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# IMPORTANCE OF TROPONIN AND B-TYPE NATRIURETIC PEPTIDE TESTS IN HEART DISEASE

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**Abstract**
The heart is a muscular, fist-sized organ located within your chest in a space between the two lungs (mediastinum). The heart continuously pumps blood, beating as many as 100,000 times a day. The blood that the heart moves carries oxygen and nutrients throughout the body and transports carbon dioxide and other wastes to the lungs, kidneys, and liver for removal. In cases of heart muscle damage due to various causes, several laboratory tests are required. This article will review some of them.

**Keywords**: Heart, B-type natriuretic peptide (BNP), troponin, cardiac muscle, cardiac troponin.

## Introduction

BNP is one of several proteins that help regulate blood circulation throughout your body. Even though your heart makes this protein, providers sometimes call it "brain" natriuretic peptide because it was first discovered in brain tissue.

A B-type natriuretic peptide (BNP) test gives information about how your heart is working. This blood test measures the levels of a protein called BNP in your bloodstream. When your heart has to work harder to pump blood, it makes more BNP. Higher levels of BNP can be a sign of heart failure. Higher-than-normal levels of BNP in your blood can be a sign that your heart isn't working as it should. It can mean that your heart isn't pumping enough blood through your body. Since BNP is cleared by kidneys, it may also mean that kidneys are not functioning properly. Some laboratories offer a similar test called "aminoterminal pro B-type natriuretic peptide" (or NT-proBNP). Both the BNP and NT-proBNP tests show similar information, although the absolute values of NT-proBNP are about five to 10 times higher than BNP. Providers use a BNP or an NT-proBNP test to diagnose heart failure. They may also use this test to monitor how heart failure treatments are working. In some cases, your provider may also order it if they think you may be at higher risk of developing heart failure. This test performed for the following symptoms of heart failure:

Difficulty breathing, shortness of breath (dyspnea) or wheezing.
Delirium (confusion).
Dizziness or fainting (syncope).
Fatigue or feeling sluggish.
Heart palpitations.
Nausea and vomiting or loss of appetite.



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Swelling (edema) in your abdomen, legs, ankles and feet.

Urinating (peeing) more than usual at night (nocturia).

As part of circulatory system, heart and blood vessels pump oxygen-rich blood to your muscles, organs and other tissues. The left ventricle (one of the heart's four chambers) pumps a great deal of blood through the heart and it goes on to flow through body. The left ventricle is one of the main organs that make BNP. As heart stretches due to increasing load or experiences increased stress from injury, BNP levels rise. Heart muscle cells respond to such stress by secreting BNP to unload your heart, which prompts your kidneys to relieve salt and water (hence the name "natriuretic"). A BNP test or NT-proBNP test detects heart failure by measuring the amount of BNP or its NT-proBNP in the bloodstream, respectively. High levels of BNP or NT-proBNP are a sign that the heart has to work too hard to pump blood.

For people who don't have heart failure, normal BNP levels are less than 100 picograms per milliliter (pg/mL). BNP levels over 100 pg/mL may be a sign of heart failure. For NT-proBNP, normal levels are less than 125 pg/mL for people under 75 years old and less than 450 pg/mL for people over age 75. NT-proBNP levels over 900 pg/mL may be a sign of heart failure. Every person has their own range of BNP or NT-proBNP level range. Heart failure medications, including beta blockers, ACE inhibitors and diuretics, can lower BNP or NT-proBNP levels in the blood.

A troponin test measures the level of troponin in a sample of blood. Troponin is a protein that's found in the cells of heart muscle. Normally, troponin levels in blood are so low that only the most sensitive types of tests can measure them. But if heart muscle is damaged, troponin leaks into your bloodstream, and troponin blood levels will rise. Troponin testing is mainly used to help diagnose heart attacks. Heart attacks damage the heart by suddenly blocking the blood flow that brings oxygen to part of the heart muscle. Without oxygen from blood, heart muscle cells die and release troponin. Troponin test results can confirm damage to the heart muscle from a heart attack. The more damage there is to the heart, the more troponin is released into the blood. So, measuring the amount of troponin in the blood can also help estimate how much of the heart has been damaged. Higher than normal troponin levels may also be found in other conditions that can damage heart muscle. Two types of troponin maybe be measured to diagnose heart damage. They are called troponin I and troponin T. Tests can measure either type. Other names: cardiac troponin I (cTnI), cardiac troponin T (cTnT), cardiac troponin (cTn), cardiac-specific troponin I and troponin T.

A troponin test is mainly used to:

Confirm if a person is having a heart attack or recently had a heart attack. This is the most common reason for troponin testing. The test is usually done in the emergency room of a hospital along with other heart tests, such as an EKG (also called an ECG or electrocardiogram).

Diagnose and monitor unstable angina. Angina is chest pain that happens if part of the heart muscle doesn't get as much blood as it needs. Unstable angina is a type of angina that happens at any time, even during rest. It's a medical emergency because it can lead to a heart attack.

Check heart health after a surgery that could damage the heart. In this case, a troponin test may be done before and after surgery so that the results can be compared.



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This test is performed when the following symptoms are present:

Chest pain, heaviness, or discomfort in the center or left side of the chest.

Pain or discomfort in one or both arms, your back, shoulders, neck, jaw, or above your belly button. Trouble breathing when resting or doing light physical activity.

Nausea and vomiting.

Feeling unusually tired for no reason, sometimes for days.

Dizziness and light-headedness.

Sweating a lot for no reason.

Rapid or irregular heartbeat (arrhythmia).

Troponin levels can continue to rise for about 24 hours after a heart attack begins. So, if test results show high troponin levels, patients'll probably be tested two or more times over a 24-hour period. The results of these tests show how fast your troponin level increased and the highest level it reached. That information helps estimate how much of heart muscle is damaged and how well patients might recover.

Troponin levels are usually so low that standard blood tests cannot detect them. Even small increases in troponin can indicate some damage to the heart. Significantly raised troponin levels, particularly those that rise and fall over a series of hours, are a strong indication of a heart injury. The range for “normal” troponin levels can vary among laboratories, so it is best to discuss the results with the doctor who ordered the test. Laboratories measure troponin in nanograms per milliliter (ng/ml) of blood. Laboratories may use the following as the normal and at-risk ranges of troponin:

Normal troponin range: 0–0.04 ng/ml

Probable heart attack: Above 0.40 ng/ml

Having a result between 0.04 and 0.39 ng/ml often indicates a problem with the heart. However, a very small number of healthy people have higher-than-average levels of troponin. Due to this, if the result is in this range, a doctor may check for other symptoms and order further tests before making a diagnosis.

In conclusion, early and accurate diagnosis of heart disease is crucial to saving the patient's life. The results of the above tests are essential to determine the extent of damage to the heart muscle.

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