

Reading Paper

Exam Center _____
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Read the article below, then according to what you have read complete Task Sheet 1.

Biomarkers and Imaging in Chest Pain: The Iceberg Beneath the Waterline*

Acute chest pain (ACP) continues to occupy the top tier of symptoms that concern the emergency department physician and the cardiologist. In the preceding decades, ACP has driven much of the field in the quest for the perfect test—one that enables accurate and efficient prediction of not just the need for immediate intervention, but also of subsequent outcomes.

Innovations in the parallel streams of biomarkers and imaging have resulted in an array of testing choices that have enabled an acceleration of ACP triage. The days of prolonged observation are over, replaced by the era of near-immediate testing and triage for coronary artery disease (CAD). With ACP landing anywhere on the spectrum of noncardiovascular discomfort to acute plaque erosion, rupture, or complete artery occlusion, it is no longer enough to identify coronary stenosis presence or severity. The important question we seek to answer is whether the ACP is the result of *functional* CAD, implying flow limitation or high-risk, unstable plaque.

Although biomarkers and imaging have developed in somewhat separate spheres, they are often combined in clinical decision-making and provide complementary information: an abnormal biomarker reflects abnormal biological processes such as myocardial injury or stress that may be confirmed on imaging; alternatively, a significant finding on imaging clues us in to biological changes indicated by biomarkers. Ideally, combining biomarkers and imaging can determine what matters the most, find which is the need for urgent revascularization, and predict hard events.

In the biomarker sphere, high-sensitivity cardiac troponin (hs-cTn) is useful to determine the need for emergent intervention and to predict long-term risk not only in ACP but also in chronic coronary syndromes and heart failure, and even in those without symptoms of coronary ischemia (1). Although the growing body of data on the use of hs-cTn assays has changed the landscape of ACP evaluation, the remarkable strength of troponin assays is also its weakness: clinicians often trust the sensitivity of these tests, frequently considering patients in the “normal range” of hs-cTn as a homogenous, lower risk group, when in truth a wide range of risk exists among those with “normal” troponin, including many with obstructive CAD. Notably, hs-cTn may provide some guidance for understanding the likelihood for CAD presence in those with ACP but without acute myocardial infarction: using hs-cTn, patients may, in fact, be stratified for their risk of obstructive CAD across the normal reference range; such CAD could affect longer-term outcomes (1). Thus, although excluding acute myocardial infarction, one might leverage the information from an hs-cTn in the normal range for further decision making beyond simple discharge. This is where the intersection of markers and imaging might be robust.

439 words

Source: <https://www.jacc.org/doi/10.1016/j.jacc.2021.08.004>

TASK SHEET 1

1) Match the phrases expressing the message of a given paragraph (A-F) with the appropriate number indicating the paragraph (1 - 4). There are two options that do not match any of the paragraphs.

A	the double purpose of research on diagnosing acute chest pain	
B	the introduction of immediate testing in acute chest pain (ACP)	
C	the importance of finding out about the origin of ACP	
D	the area of optimal combination of two diagnostic procedures	
E	the reliability of one of the diagnostic measures	
F	the relationship between two major diagnostic measures in ACP	

/4 points

2) Choose the best answer (A, B, C, or D) in each question according to what you have read.

Q01

	A	Acute chest pain is a most important condition that requires immediate intervention.
	B	Acute chest pain gives concerns to both emergency physicians and cardiologists
	C	Acute chest pain requires immediate cardiologic intervention
	D	Cardiologists and emergency physicians are responsible for curing acute chest pain.

Q02

	A	Biomarkers and imaging techniques require new approach in testing acute chest pain.
	B	Triage in acute chest pain accelerated the development of new tests.
	C	After prolonged observation of patients near-immediate testing should be performed.
	D	ACP triage can be conducted faster, thanks to the combined use of two test types.

Q03

	A	The period of ACP triage is prolonged in the new protocol.
	B	The period of CAD triage became shorter in the new protocol.
	C	The major focus of the new protocol of CAD triage includes long-lasting observation.
	D	ACP triage is now based on a protocol including testing for CAD as soon as possible

Q04

	A	Coronary artery stenosis by itself cannot cause acute chest pain.
	B	Complete artery occlusion is a possible cause of acute chest pain.
	C	Acute chest pain is not enough for the diagnosis of coronary artery stenosis.
	D	Presence and severity of coronary stenosis is no longer part of diagnosing CAD.

Q05

	A	The major aim of the research reported here is to find a cause of ACP.
	B	The major aim of the research reported here is to find a cause of functional CAD.
	C	The major aim of the research reported here is to find a cause of unstable plaque.
	D	The major aim of the research reported here is to find a cause of flow limitation.

Q06

	A	Biomarkers and imaging are used to treat myocardial injury.
	B	Biomarkers and imaging are used to detect myocardial stress.
	C	Biomarkers and imaging are used to detect revascularization.
	D	Biomarkers can determine the duration of revascularization.

Q07

	A	High sensitivity cardiac troponin is used to treat those with acute chest pain.
	B	Acute chest pain can be relieved by high sensitivity cardiac troponin.
	C	Patients with acute chest pain can be at high risk of heart failure.
	D	High sensitivity cardiac troponin can be used to predict coronary ischemia.

Q08

	A	There is remarkable intersection between biomarkers and imaging.
	B	There is low risk for patients with normal hs-c-Tn levels.
	C	Patients within the normal range of hs-c Tn run a low risk obstructive CAD.
	D	Decision making can be made more complicated by the information on hs-c Tn.

/8 points

Points:

/12

1) Match the phrases expressing the message of a given paragraph (A-F) with the appropriate number indicating the paragraph (1 - 4). There are two options that do not match any of the paragraphs.

A	the double purpose of research on diagnosing acute chest pain	1
B	the introduction of immediate testing in acute chest pain (ACP)	-
C	the importance of finding out about the origin of ACP	2
D	the area of optimal combination of two diagnostic procedures	4
E	the reliability of one of the diagnostic measures	-
F	the relationship between two major diagnostic measures in ACP	3

/4 points

2) Choose the best answer (A, B, C, or D) in each question according to what you have read.

Q01

	A	Acute chest pain is a most important condition that requires immediate intervention.
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Q02

	A	Biomarkers and imaging techniques require new approach in testing acute chest pain.
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	C	After prolonged observation of patients near-immediate testing should be performed.
x	D	ACP triage can be conducted faster, thanks to the combined use of two test types.

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	A	The period of ACP triage is prolonged in the new protocol.
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	C	The major focus of the new protocol of CAD triage includes long-lasting observation.
x	D	ACP triage is now based on a protocol including testing for CAD as soon as possible

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