

PREDICTION OF LEFT MAIN DISEASE USING CLINICAL AND STRESS TEST PARAMETERS



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INTRODUCTION

- Detection of flow-limiting left main (LM) coronary artery disease (CAD) has both prognostic and therapeutic implications
- Stress testing is the most common method to detect obstructive CAD
- However stress markers of LM CAD remain unclear
- The aim of the study is to identify markers of LM CAD using clinical and stress testing parameters

METHOD

- Pts enrolled in the ISCHEMIA trial who underwent exercise ECG(ExECG), stress single-photon-emission-tomography(SPECT) or stress echocardiography (SE) and coronary computed tomography angiography (CCTA) were evaluated
- Pts were enrolled based on local determination of moderate or severe ischemia
- Those with prior CABG were excluded
- Multivariate modeling was used to identify predictors of $\geq 50\%$ LM diameter stenosis (“LM disease”), first without and then with stress testing parameters included in the model.
- A low average model-predicted probability of $\geq 50\%$ LM by using the multivariate model described above was used to identify subgroups with an average model-predicted probability less than 2.5%

RESULTS

- Of the 5146 patients included-see flow diagram below (mean age: 63 years, male: 74%), 414 (8%) had LM disease. Predictors of LM disease are shown in the Table 1. The models were weakly predictive of LM disease (C index 0.643 for clinical model, 0.671 for clinical + stress model)
- Table 2 indicated that the optimum models that predicted the probability of $\geq 50\%$ LM as $< 2.5\%$ taking individual stress testing factors into account were always female, such as women with SE determined number of ischemic segments < 5 or stress SPECT summed stress score < 10

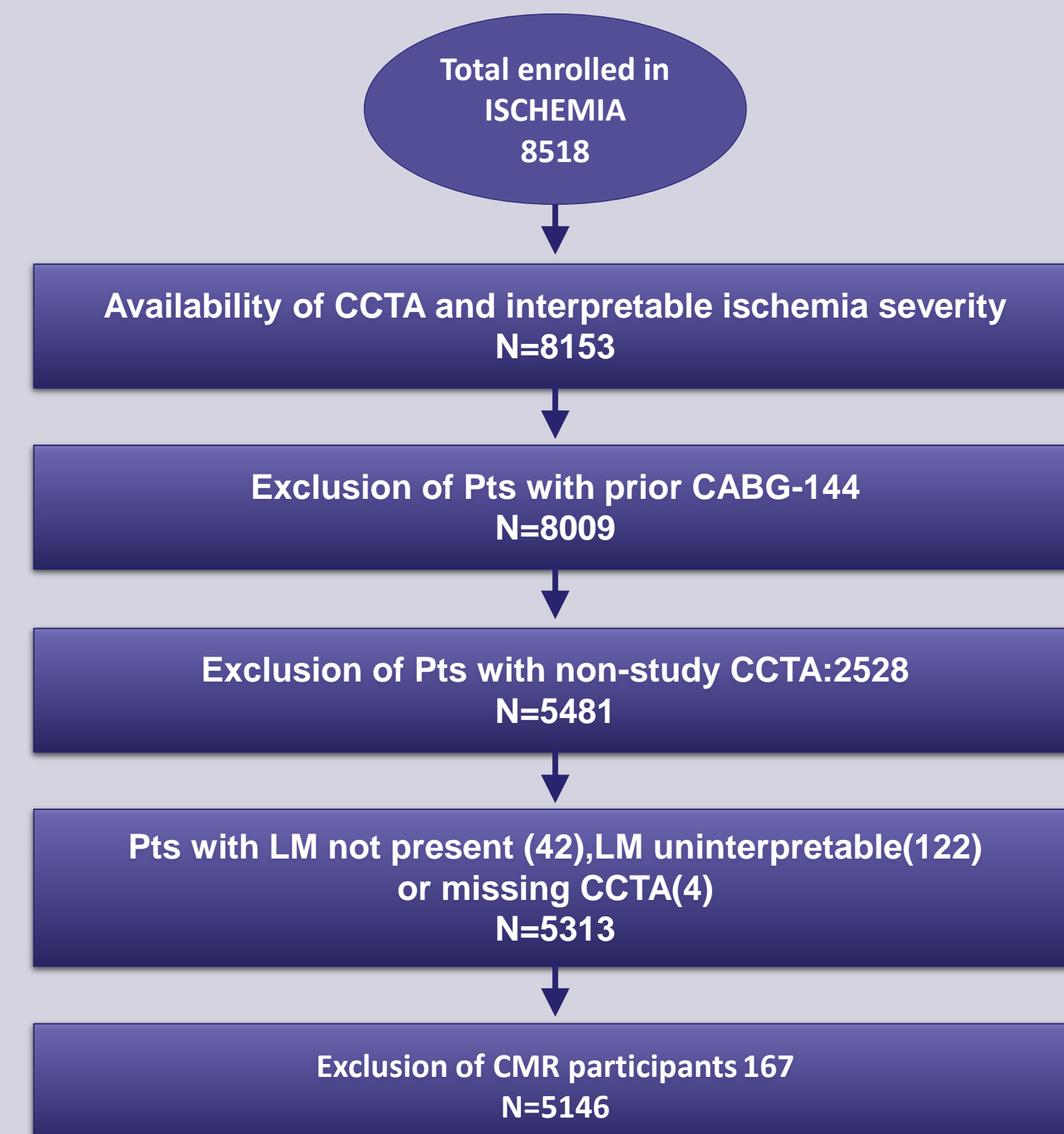


TABLE 1 - Results from Imaging and Stress Test Model Adjusted for Clinical Factors

Variable	Left main stenosis $\geq 50\%$		
	OR	95% CI	P-value
Age at Enrollment, years ¹			$<.001$
65 versus 55	1.44	1.23 - 1.7	
75 versus 65	1.13	0.93 - 1.39	
Female Sex among nuclear modality	0.26	0.14 - 0.48	$<.001$
Race/Ethnicity			0.461
Non-Hispanic White	ref		
Non-Hispanic Asian	0.97	0.71 - 1.31	
Other	0.83	0.61 - 1.12	
Hypertension	0.95	0.76 - 1.2	0.691
Diabetes	0.88	0.71 - 1.1	0.270
Cigarette Smoking			0.275
Never Smoked	ref		
Former Smoker	0.82	0.65 - 1.05	
Current Smoker	0.97	0.68 - 1.37	
Prior MI	0.61	0.42 - 0.88	0.009
eGFR (ml/min) ¹			0.967
120 versus 90	1.02	0.8 - 1.29	
90 versus 60	0.96	0.72 - 1.3	
Imaging and Stress test			
Number of ischemic segments on echo, per 1 segment increase	1.10	0.97 - 1.25	0.155
Number of infarcted segments on echo, per 1 segment increase	1.08	0.94 - 1.25	0.276
Summed difference score on nuclear ≥ 10	1.49	0.95 - 2.33	0.080
Summed stress score on nuclear	1.00	0.96 - 1.04	0.979
TID (Transient ischemic dilation in the LV) on nuclear	1.01	0.63 - 1.62	0.954
TID (Transient ischemic dilation in the LV) on ECHO	1.63	1 - 2.65	0.050
Maximum ST Depression in Any Lead on ETT, per 1 mm increase	1.20	1.02 - 1.42	0.025
Severe or Moderate Anterior Ischemia on Nuclear	1.33	0.91 - 1.93	0.137
Severe or Moderate Anterior Ischemia on ECHO	1.03	0.58 - 1.84	0.918
LAD + LCX ischemia on Nuclear	1.32	0.76 - 2.31	0.329
LAD + LCX ischemia on ECHO	1.24	0.69 - 2.22	0.478

TABLE 2 - Subgroups with Average Model-predicted Probability of Left Main Stenosis $> 50\%$ that is $< 2.5\%$ Defined Using Modality Specific Variables

Subgroup Definition	N	Mean Predicted Probability
Female: Nuclear	508	0.024
Female: Echo	446	0.025
Female: Nuclear: Age ≤ 75	445	0.023
Female: Nuclear: Summed Difference Score < 10	389	0.021
Female: Nuclear: Age ≤ 75 ; No Prior MI	377	0.024
Female: Echo: Age ≤ 75	372	0.023
Female: Nuclear: 55 $<$ Age ≤ 75	369	0.025
Female: ECHO: Number of Ischemic Segments ≤ 5	361	0.021

The following variables were used to define subgroups: Sex, age (categorized as < 55 , < 65 and < 75), prior MI, Stress modality (Nuclear, ECHO and ETT). Modality specific variables included: summed difference score on nuclear > 10 ; Severe or moderate Anterior Ischemia on Nuclear; Number of Ischemic segments (categorized as ≤ 3 ; ≤ 5); TID (Transient ischemic dilation in the LV) on ECHO; Maximum ST Depression in Any Lead on ETT (categorized as ≤ 2 , ≤ 3)

CONCLUSIONS

- In patients with moderate or severe ischemia on stress testing, clinical and stress testing parameters were weakly predictive of LM disease on CCTA
- SE-detected TID and ST depression during ETT provided incremental information independent of clinical and other stress modality specific parameters for the prediction of LM disease
- Subgroups with a probability of at least 97.5% for no significant LM disease were always female, such as women with SE determined no of ischemic segments < 5 or stress SPECT summed stress score < 10