

Late Outcomes for Patients with Acute Chest Pain and Positive Fractional Flow Reserve by Computed Tomography

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Introduction

- Testing with fractional flow reserve derived from computed tomography (FFR_{CT}) can be used to stratify otherwise indeterminate grade stenoses on cardiac computed tomography angiography^{1,2}.
- Short term data in patients with acute chest pain (ACP) and FFR_{CT} showed better outcomes at 90 days for negative FFR_{CT} compared to positive results³.
- Long-term clinical outcomes using FFR_{CT} have been reported in stable heart disease but not for patients with ACP².
- This study is the first to analyze late clinical outcomes in patients with ACP who underwent FFR_{CT}.
- We hypothesized that FFR_{CT} could be used to accurately predict which patients benefit from ICA and revascularization, therefore improving the workup of ACP in the acute setting.

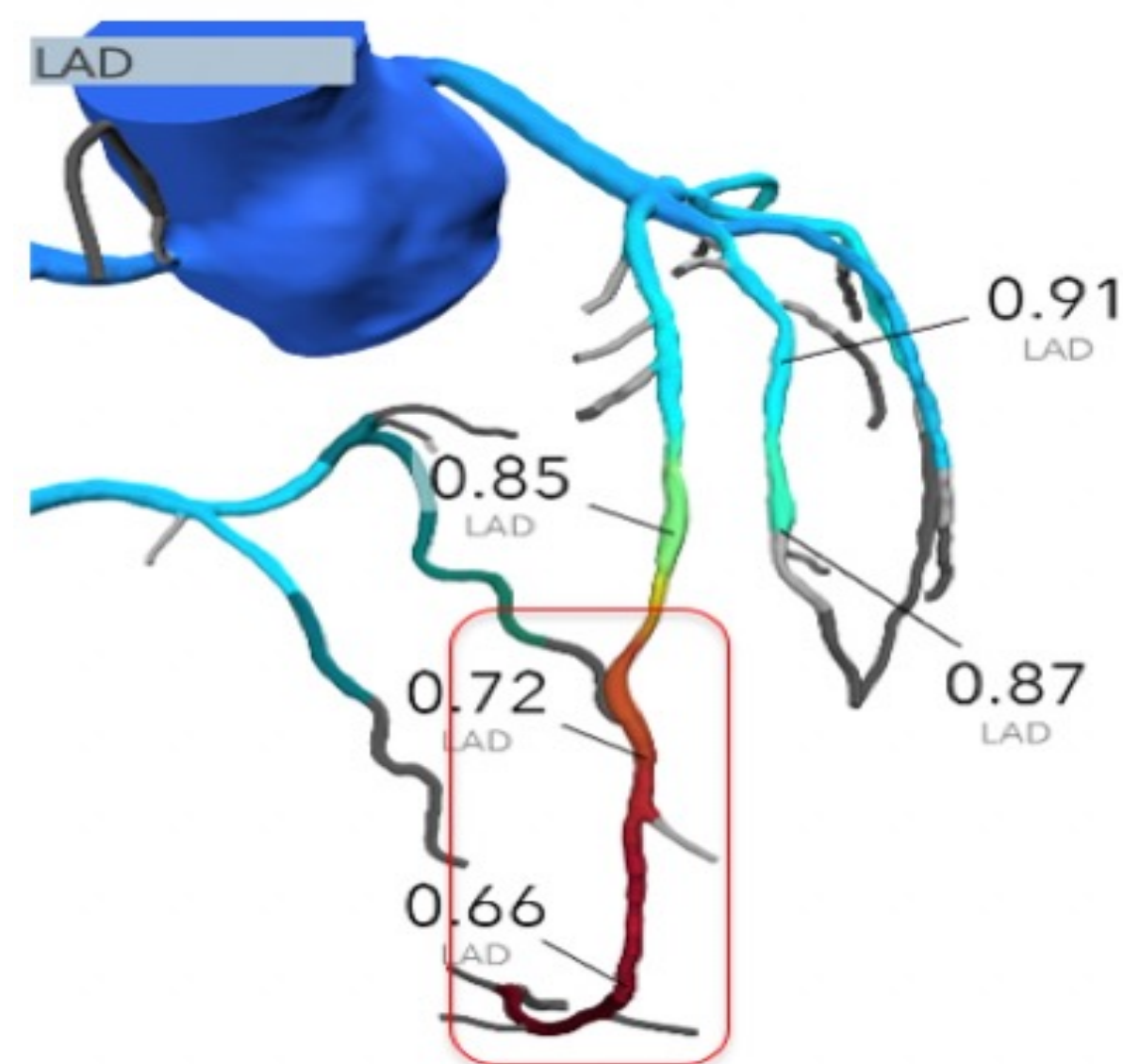


Figure 1: FFR_{CT} coronary artery reconstruction demonstrating physiologic decreased flow with red in the left anterior descending artery (LAD).

Aims and Objectives

- Analyze the long-term risk of death, myocardial infarction, invasive coronary angiography, and coronary revascularization after FFR_{CT}.
- Identify any discrepancies between FFR_{CT} and invasive testing.
- Determine the diagnostic value of including FFR_{CT} in patients with ACP and associated costs.

Methods

- Over 2015-2018, 389 patients presented to Beaumont with ACP and underwent FFR_{CT}.
- Retrospective review of medical records was used to assess for mortality, MI, revascularization, and ICA over three years of follow-up.
- Additional variables included correlation of FFR_{CT} results to invasive testing, physician rationale for withholding revascularization, estimated cost, and accuracy of FFR_{CT} interpretation.
- Appropriateness of revascularization was determined by a blinded cardiologist based on established guidelines.

Results

- The sensitivity, negative predictive value, specificity, positive predictive value, and accuracy of FFR_{CT} assessing obstructive disease are 0.94, 0.97, 0.89, 0.77, and 0.91, respectively.

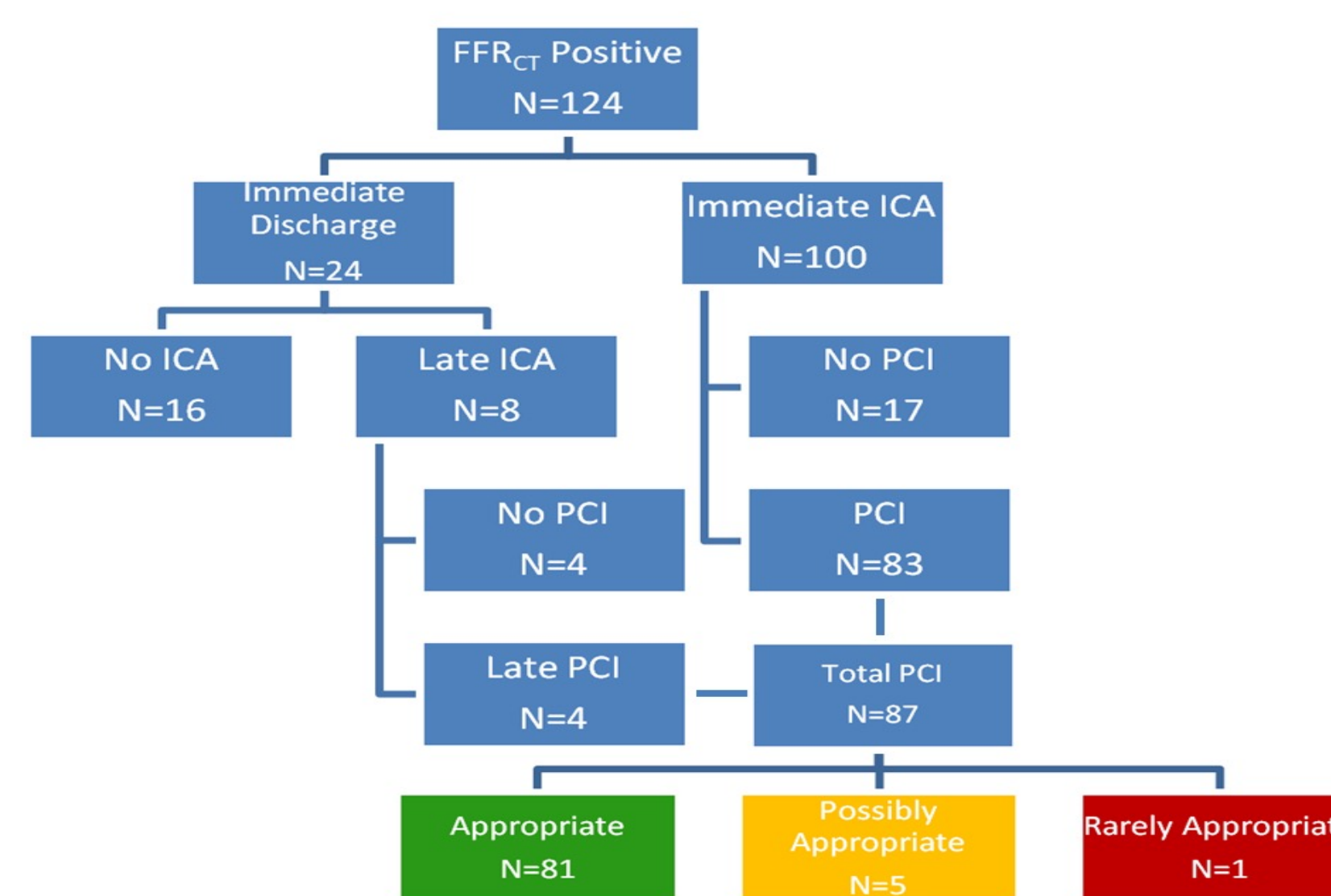


Figure 1: Positive FFR_{CT} outcomes.

- Among the 24 positive FFR_{CT} patients without immediate ICA, late cardiovascular events included 1 death of unknown cause, 2 MIs, and 4 appropriately revascularized.

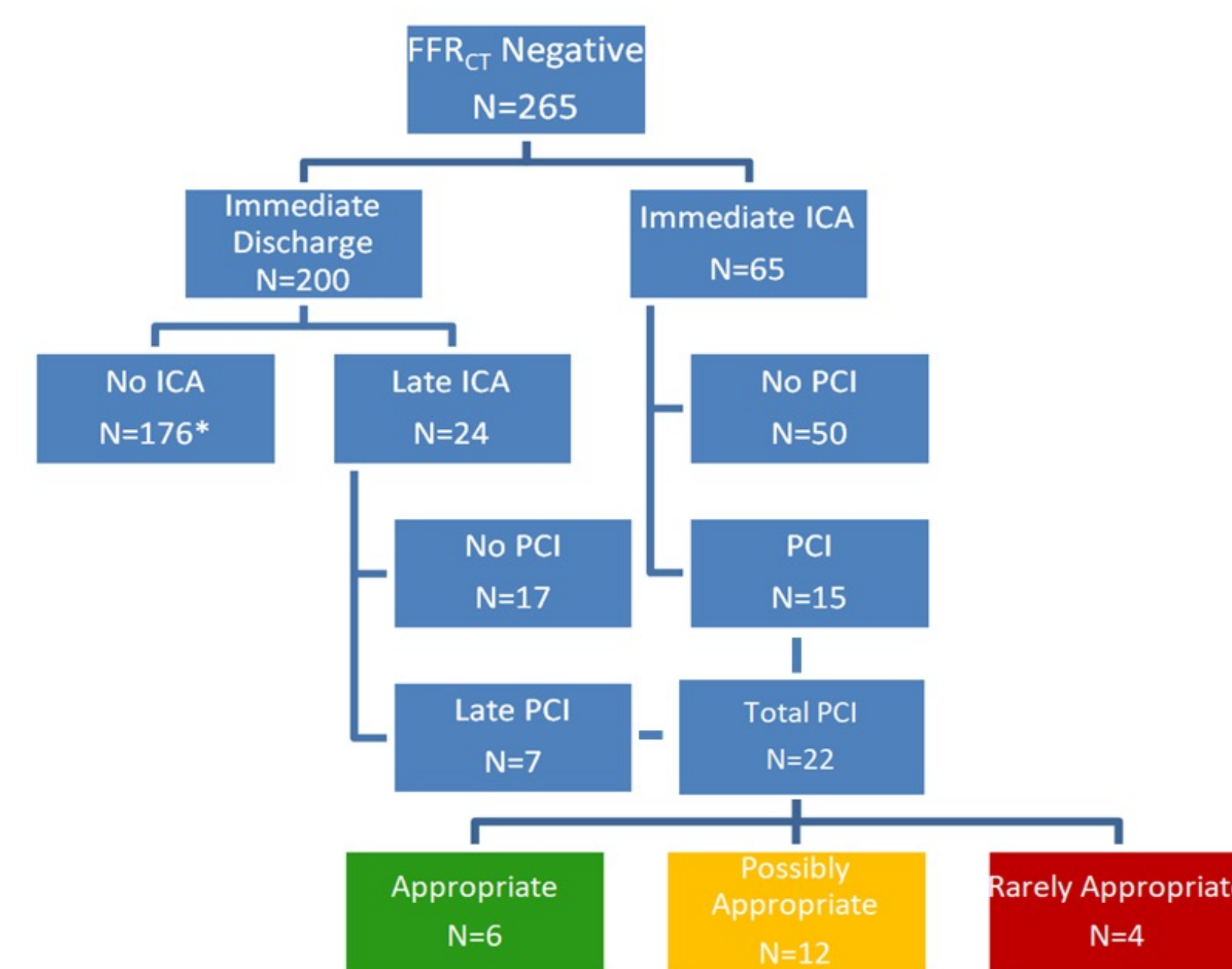


Figure 2: Negative FFR_{CT} outcomes.

- Of 200 negative FFR_{CT} patients without immediate ICA, no cardiac deaths, 1 MI, and 24 non-urgent ICA occurred in follow up (mean 41±10 months) with appropriate revascularization in 2.

Conclusions

- Positive FFR_{CT} is strongly associated with obstructive disease that benefits from ICA.
- Negative CCTA is associated with an excellent long-term prognosis without intervention, with a risk of late death and MI at 0.4% over three years of follow-up.
- FFR_{CT} can be used to accurately risk stratify patients presenting with ACP and can further guide which patients will benefit from ICA. This in turn will result in decreased costs from unnecessary ICA.
- Therefore, FFR_{CT} should be adopted into Emergency Department triage algorithms for patients with ACP to improve patient outcomes.

References

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