSIONS** This multi-year, multi-center retrospective cohort analysis suggests older patients with delirium but not frailty are less likely to receive PCI despite comparable clinical severity and ultimate mortality odds compared to non-delirium, regardless of the presence or absence of cancer.

### CRT-101.10

#### Outcomes of Underlying Infiltrative Cardiomyopathy in Percutaneous Coronary Intervention

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**BACKGROUND** Evidence on the prognosis of infiltrative cardiomyopathy in patients undergoing percutaneous coronary intervention (PCI) has not been well established. Our objective was to assess the prevalence of infiltrative cardiomyopathy including amyloidosis, sarcoidosis and hemochromatosis in PCI patients and its effect on mortality.

**METHODS** National Inpatient Sample 2016-2019 was used to conduct a retrospective analysis by identifying a cohort of patients who underwent PCI with infiltrative cardiomyopathy using respective ICD-10 codes. Primary outcome was the effect of infiltrative cardiomyopathy on mortality in patients undergoing PCI. Secondary outcomes were the independent predictors of mortality. Multivariate logistic regression model was used for analysis.

**RESULTS** 1.93 million patients were hospitalized for undergoing PCI, out of which 6270 patients had infiltrative cardiomyopathy (prevalence 0.33%). Subgroup analysis showed that 710 patients had underlying amyloidosis (prevalence 0.04%), 4300 patients had sarcoidosis (prevalence 0.23%) and 1280 patients had hemochromatosis (prevalence 0.07%). Mean age of patients undergoing PCI with infiltrative cardiomyopathy was 61 years, 54% were females and 53.5% were white. Patients undergoing PCI were predominantly males (67%) but patient with infiltrative cardiomyopathy who underwent PCI were predominantly females (54%). Underlying amyloidosis was associated with two fold increased odds of mortality in patients undergoing PCI (OR 2.13, 95% CI 1.08-4.23, p=0.029). While sarcoidosis (OR 1.11, 95% CI 0.73-1.7, p=0.6) and hemochromatosis (OR 0.79, 95% CI 0.32-1.92, p=0.6) were not significantly associated with mortality in patients undergoing PCI. The independent predictors of mortality in patients undergoing PCI with infiltrative cardiomyopathy are arrhythmias (OR 2.59, OR 1.14-5.9, p=0.02), cardiac arrest (OR 10.3, CI 3.8-27.6, p=0.00), pulmonary embolism (OR 5.8, CI 1.06-32.4, p=0.04), kidney disease (OR 4.5, CI 1.99-10.3, p=0.00) and liver disease OR 3.5, CI 1.34-9.1, p=0.01).

**CONCLUSION** Prevalence of infiltrative cardiomyopathy in patients undergoing PCI is 0.33%. Amyloidosis is associated with significantly increased odds of mortality in patients undergoing PCI while sarcoidosis and hemochromatosis are not significantly associated with mortality. Arrhythmias, cardiac arrest, pulmonary embolism, kidney and liver disease are independently associated with increased mortality in infiltrative cardiomyopathy patients undergoing PCI.

## ACUTE MYOCARDIAL INFARCTION

### CRT-100.04

#### Delaying Reperfusion Plus LV Unloading Reduces Infarct Size: A Per-Protocol-Analysis of the STEMI_DTU Pilot Study

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**BACKGROUND** Myocardial infarct size (IS) and microvascular obstruction (MVO) are well-established prognostic markers in STEMI. The STEMI-DTU pilot trial was the first exploratory study to identify that LV unloading and delayed reperfusion was feasible. We now report new findings in patients from per-protocol cohort on the basis of magnitude of sum of precordial ST-segment elevation.