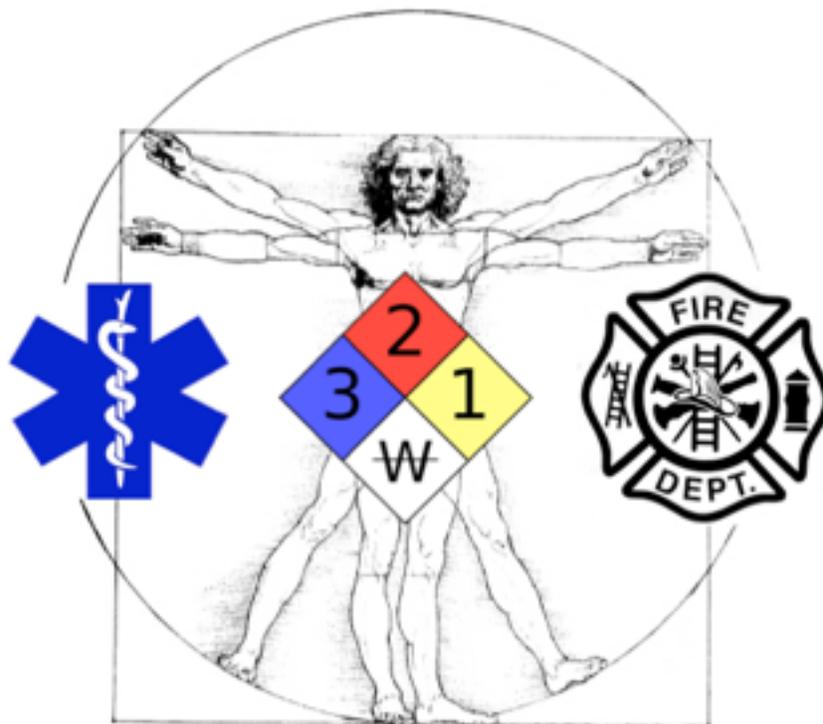

Will an aspirin a day keep the doctor away?

A review of A Randomized Controlled Trial of Aspirin and Exertional Heat Stress Activation of Platelets in Firefighters During Exertion in Thermal Protective Clothing *Original article written by:* D Hostler et al. Prehospital Emergency Care 2014 Jul-Sep;18(3):359-67.

September 1, 2014



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Introduction

It is well known that heart attacks are the number one cause of line-of-duty deaths among firefighters. The reasons for this are partly attributable to low fitness among firefighters who are required to perform heavy exertion in protective clothing and endure severe heat stress. While those issues can be addressed through physical fitness programs and nutritional education, we must assume that heart attacks will still occur on the fireground and understand how to minimize the severity.

Aspirin is considered one of the best initial treatments for a suspected heart attack. A single large dose of aspirin given at the first sign of a heart attack poisons the platelets preventing them from sticking to the thrombus that is developing in the coronary artery. Individuals who have suffered a previous heart attack are almost always prescribed a low dose aspirin each day to prevent future heart attacks. This is called secondary prevention. Some individuals who have not had a heart attack, but are at high risk, are prescribed the daily aspirin therapy. This is called primary prevention. In primary and secondary prevention, the goal is to leave enough active platelets to facilitate clotting when injured but slow the progression of a developing clot during a heart attack.

Platelets are activated during heat stress (i.e. they become sticky when hot) which will worsen heart attacks among firefighters when they occur during or after fire suppression. This study performed in the Emergency Responder Human Performance Lab examined the ability of both primary prevention, and aspirin given after exertion in turnout gear, to prevent or blunt heat stress activation of platelets.

What the study did

102 firefighters were randomly assigned once daily 81 mg of aspirin (or a placebo) for two weeks before walking on a treadmill in a hot room while wearing turnout gear and SCBA. After exiting the heat, the firefighters removed their gear and chewed a 325 mg aspirin or placebo. The possible combinations of aspirin and placebo before and after exercise resulted in four groups (aspirin before and after exercise, aspirin before and placebo after exercise, placebo before and aspirin after exercise, placebo before and after exercise). Blood was drawn once before and four times after exercise. Platelet activity (stickiness) was measured with a platelet function analyzer to determine if aspirin prevented platelet activation.

What the study reported

All firefighters ended exercise with significant heat stress (~100°F) and dehydration. Platelets were activated (clotted more quickly) in every combination of aspirin and

placebo but most firefighters who took daily aspirin before exercise were still anti coagulated (clotting more slowly than normal) after exercise in the heat. Firefighters who took aspirin immediately after exercise had significantly slower clotting times 30-60 minutes later. Most firefighters who did not receive aspirin before or after exercise still had faster than normal clotting times (were hypercoagulable) 90 minutes after ending exercise.

There were no reported side effects during the study and the heart rate and temperature responses during exercise were similar between the aspirin and placebo groups.

What it means for the fire service

Based on these data, aspirin taken before or after heat stress is safe in the context of fire suppression. Other studies have reported that both aspirin and other anti-platelet drugs can impair heat dissipation by changing skin blood flow patterns but the heat stress associated with wearing turnout gear appears to be too severe for this to matter. Therefore, we do not believe that on-duty firefighters should avoid using aspirin for primary prevention when recommended by their physician. Similarly, firefighters using aspirin as an over the counter pain reliever should not be concerned about a strong interaction between heat stress and aspirin.

Sticky platelets alone are not likely to cause a heart attack and aspirin, although generally considered safe, has other side effects for some individuals. One of the most important findings of the study is that aspirin given immediately after heat stress still had a strong anti-platelet effect within 30-60 minutes. Therefore, based on the risk to benefit ratio, we do not recommend routine use of aspirin by all firefighters since fires are a rare occurrence and heart attacks are rare at any single incident.

It is important for firefighters to recognize the signs and symptoms of a heart attack and seek immediate treatment if these symptoms occur. EMS providers should be particularly mindful to administer aspirin in accordance with their protocols when treating firefighters with heart attack symptoms.

