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Leaders in Laboratory Medicine

Laboratory Bulletin

DATE:	4 March 2024
TO:	Calgary Zone – Physicians, Nurses, and Managers
FROM:	Clinical Biochemistry, Alberta Precision Laboratories (APL)
RE:	**Implementation of an Updated Beckman High Sensitivity Troponin I (hs-TnI) 2-hr Chest Pain Pathway at Canmore General Hospital and High River General Hospital**

PLEASE POST OR DISTRIBUTE AS WIDELY AS APPROPRIATE

Key Message

- On **11 March 2024,** Canmore General Hospital and High River General Hospitals will adopt an updated version of the current 2-hr chest pain pathway.
- This update follows implementation of additional Beckman Access2 instruments in Edmonton and North Zones that have the same high sensitivity troponin I (hs-TnI) assay as these two Calgary Zone sites.
    - There will be a new 0-hr rule-out cut point, interpretive comments, and delta value (Table 1, Figure 1).
    - There will be no change in critical values or reference intervals.

Why this is important

- Implementation of Beckman Access2 hs-TnI is part of a large-scale provincial project to standardize chemistry instrumentation. Adoption of this 2-hr Beckman hs-TnI chest pain pathway with rapid rule-in/rule-out will continue to expand across the province at multiple sites.
    - This initiative will reduce the variation of hs-Tn assays and chest pain protocols in the province.
    - These changes will assist clinicians with evidence-based interpretation of troponin results and guide optimal patient management.

Background

- Evidence supports that a 2-hr chest pain pathway for Beckman Access2 hs-TnI is effective and safe for rule-in/rule-out of acute myocardial infarction (AMI).[1]
- Changes are consistent with clinical practice guidelines and are recommended by the Cardiovascular Health and Stroke Strategic Clinical Network (SCN), in consultation with Emergency Medicine SCN and Laboratory Medicine provincially.
- **SCN Recommendation:** A 2-hour hs-TnI pathway, including a single undetectable hs-TnI concentration at the time of ED arrival to rule out MI in patients with an onset of symptoms greater than 3h prior to presentation, should be included in reporting and decision support for the Beckman hs-TnI assay.

Action Required

- Be familiar with laboratory reporting changes and the updated 2-hr chest pain pathway.
- Be aware of different troponin assays used within Calgary Zone. Do not interpret results across sites with different assays.

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Questions/Concerns

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Approved by

- Dr. Allison Venner, Clinical Biochemistry Associate Section Chief APL
- Dr. Paul Klonowski, Associate Medical Director, South Sector, APL

References:

1. Nestelberger T. et al., Clin Chem (2019)

Effective September 1, 2023, APL has become the sole provider of all public lab services in Alberta. As a result, community lab services formally provided by DynaLIFE Medical Labs will become the responsibility of Alberta Precision Labs (APL). This change impacts all zones.

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Table 1: Interpretative comments reported with Beckman Access hs-TnI

hs-TnI result (ng/L)	Comment	Flagging
≤ 3	For patients with a non-ischemic ECG, a Troponin I, High Sensitivity of 3 ng/L or less on presentation is highly sensitive for excluding acute myocardial infarction, provided the specimen was collected more than 3-hours from symptom onset. However, for patients with symptoms less than 3-hours duration or concerning clinical presentations, repeat troponin testing at 2-hours after the initial sample is recommended. Please note that patients with ischemic ECG changes and/or high-risk clinical presentations should be considered for further evaluation irrespective of troponin results.	Normal
4-17	Troponin I, High Sensitivity is below the upper reference limit (18 ng/L) and results are not consistent with myocardial infarction (MI) or injury. However, patients with acute symptoms (less than 6-hours) or concerning clinical presentations should undergo repeat troponin testing at 2-hours after the initial sample. - Troponin I, High Sensitivity of 4 ng/L or less on presentation AND a 2-hour delta (change) of 4 ng/L or less is highly sensitive for excluding acute myocardial infarction (MI) - A 2-hour delta (change) of 5-19 ng/L may indicate acute myocardial injury and suggest an additional troponin measurement 4 hours after the initial sample, serial ECG testing and clinical re-evaluation. - A 2-hour delta (change) of 20 ng/L or more suggests an acute myocardial injury and may represent acute myocardial infarction in the appropriate clinical scenario. Please note that patients with ischemic ECG changes and /or high-risk clinical presentations should be considered for further evaluation irrespective of troponin results.	Normal
18-49	Troponin I, High Sensitivity has a non-specific/non-diagnostic elevation. Interpretation is highly dependent on clinical presentation and patient history. New elevations are concerning; however, many patients have chronic elevations in troponin and measured concentrations near the patient's baseline are reassuring. However, patients with acute symptoms (less than 6-hours) or concerning clinical presentations should undergo repeat troponin testing at 2-hours after the initial sample. - A 2-hour delta (change) of 4 ng/L or less is highly sensitive for excluding acute myocardial infarction. - A 2-hour delta (change) of 5-19 ng/L may indicate acute myocardial injury and suggest an additional troponin measurement 4 hours after the initial sample, serial ECG testing and clinical re-evaluation. - A 2-hour delta (change) of 20 ng/L or more suggests an acute myocardial injury and may represent acute myocardial infarction in the appropriate clinical scenario. Please note that patients with ischemic ECG changes and /or high-risk clinical presentations should be considered for further evaluation irrespective of troponin results.	High
≥50	Clear elevation of Troponin I, High Sensitivity consistent with acute myocardial injury or infarction in the appropriate clinical context. Repeat troponin testing at 2-hours after the initial sample may be helpful to assess for ongoing myocardial injury.	Critical

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Figure 1. New 2-hr Chest Pain Pathway for Beckman hs-TnI outling the risk management of patients that present with suspected acute myocardial infarction in the acute care setting.

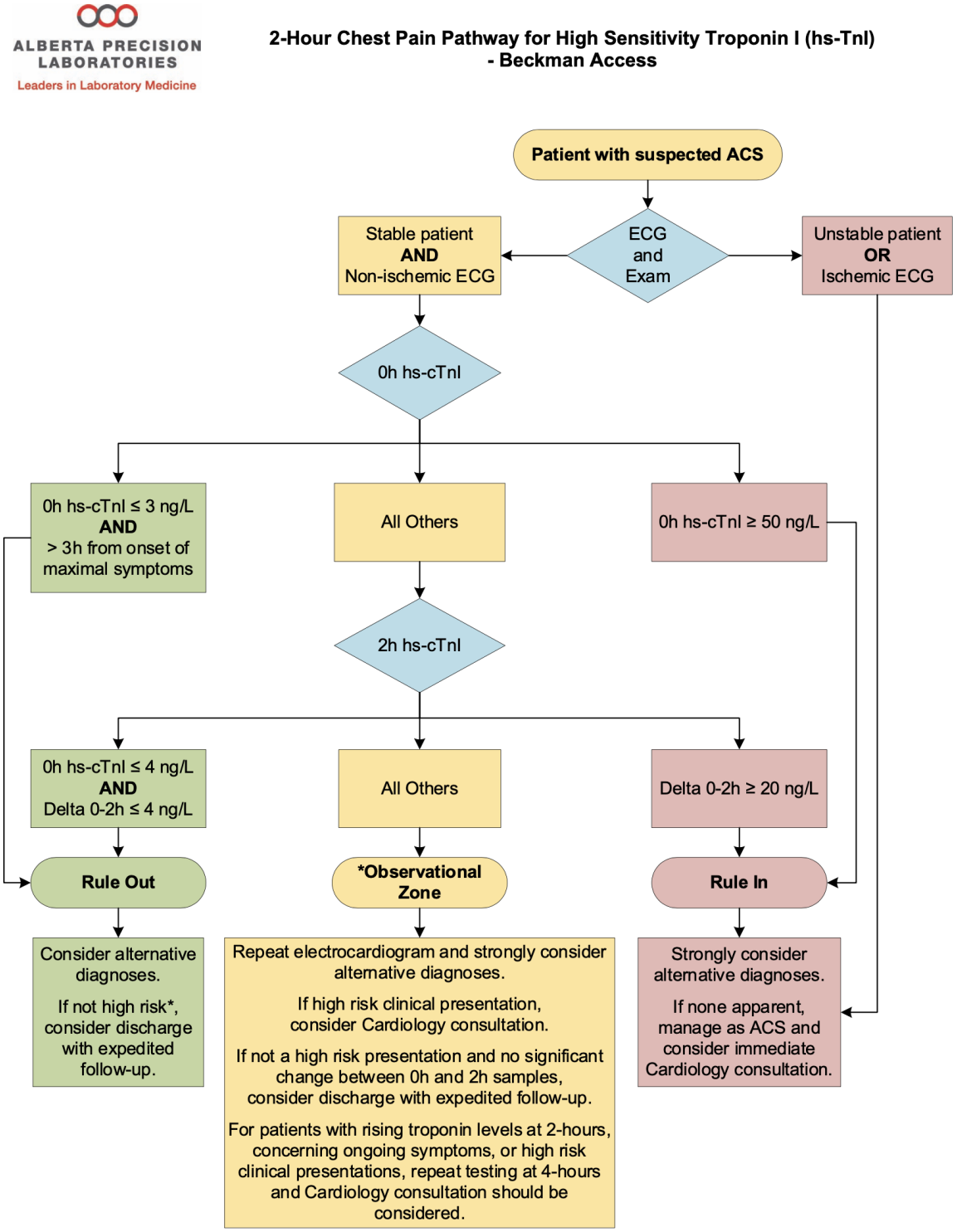

Figure 1. Continued

Note:
*For all patient with abnormal hs-cTnI results, check the medical record for prior results. Many patients have stable abnormalities in hs-cTnI and measured concentrations similar to the patient's baseline are reassuring.

For patients presenting >6 hours from symptoms onset, ESC Guidelines advise that patients are unlikely to have an acute MI if:
- hs-cTn < Upper Limit of Normal (i.e. hs-cTnI <18 ng/L) AND,
- >6 hours since symptom onset AND,
- pain-free AND,
- the clinical presentation is Low Risk.

However, coronary ischemia has not been definitively excluded and unstable angina must be considered. Disposition after a single hs-cTnI <18 ng/L should only be considered for low risk patients with >6 hours since symptoms onset and should be used cautiously.

All patients presenting <6 hours since symptom onset, with active symptoms or presentations that are not clearly low risk, should have repeat hs-cTnI testing at 2 hours. For patients with rising troponin levels at 2 hours, concerning ongoing symptoms, or high risk clinical presentations, repeat testing at 4 hours and Cardiology consultation should be considered. Clinicians may consider using a structured risk score such as the HEART score to guide decision making for patients in the observational zone.

HEART Score Calculation				
History		Highly suspicious	**2**	
		Moderately suspicious	**1**	
		Slightly suspicious	**0**	
ECG		Significant ST-depression	**2**	
		Non-specific repolarization disturbance, LBBB, LVH, Paced	**1**	
		Normal	**0**	
Age		≥ 65 years	**2**	
		45-64 years	**1**	
		≤ 44 years	**0**	
Risk Factors	☐ Diabetes ☐ Current smoker ☐ Obesity ☐ Family hx CAD ☐ HTN (diagnosed) ☐ HL (diagnosed)	≥3 risk factors or history of atherosclerotic disease	**2**	
		1 or 2 risk factors	**1**	
		No risk factors known	**0**	
Hs-cTnI (peak)		>3x normal limit (55 ng/L or greater)	**2**	
		1-3x normal limit (18-54 ng/L)	**1**	
		< normal limit (<18 ng/L)	**0**	
			Total (10 maximum)	
HEART Score Interpretation				
			Low Risk	**0-3**
			Moderate Risk	**4-6**
			High Risk	**7-10**