



Advanced Cardiac Testing in Firefighters

Firefighters have about three times the risk of the general population of suffering a fatal heart attack. The exact reason for this is unclear but is likely related to stress, shift work, high intensity work, toxic exposures, and unhealthy lifestyle choices. What is clear is that identifying and dealing with cardiac disease in firefighters should be an integral component of all medical surveillance programs.

Currently there is no national standard for cardiac testing in firefighters. Departments have been left to make their own choices as to the best approach for detecting cardiac disease. One of the more common methods is a submaximal exercise stress test performed at the fire department. In this test, the firefighter is placed under some cardiovascular stress using a treadmill or a bike and their EKG is monitored for concerning changes. The test is terminated when the firefighter reaches 80% of their target heart rate.

While this sounds like it might be an effective way to detect heart disease it is not. A submaximal stress test will only pick up about 70% of individuals with heart disease. Another way to say this is that a submaximal stress test is wrong three out of every ten times it is performed on people with heart disease. These are called false negatives. When you perform this test on a group of firefighters many of whom do not have heart disease the false negative rate can be as high as 50%. This test can fail to detect heart disease five out of every ten times it is performed.

Missing 5 out of every 10 is not very reassuring but the true picture is even worse.

Submaximal Exercise Stress tests also have a very high false positive rate. This means that the test will falsely show that firefighters have heart issues when they do not. This false positive rate has been shown to be as high as 50%. Five out of every ten times this is performed the test is wrong in the other direction. These false positive results lead to time away from work and unnecessary and potentially risky further testing. Cardiologists tell us that stress testing in firefighters will result in one half of the positive tests being false alarms. Stated another way, half of all positive results found in firefighters with a standard treadmill stress test are wrong!

Standard testing methods miss firefighters with cardiac disease and cause unnecessary testing, worry and cost by getting false alarm positives on firefighters with no disease. There is a much more effective approach to the detection of cardiac disease in firefighter

We have identified three key components to developing a more effective cardiac screening program.

1. Take and review a thorough medical history

One of the most effective tools for a Fire Department Physician is a good medical history. Without knowing a firefighter's medical history, smoking history, family history, blood pressure and cholesterol we are flying blind. We have seen many unnecessary referrals and removals from duty because of an "abnormal" stress test. The firefighter's history was never asked or reviewed, but rather the decision to send him for further testing was made just based on the "abnormal" stress test. This is inconvenient, expensive and sometimes not without risk. Procedures like cardiac catheterizations can have complications that can occasionally be fatal. A thorough medical history helps avoid unnecessary testing.

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2. Identify High Risk Individuals

By using the medical history, physical examination and testing results it is possible to identify firefighters that are at high risk of heart disease. Risk is based on several factors including age, sex, family history, blood pressure, weight, fitness, tobacco use and cholesterol. This is the basic information that obtained during every NFPA 1582 physical we perform.

However, as physicians we now take this one step further. There are advanced tests that can be ordered to help us better identify which firefighters are at the most risk. Did you know that high cholesterol is not always a cardiac risk factor? The cholesterol test that you get at your doctor's office is a very basic screening test. As physicians, we have access to a panel of tests that look at cholesterol in much more detail and can paint a more accurate picture of cardiac risk.

Did you know that there is a blood test that is more predictive for heart disease than measuring bad cholesterol? There is and using it can prevent unnecessary referrals. There is also genetic testing for the markers of heart disease, and when used appropriately they can help predict cardiac issues. As physicians, we can bring this advanced testing to our fire departments to better detect heart disease.

3. Screen the right people with the right tests.

There is now an inexpensive imaging study called a coronary calcium score. This test can identify individuals with heart disease with about 95% accuracy. It is about a \$150 test and only needs to be performed every 5-10 years. As fire department physicians, we coordinate this testing for our departments. Lives have been saved using this technology.

Some firefighters need to see a cardiologist because of their risk factors and testing results. As physicians, it is our job to send the right firefighters. NFPA 1582 (2018) provides a useful risk calculator that helps us make this determination. Cardiologists can perform more advanced testing like Stress Echocardiograms and Nuclear Stress Tests. These are very accurate tests for detecting heart disease.

When we refer someone for further cardiac testing we send them with information that they can take to the Cardiologist. Many doctors don't understand the physical and emotional demands of firefighting. We do our best to educate physicians so firefighters receive the best care possible.

It is our desire that no firefighter die from a preventable disease like heart disease. Let us help you design an effective program that saves lives.

Gonzalo Fernandez, M.D.
Lance Walker, D.O.

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