Observation Unit Admissions:

CHEST PAIN

LAST UPDATED: 10/2024

All patients presenting to the ED with a chief complaint of chest pain should have a detailed history and physical performed to help ascertain potential cardiac etiologies.

This should include but is not limited to the following:

- Description of pain
- Location of pain with attention to radiation
- Duration of pain
- Aggravating and alleviating factors of pain
- Symptoms associated with the pain
- Reproducible nature of the pain
- Personal cardiac history including assessment of CAD equivalents[1]
- Family history of CAD in first degree relatives
- Modifiable risk factors[2]
- History of prior cardiac testing including but not limited to: EKGs, Echocardiograms, Stress tests, Cardiac cath

Recommended tests/ assessments before admission decision:

1. EKG at 0 and 6 hrs[3]
2. Troponin x2 at 0 hr and 1 hr
3. D-dimer (if clinically indicated based on interview and physical)
4. HEART score[4]
5. Chest X-Ray (if clinically indicated based on interview and physical)

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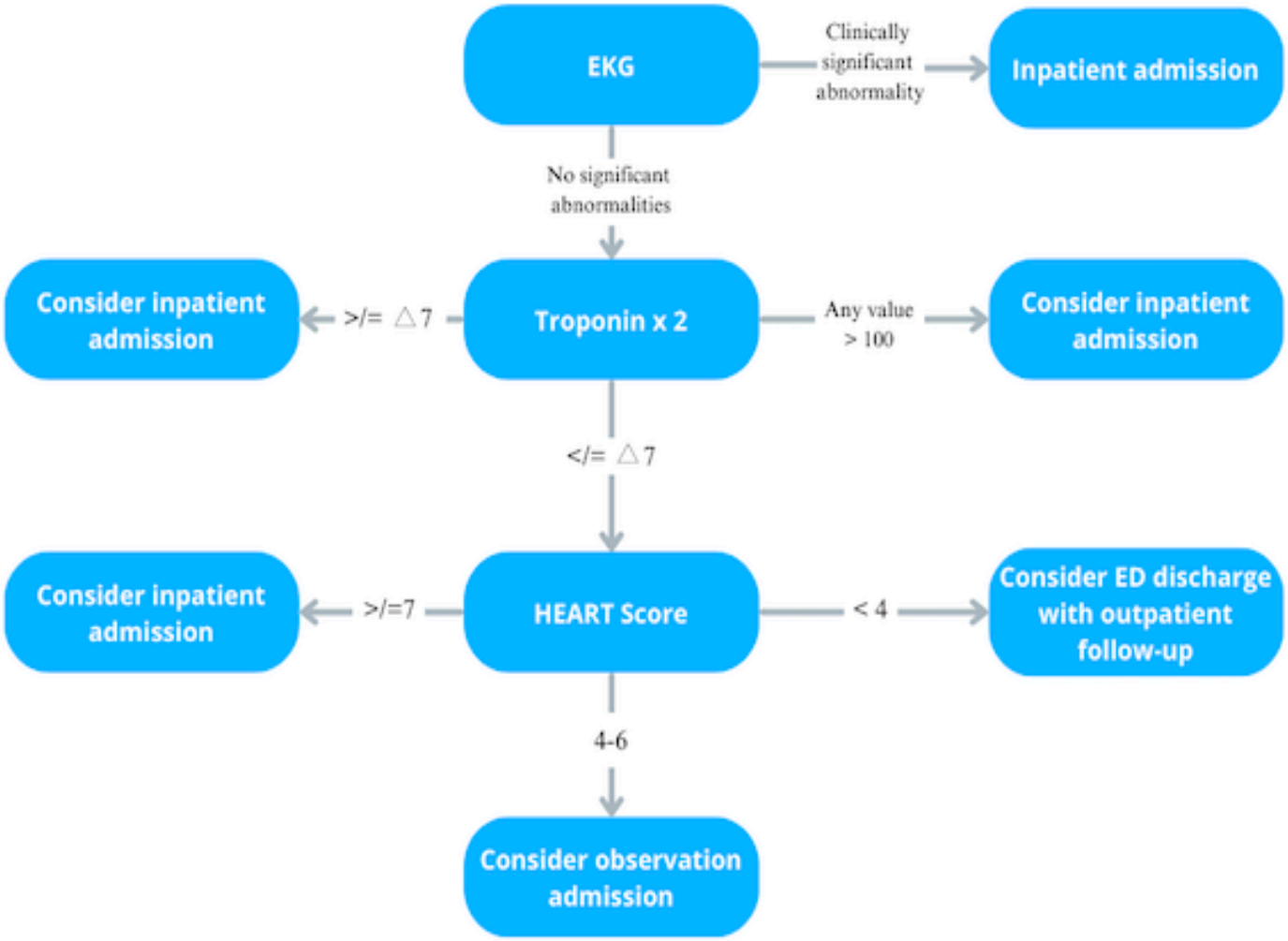
[1] CAD equivalents include Diabetes, history of Stroke, Peripheral Arterial Disease
[2] Modifiable risk factors includes smoking history, uncontrolled HLD, uncontrolled HTN
[3] 6 hr repeat EKG can be done while admitted to Observation Unit if initial EKG without clinically significant abnormalities
[4] The HEART Score is a verified scoring tool utilized to assess patients presenting to the ED with chest pain as a means of estimating their pre-test probability for MACE

If elevated concern for CAD as the etiology for chest pain use this algorithm:



Relative exclusion criteria for Observation unit admission:

- Ischemic changes on EKG
- Cardiac biomarkers with Δ of 7 or greater or any value > 100
- Unstable angina without reasonable non-cardiac alternative etiology
- Hemodynamic instability (SBP < 90 or > 220, sustained HR < 50 while awake)
- Cardiac stent placement within 6 weeks
- History of heart transplant or LVAD

**Removed from prior version: Evidence of decompensated heart failure, History of STEMI or NSTEMI*

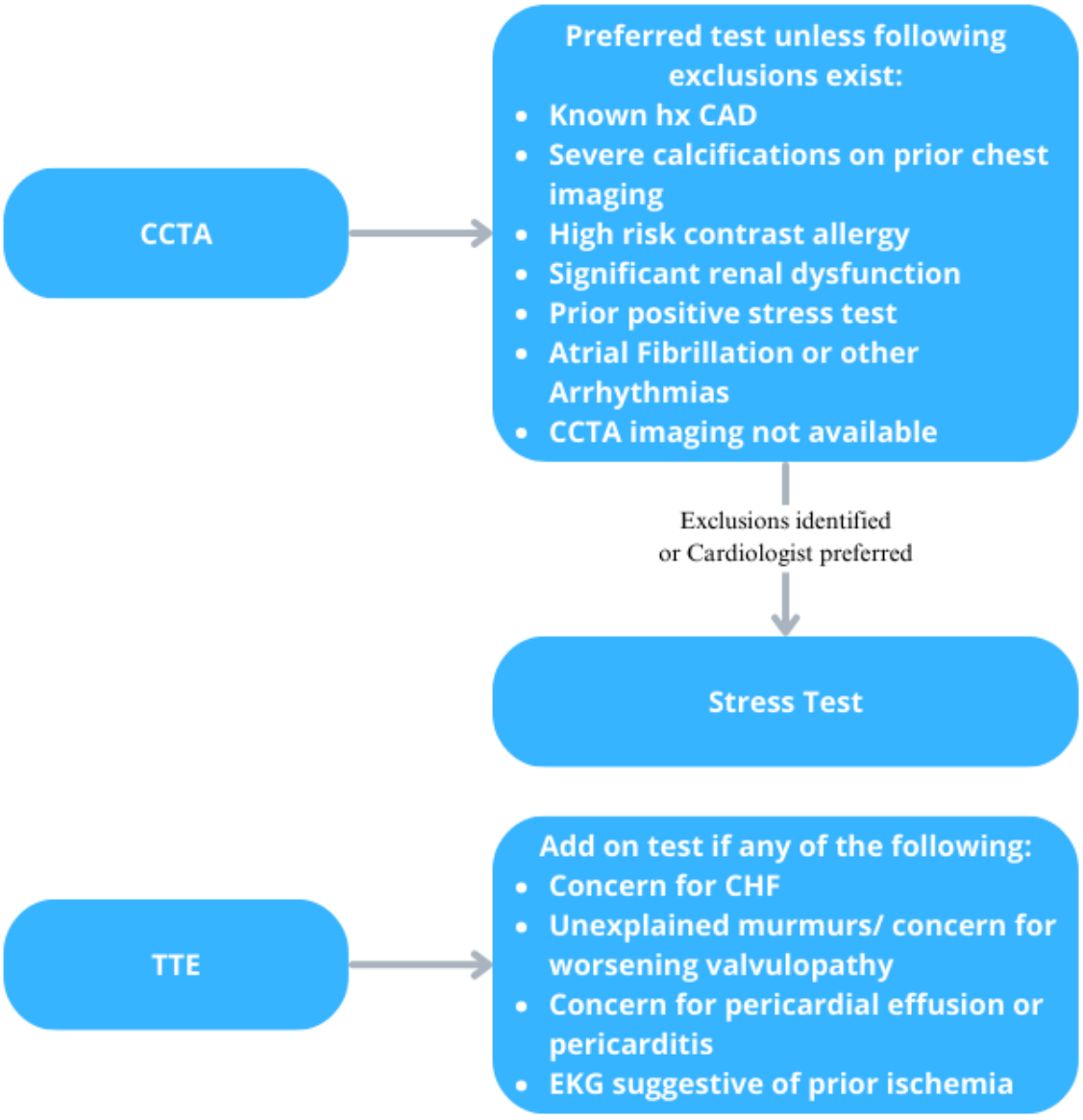
Patients recommended for admission to the Observation Unit should be considered for a cardiology consultation for additional management recommendations

- If the patient has a Cardiologist on staff at NWH or OPTUM please alert them of the chest pain admission

While awaiting cardiac assessment, consider the following:

- Repeat EKG and troponin stat if symptoms return
- Initiation of ASA 81mg po qd unless otherwise contraindicated
- Initiation of high intensity statin daily for secondary prevention
- Lab assessment with Lipid panel and Hemoglobin A1c if not done within the prior 6 months for risk stratification
    - NOTE: Order these studies as ADD-ONs to blood work done in the ED rather than next morning labs to increase likelihood of results being completed prior to discharge
- If patient is pending stress testing, avoid/ hold Beta-Blockers

Choosing the appropriate cardiac test[5]:



[5] Kontos, Michael C., et al. "2022 ACC Expert Consensus Decision Pathway on the Evaluation and Disposition of Acute Chest Pain in the Emergency Department." *Journal of the American College of Cardiology*, vol. 80, no. 20, Oct. 2022, https://doi.org/10.1016/j.jacc.2022.08.750.

For patients cleared for discharge after completion of cardiac evaluation:

- Reassess the need for continued aspirin and statin on discharge
- Consider referral to cardiology outpatient for elevated risk patients
- Provide instructions for return to the ED if recurrent symptoms

Indications for upgrade from Observation to Inpatient admission:

- New EKG changes concerning for ischemia
- New or worsening clinically significant elevation of troponin
- Development of unstable angina
- Development of hemodynamic instability (ex. Hypotension, sustained bradycardia)
    - This is INDEPENDENT of the presence or absence of symptoms
- Abnormal cardiac testing results
- Serious alternative etiology of chest pain identified

SUPPLEMENTS

HEART SCORE[6]:

The HEART score for chest pain patients at the emergency department.

History (=anamnesis)	Highly suspicious	2
	Moderately suspicious	1
	Slightly or non-suspicious	0
ECG	Significant ST-depression	2
	Nonspecific repolarization disturbance	1
	Normal	0
Age	≥65 years	2
	>45–<65 years	1
	≤45 years	0
Risk factors	≥3 risk factors, *or* history of atherosclerotic disease	2
	1 or 2 risk factors	1
	No risk factors known	0
Troponin	≥3× normal limit	2
	>1–<3× normal limit	1
	≤Normal limit	0
Total		

[6] B.E. Backus, et al. *A Prospective Validation of the HEART Score for Chest Pain Patients at the Emergency Department*. International Journal of Cardiology, 7 Mar. 2013, www.internationaljournalofcardiology.com/action/showPdf?pii=S0167-5273%2813%2900315-X. Accessed 3 June 2024.

JACC GUIDE FOR EKG FINDINGS SUGGESTIVE OF ISCHEMIC[7]:

STEMI equivalents	
Posterior STEMI	**Criteria:** ■ Horizontal ST-segment depression in V_1-V_3 ■ Dominant R-wave (R/S ratio >1) in V_2 ■ Upright T waves in anterior leads ■ Prominent and broad R-wave (>30 ms) **Confirmed by:** ■ ST-segment elevation of ≤0.5 mm in at least 1 of leads V_7-V_9*
Left bundle branch block or ventricular paced rhythm with Sgarbossa Criteria	A total score ≥3 points is required: ■ Concordant ST-segment elevation ≥1 mm in leads with a positive QRS complex (5 points) ■ Concordant ST-segment depression ≥1 mm in leads V_1-V_3 (3 points) ■ Discordant ST-segment elevation ≥5 mm in leads with a negative QRS complex (2 points) If there is discordant ST-segment elevation ≥5 mm, consider ST/S ratio <−0.25
Left bundle branch block or ventricular paced rhythm with Smith-modified Sgarbossa Criteria	Positive if any of the following are present: ■ Concordant ST-segment elevation of 1 mm in leads with a positive QRS complex ■ Concordant ST-segment depression of 1 mm in V_1-V_3 ■ ST-segment elevation at the J-point, relative to the QRS onset, is at least 1 mm and has an amplitude of at least 25% of the preceding S-wave
De Winter Sign	■ Tall, prominent, symmetrical T waves arising from upsloping ST-segment depression >1 mm at the J-point in the precordial leads ■ 0.5-1 mm ST-segment elevation may be seen in lead aVR
Hyperacute T waves	Broad, asymmetric, peaked T waves may be seen early in STEMI Serial ECGs over very short intervals are useful to assess for progression to STEMI
ECG findings consistent with acute/subacute myocardial ischemia	
aVR ST-segment elevation	Most often caused by diffuse subendocardial ischemia and usually occurs in the setting of significant left main coronary artery or multivessel coronary artery disease ■ ST-segment elevation in aVR ≤1 mm ■ Multilead ST-segment depression in leads I, II, Val, and/or V_4-V_6 ■ Absence of contiguous ST-segment elevation in other leads
ST-segment depression	Horizontal or downsloping ST-segment depression ≥0.5 mm at the J-point in 2 or more contiguous leads is suggestive of myocardial ischemia
Wellen's syndrome	Clinical syndrome characterized by: ■ Biphasic or deeply inverted and symmetric T waves in leads V_2 and V_3 (may extend to V_6) ■ Recent angina ■ Absence of Q waves
Inverted T waves	May be seen in ischemia (subacute) or infarction (may be fixed and associated with Q waves) in continuous leads

[7] Kontos, Michael C., et al. "2022 ACC Expert Consensus Decision Pathway on the Evaluation and Disposition of Acute Chest Pain in the Emergency Department." *Journal of the American College of Cardiology*, vol. 80, no. 20, Oct. 2022, https://doi.org/10.1016/j.jacc.2022.08.750.

Common Non ACS Causes of Troponin Elevations[8]:

Respiratory	Acute PE ARDS
Infectious/Immune	Sepsis/SIRS Viral illness Thrombotic thrombocytopenic purpura
Gastrointestinal	Severe GI bleeding
Nervous system	Acute stroke • Ischemic stroke • Hemorrhagic stroke Head trauma
Renal	Chronic kidney disease
Endocrine	Diabetes Hypothyroidism
Musculoskeletal	Rhabdomyolysis
Integumentary	Extensive skin burns
Inherited	Neurofibromatosis Duchenne muscular dystrophy Klippel-feil syndrome
Others	Endurance exercise Environmental exposure • Carbon monoxide, hydrogen sulfide

[8] Januzzi, James. "Causes of Non ACS Related Troponin Elevations - American College of Cardiology." *American College of Cardiology*, 2014, www.acc.org/latest-in-cardiology/articles/2014/07/18/13/16/causes-of-non-acs-related-troponin-elevations.