DETECTION OF CORONARY ARTERY DISEASE ON CT CHEST IMAGING

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Problem Definition

Cardiovascular disease (CVD) remains the leading cause of death in the United States, responsible for 840,768 deaths in 2016. From 2006 to 2016, the US death rate from Cardiovascular disease decreased by 18.6% and decreased by 31.8% from coronary artery disease (CAD) specifically. This decrease in mortality has largely been driven by early detection and initiation of statin therapy. Atherosclerotic risk factors have been evaluated in multiple longitudinal studies. These studies have defined advancing age, male gender, hypertension, dyslipidemias, diabetes, cigarette smoking and family history as predictors of cardiac events. In addition to this, an underrecognized surrogate marker for CAD is coronary artery calcification (CAC). This should be considered ***diagnostic*** for CAD. In the PROVIDI study, using a qualitative scoring system for CAC, the authors found a stepwise increase in the likelihood of cardiovascular events with increasing CAC burden (four-fold increase in CV events in patients with severe CAC relative to patients without CAC). Yet despite this, CAC remains an under-recognized and under-reported marker of CAD and an opportunity for improvement.

Initial Measurement and Results

Study population: For this project, we have selected a total of 194 patients aged ≥40 years who had an inpatient stay at TJUH between July of 2018 and June of 2019, did not have an existing diagnosis of CAD and had CT imaging of the chest for any indication.

Results: There was a higher prevalence of females in this study 57% compared to males 43%. The majority of the patients fell into the age range of 60-79 and were White. Among the patients with CAC on CT, 57% were not taking a statin. Among the patients with diagnosis of diabetes and CAC on CT, 33% were not taking a statin. 31% of patients with hyperlipidemia and CAD findings were not taking a statin. Among those who had severe CAC, 30% were not prescribed a statin. Among them only 1 patient (2%) was prescribed alternative cholesterol lowering medication (ezetimibe). Only 18% of patients who had CAC had CAD discussed in their chart. 31% of patients who had evidence of CAD on CT had follow-up with cardiology. 48% of patients with CAC on CT had Jefferson providers as PCP. Among them, 51% had follow-up with PCP shortly after imaging and only 11% had CAD discussed during that visit.

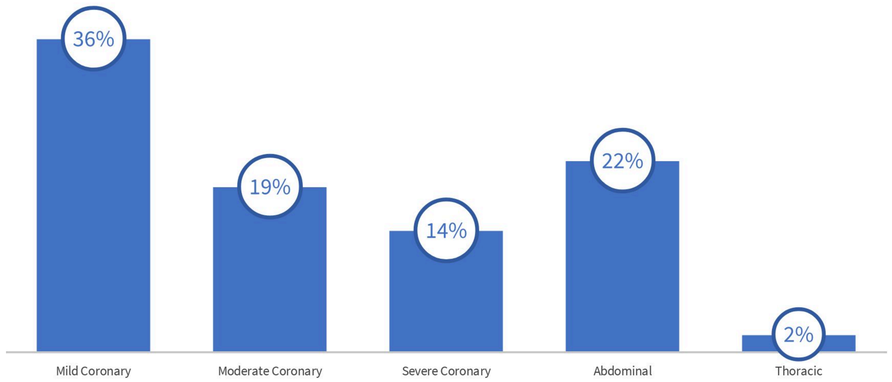

Fig 1. Distribution and severity of atherosclerotic findings on CT chest imaging.

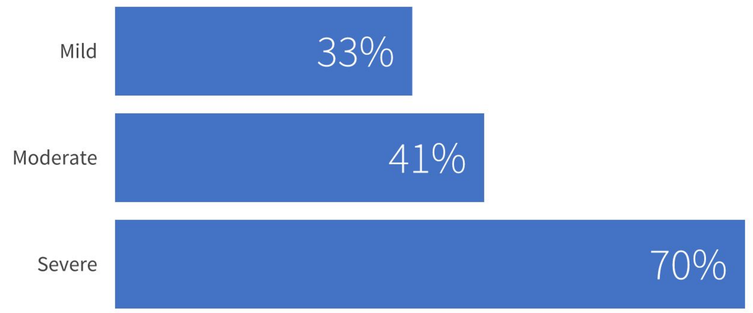

Fig 2. Percent of patients with CAC on a statin based on severity .

Fig 3. Statin and aspirin prescriptions among the patients with CAC findings.

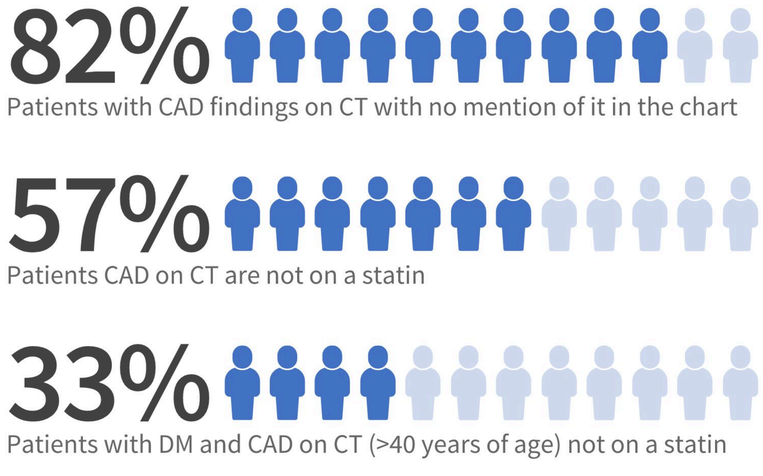

Fig 4. Summary of important findings based on initial analysis of study population.

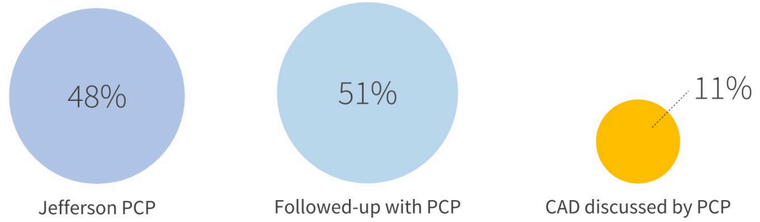

Fig 5. Percent of patients with CAC findings on CT who had an internal PCP, followed-up with their PCP shortly after imaging and had CAD discussed by PCP during that visit.

Aims For Improvement

Overall aim: Improve diagnosis and management of CAD based on CT chest imaging.

- Improve diagnosis of silent CAD based on CT chest imaging: more patients who have findings of CAC on CT chest imaging will be diagnosed with CAD.
- Increase the number of appropriate statin prescriptions based on CAD findings on CT chest imaging.

Intervention

Our proposed intervention has three components which will be implemented sequentially.

1. Standardize the reporting format for CAC on CT chest imaging by the Radiology Department.
2. Creation of best practice advisory for CAC CT findings in Epic. The goal is to alert the provider on the presence of CAC, and thus CAD, and to consider statin initiation.
3. Educate Jefferson primary care providers on new best practice advisory that will prompt them to have a discussion about the presence of CAD and risks and benefits of statin initiation.

Next Steps