Department of Medicine

A Retrospective Chart Review to Determine Proper Stress Test Utilization in Low Risk Chest Pain Patients

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Disclosures: None.

Introduction

- Patient presenting with chest pain to the ED is a very common clinical problem.
- This is the second most common presentation to the emergency departments.
- A typical chest pain admission requires serial EKGs, cardiac biomarkers, stress testing, echocardiography and if needed invasive testing such as cardiac catheterization.
- The extent of workup depends upon clinical history, physical examination, risk factors, and initial workup (EKGs and cardiac enzymes).
- There are many scoring criteria such as TIMI risk score, simple risk scoring and Grace score that help to risk stratify chest pain patients and to determine the appropriate workup.
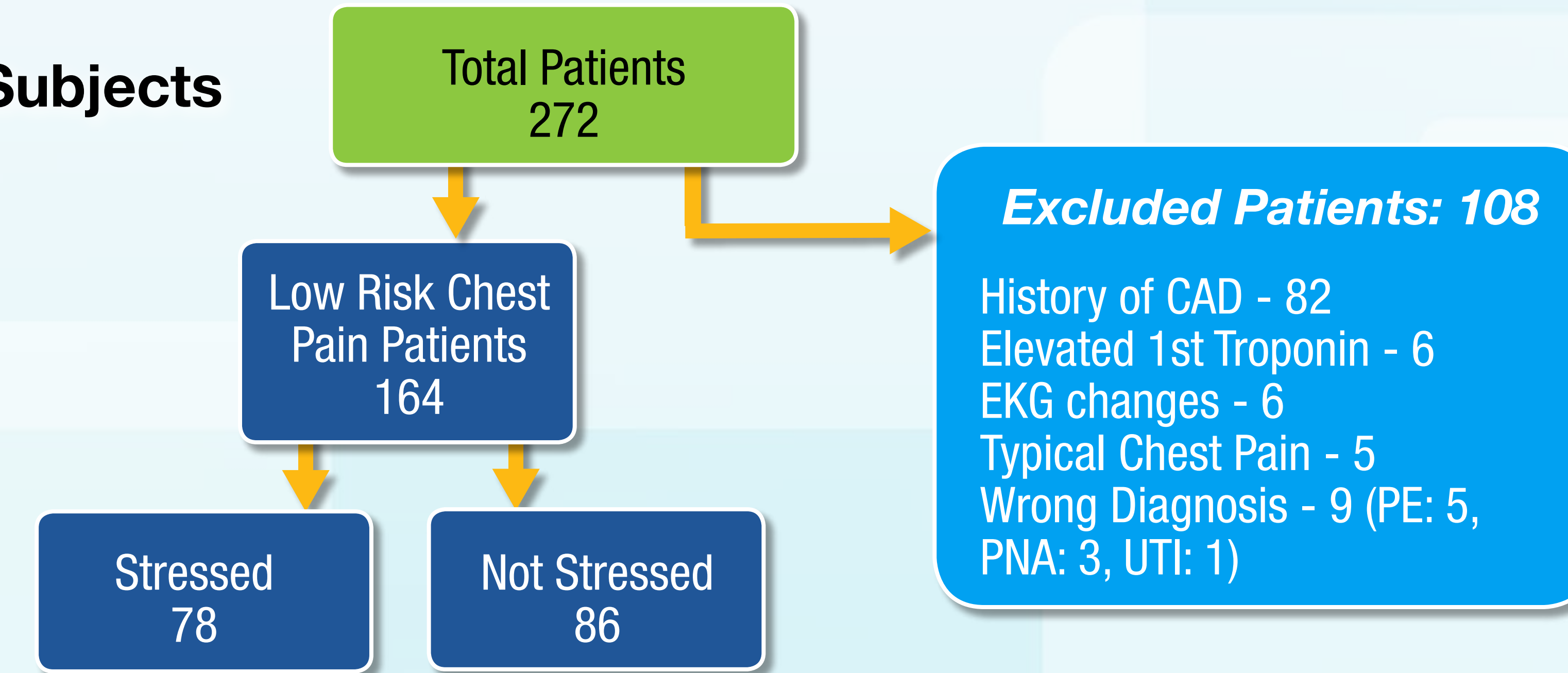
Objectives

The objectives of this study were to:

- Examine the utilization of inpatient stress tests in low risk chest pain admissions.
- To determine if proper risk stratification is utilized at admission to order stress tests.
- To determine the incidence of outcomes such as acute coronary syndromes, MI, Death, 30 day re-hospitalization in low risk chest pain admissions?

Methods

- It was a retrospective observational chart review and included patients that were admitted with a primary diagnosis of chest pain.
- Patients were included if they had atypical chest pain with no prior history of coronary artery disease (CAD) and a normal initial EKG and first troponin.
- Patient were excluded if they have typical chest pain, or a history of CAD, an abnormal admission EKG or positive cardiac enzymes.
- All included patients underwent further risk stratification per TIMI Risk score from 0 to a maximum score of 4. (Since history of CAD, abnormal EKG and positive Biomarkers were already excluded the maximum calculated TIMI risk of this population was 4).
- Stress test utilization in each TIMI risk class was determined.
- Patients were divided into stressed and non stressed groups.
- Cardiac outcomes such as acute coronary syndrome, Death, 30 day re-hospitalizations due to cardiac events were compared between the two groups.

Study Subjects

Total Patients 272 → Low Risk Chest Pain Patients 164 → Stressed 78 / Not Stressed 86

Excluded Patients: 108

History of CAD - 82
Elevated 1st Troponin - 6
EKG changes - 6
Typical Chest Pain - 5
Wrong Diagnosis - 9 (PE: 5, PNA: 3, UTI: 1)

Table 1. TIMI Risk Score

Historical	Points
Age $\geq$ 65 Y	1
$\geq$ 3 CAD risk factors (FH, HTN, ↑chol, DM active smoker)	1
Known CAD (stenosis $\geq$ 50%)	1
ASA use in past 7 days	1
Presentation	
Recent (> 24h) severe angina	1
↑ cardiac markers	1
ST deviation $\geq$ 0.05 mV	1
RISK SCORE - Total Points	(0-7)

Table 2. Population Characteristics

	Frequency	Percent of Total
Female Sex	55	66.5%
Hypertension	104	63%
Diabetes Mellitus	38	23%
Current Smoker	32	20%
Hyperlipidemia	80	49%
Family History of CAD	62	38%
Stress Test Performed	78	48%

Figure 1
TIMI Risk Distribution

Number of Patients in Each TIMI Class: TIMI 0 = 26, TIMI 1 = 53, TIMI 2 = 44, TIMI 3 = 31, TIMI 4 = 10
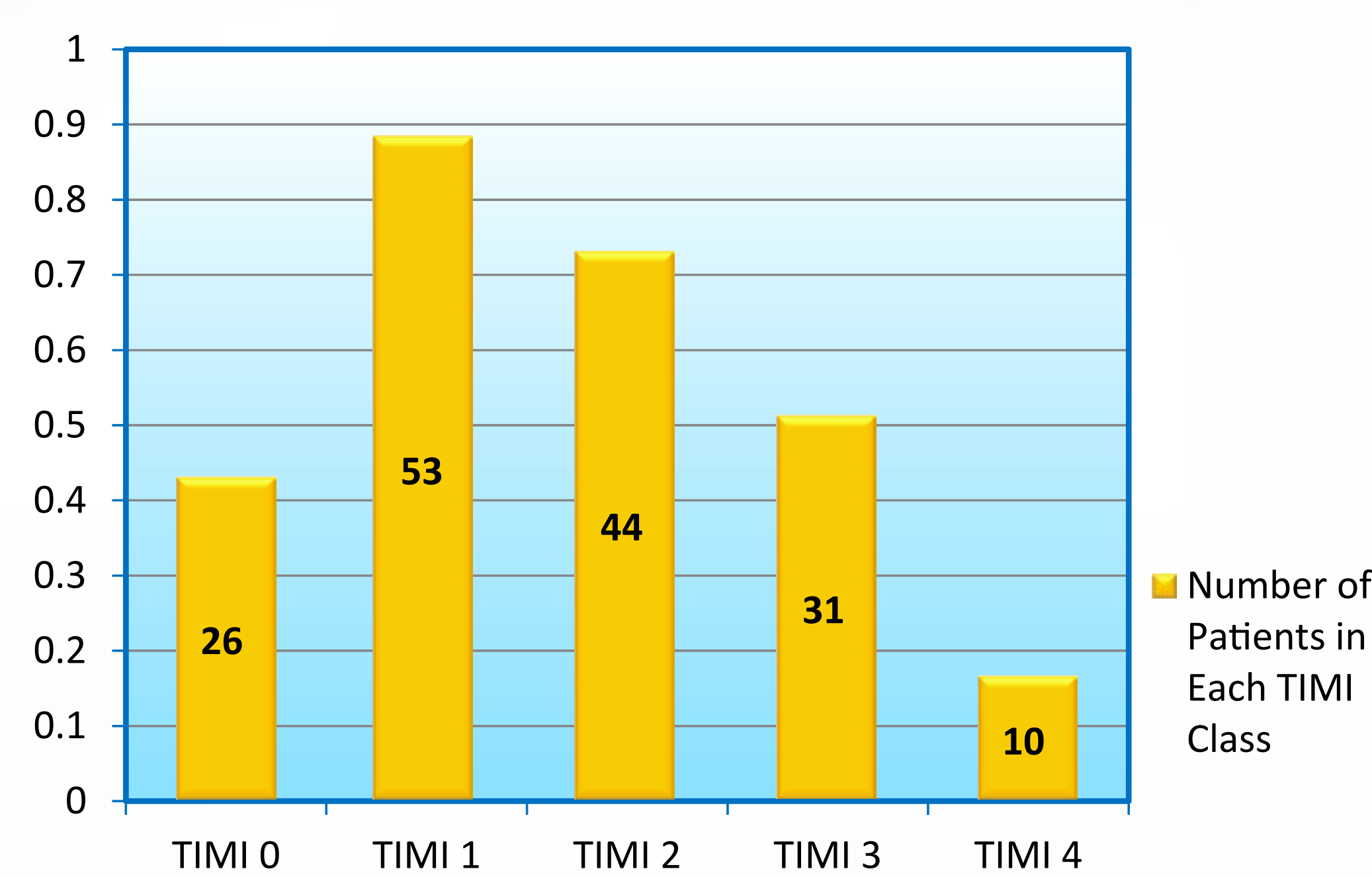
Figure 2
Stress Test Utilization Per TIMI Risk

No association P = 0.494 (Chi Square)

% of Patients Stressed: TIMI 0 = 53, TIMI 1 = 37, TIMI 2 = 50, TIMI 3 = 52, TIMI 4 = 60

Table 3. Cardiac Outcomes
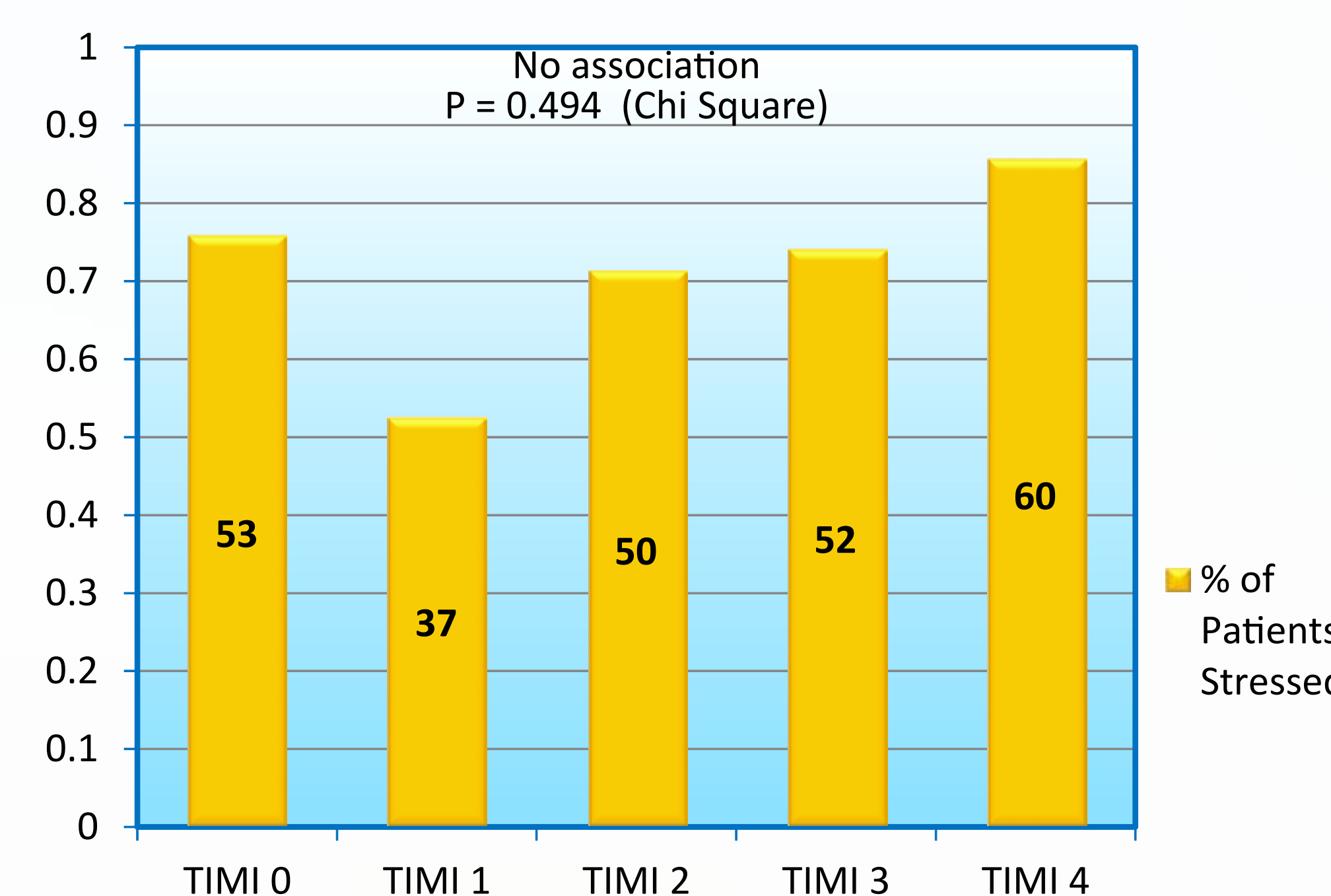
	Stressed	Not Stressed
Acute Coronary Syndromes	0	0
Death	0	0
30 Day Re-hospitalization due to Cardiac Reasons	0	0

Results

- 164 consecutive low risk chest pain patients were included based on the inclusion criteria.
- Patients were stratified by TIMI risk score from 0 to a maximum score of 4 (Figure 1).
- A stress test was performed in 48% of the patients.
- Patient's with higher TIMI scores did not have more stress test ordered and there was no association between TIMI risk scores and utilization of the stress test (p = 0.494) (Figure 2).
- None of the stress tests were true positive.
- There were no acute coronary syndromes, deaths or 30 day re-hospitalizations due to cardiac events in these patients whether they did or did not have an inpatient stress test.

Conclusions

- In low risk populations stress test is low yield.
- Stress testing was over utilized independent of patient's risk.
- A proportional increase in stress test utilization compared to risk was not seen.
- A proper risk stratification on admission can decrease stress test utilization for very low risk patients TIMI scores 0-2.

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