

# Non-Adherence to the American College of Cardiology/American Heart Association (ACC/AHA) Guidelines for Exercise Treadmill Testing

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## BACKGROUND

- ACC/AHA guidelines (GLs) recommend Ex treadmill test (ETT) without imaging as the initial test to evaluate patients with chest pain who have normal baseline ECG and adequate exercise capability<sup>2,3</sup>.
- Stress imaging (ESE or ex-MPI) preferred by clinicians because of superior sensitivity and specificity to standard treadmill<sup>2,4</sup>.
- Studies show ETT performs adequately vs. stress imaging for Dx and prognosis<sup>5</sup>
- ETT preferred because: relatively low cost, less labor and technician demand.

## OBJECTIVES

- We identified consecutive patients from January to July 2019 who were referred for Ex Echo (ESE) who had normal baseline ECGs.
- ESE includes simultaneous ETT component.
- Of pts who had ESE, we determined % with adequate exercise capacity, thereby implying a diagnostic ETT as initial test would have been appropriate
- We also determined proportion of pts who reached  $\geq 85\%$  max predicted HR which also required for Dx ETT.
- We compared the foregoing variables (bullets 3 and 4 above) in men and women.

## METHODS

- Retrospective review of 283 (women = 142, men = 141) consecutive patients referred for ESEs from January to July 2019 using the UCDCM Muse database.
- Patients stratified into normal and abnormal baseline ECGs. Abnormal baseline ECGs also included patients with history of CAD, valvular and other types of heart diseases.
- Inclusion criteria: majority of patients referred for chest pain, others for variety of indications, age 25 and greater, no history of CAD or other CVD, no prior ESE or ETT
- Amongst patients with normal baseline ECG, the patient's functional capacity (max HR% and METs reached) were recorded to determine if s/he could have had an adequate, Dx ETT as the initial test.

## RESULTS

**Table 1a: NI and abn baseline ECGs**  
Men/Women Approx. Equal

	Female		Male		Total	p-Value
	n	%	n	%		
Normal	59	50.43	58	49.57%	117	NS
Abnormal	83	50.00%	83	50.00%	166	NS

Table 1a: Men/Women Approx. Equal

**Table 1b: Categorized ECGs into normal and abnormal according to baseline ECGs and history of heart disease.**

Normal Baseline ECGs	n	Abnormal Baseline ECGs / History of Heart Disease	n
Normal ECG	87	Atrial Fibrillation	4
Atrial enlargement	5	Pathological Q Waves	18
Low voltage QRS	5	ST-T Abn	81
Prolonged QT	1	Infarct (anterior, septal)	29
Early R wave transition	1	ILBBB, LBBB	3
Poor R wave progression	3	LVH	13
IRBBB / RBBB	15	History of CAD, MI, valvular disorders	18
<b>Total</b>	<b>117</b>	<b>Total</b>	<b>166</b>

Table 1b: Majority of women and men had abn baseline ECG and were excluded from the study

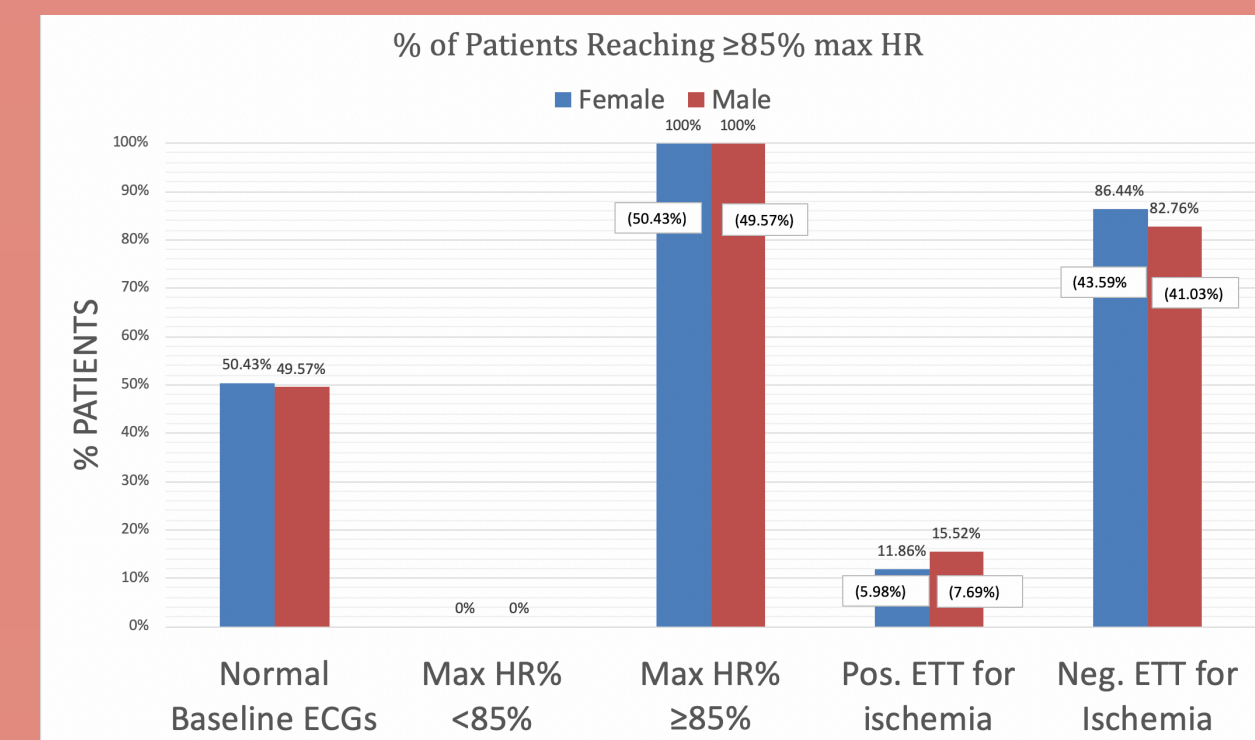


Chart 1: No difference in %men/women reaching  $\geq 85\%$  target heart rate ( $>90\%$ )

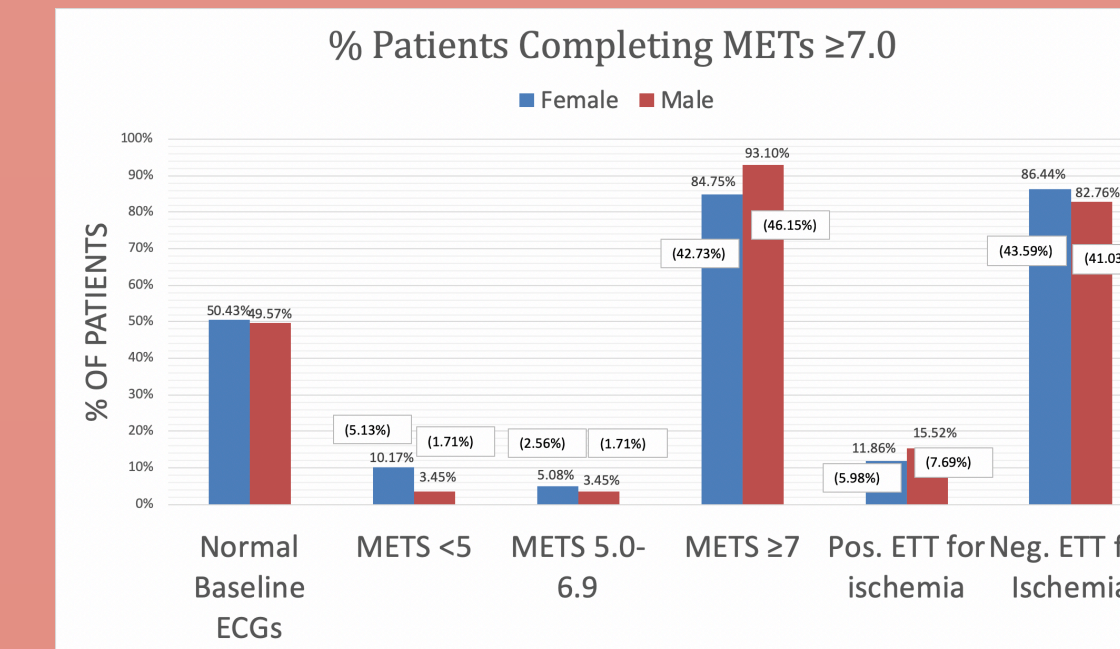


Chart 2: No difference in %men/women who completed METs  $\geq 7.0$  ( $>85\%$ ).

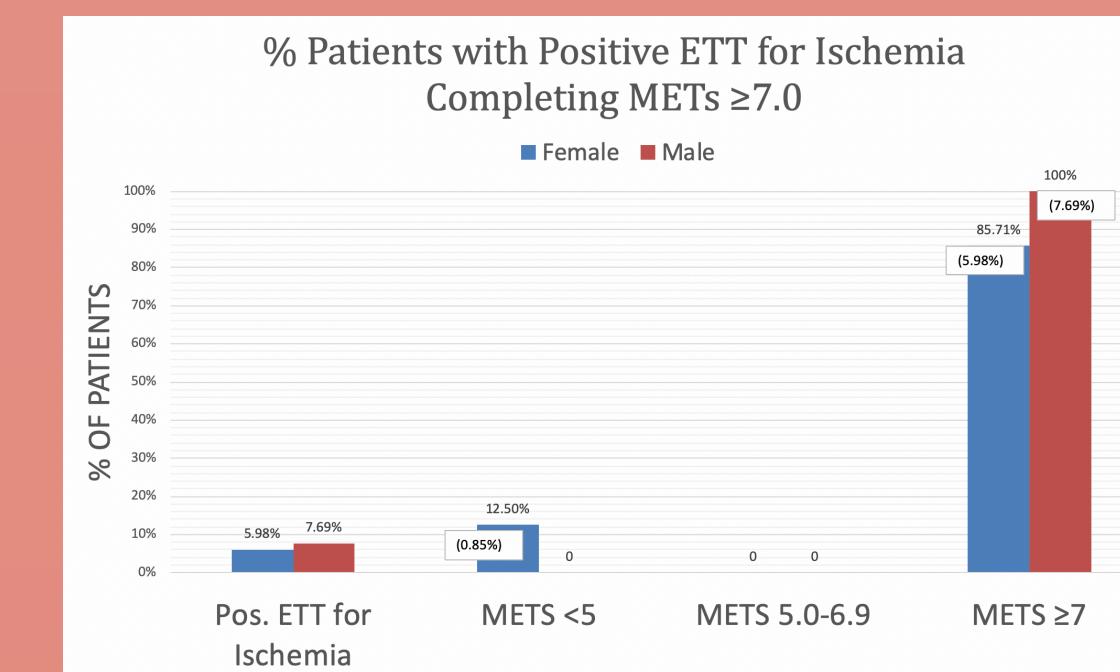


Chart 3: Majority of patients with positive ETT for ischemia completed METs  $\geq 7.0$  ( $>85\%$ ). No difference between men and women.

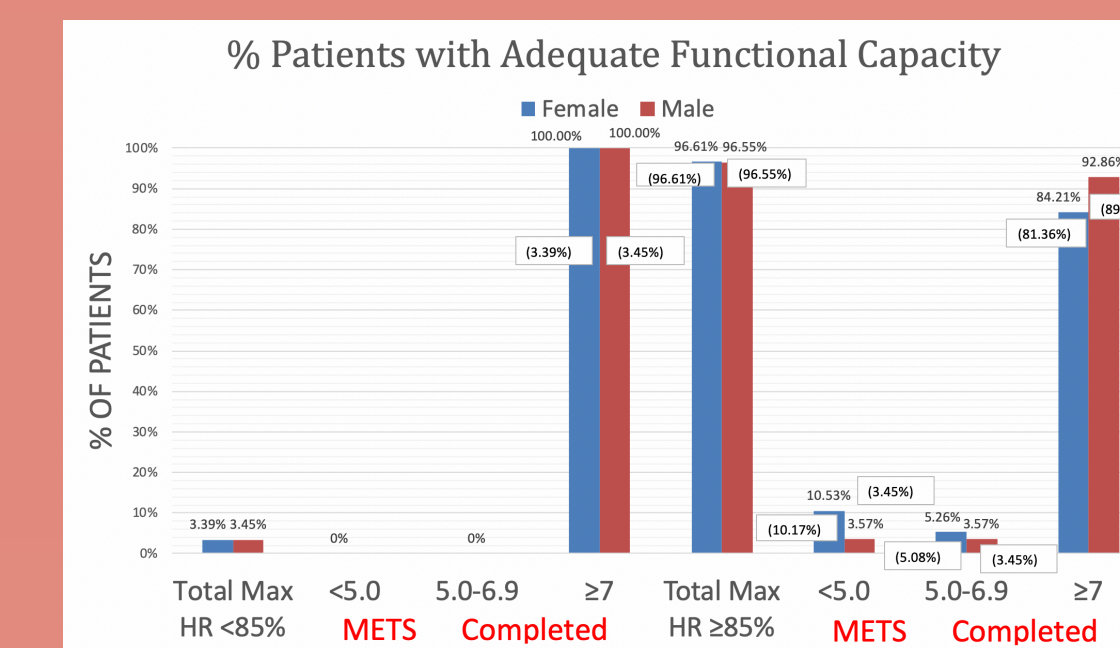


Chart 4: Majority of patients with normal baseline ECG had adequate functional capacity, defined as reaching max HR  $\geq 85$  and completing METs  $\geq 7.0$  (women 84%, men 93%).

## RESULTS

- $\sim 50\%$  patients with chest pain or SOB from Jan to July 2019 with normal baseline ECG referred for stress imaging
- $>85\%$  men and women had adequate functional capacity, max HR  $\geq 85\%$  and METs  $\geq 7.0$ .
- 84% women and 93% men with positive ETT for ischemia had adequate workload.

## SUMMARY

- No difference between men and women who were referred for stress imaging.
- Men were as likely as women to be referred for ESE despite a normal baseline ECG.
- Both men and women were able to achieve target HR (max HR  $\geq 85\%$ ) and had adequate workload (METs  $\geq 7$ )
- These data suggests that many are referred for stress imaging studies that don't require them who can have adequate and diagnostic non-imaging stress tests.

## LIMITATIONS

- Single-center study with small cohort
- Snapshot look at studies completed (7 months)
- Retrospective chart review
- Many possible reasons why patient with normal baseline ECG were referred for ESE instead of ETT, including need to identify and localize lesions.

## CONCLUSIONS

- ETT can be an equally diagnostic but inexpensive test for ischemia, given patient has adequate functional capacity
- Almost 1 in every 2 cases, patients with normal baseline ECG and adequate functional capacity are referred for ESE instead of evidence-based ACC/AHA guideline for ETT.
- Next goal is determine motivating factors guiding decisions for referrals for either ESE or ETT, outside ACC/AHA guidelines
- Understanding motivations can help minimize unnecessary imaging tests.

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