



MDwise

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Heart Attack and Unstable Angina

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Cause

A heart attack or unstable angina is caused by sudden narrowing or blockage of a coronary artery. This blockage keeps blood and oxygen from getting to the heart.

This blockage happens because of a problem called atherosclerosis, or hardening of the arteries. This is a process where fatty deposits called plaque build up inside arteries. Arteries are the blood vessels that carry oxygen-rich blood throughout your body. When atherosclerosis happens in the coronary arteries, it leads to heart disease.

If the plaque breaks apart, it can cause a heart attack or unstable angina. A tear or rupture in the plaque tells the body to repair the injured artery lining, much as the body might heal a cut on the skin. A blood clot forms to seal the area. The blood clot can completely block blood flow (See figure 1 in appendix) to the heart muscle.

With a heart attack, lack of blood flow causes the heart's muscle cells to start to die. With unstable angina, the blood flow is not completely blocked by the blood clot. But the blood clot can quickly grow and block the artery.

A stent in a coronary artery can also become blocked and cause a heart attack. The stent might become narrow again if scar tissue grows after the stent is placed. And a blood clot could get stuck in the stent and block blood flow to the heart.

Heart attack triggers

In most cases, there are no clear reasons why heart attacks occur when they do. But sometimes your body releases adrenaline and other hormones into the bloodstream in response to intense emotions such as anger, fear, and the "fight or flight" impulse. Heavy physical exercise, emotional stress, lack of sleep, and overeating can also trigger this response. Adrenaline increases blood pressure and heart rate and can cause coronary arteries to constrict, which may cause an unstable plaque to rupture.

Rare causes

In rare cases, the coronary artery spasms and contracts, causing heart attack symptoms. If severe, the spasm can completely block blood flow and cause a heart attack. Most of the time in these cases, atherosclerosis is also involved, although sometimes the arteries are not narrowed. The spasms can be caused by smoking, cocaine use, cold weather, an electrolyte imbalance, and other things. But in many cases, it is not known what triggers the spasm.

Another rare cause of heart attack can be a sudden tear in the coronary artery (See figure 2 in appendix), or spontaneous coronary artery dissection. In this case, the coronary artery tears without a known cause.

- How does the heart work?
- What do the coronary arteries do?

Credits

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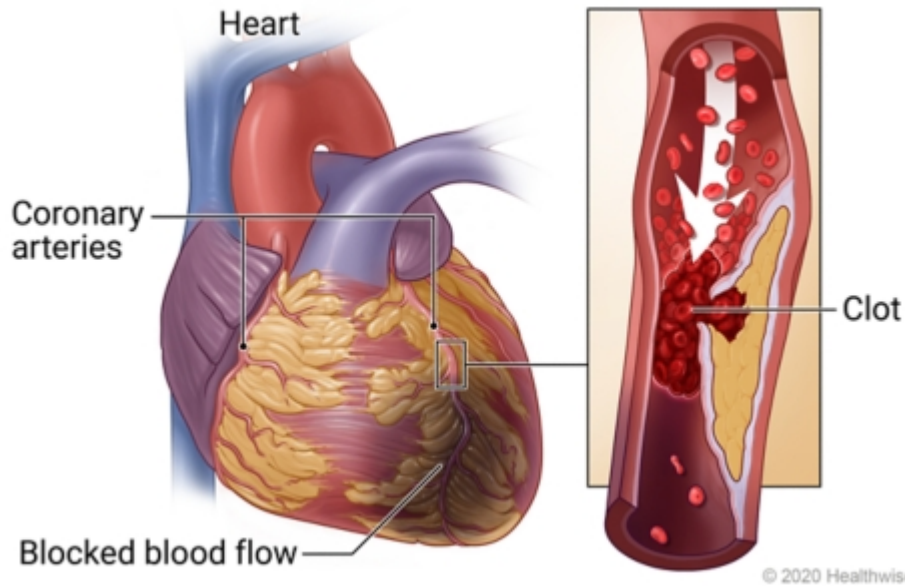
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Appendix

Topic Images

Figure 1

How a heart attack happens



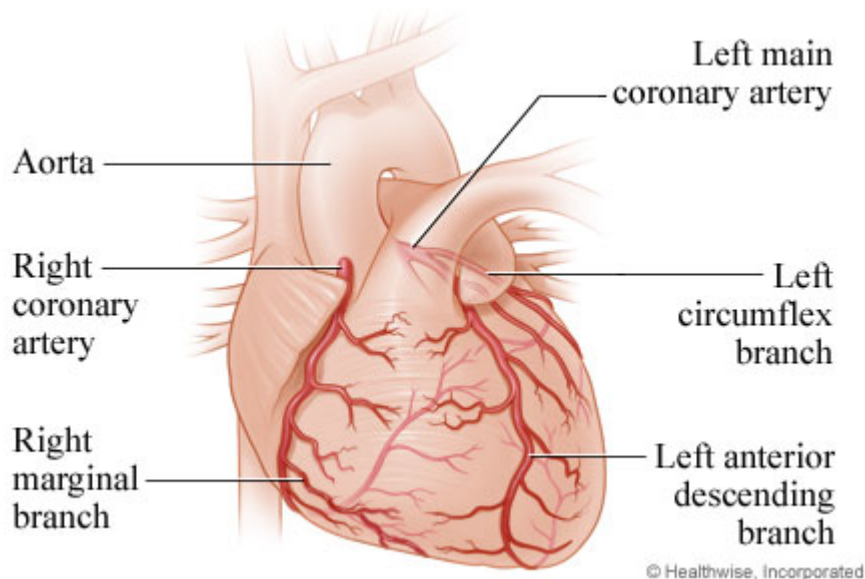
A heart attack is caused when not enough blood and oxygen reach part of the heart muscle. The heart muscle starts to die. This lack of blood and oxygen is most often caused by a blockage in one or more of the coronary arteries.

This blockage is usually the result of coronary artery disease, in which fatty deposits called plaque (say "plak") build up inside the coronary arteries. Plaques are covered by a fibrous cap. If the cap breaks open or ruptures, the body will try to repair the injured artery lining. A blood clot may form and block blood flow.

Sometimes a blood clot that forms over a ruptured plaque may not completely block the artery. But the clot may block blood flow enough to cause angina symptoms. These symptoms may happen with rest and may not go away with rest or nitroglycerin. These symptoms are an emergency, because the blood clot can quickly grow and block the artery. If the blood clot dissolves and an immediate heart attack is avoided, the body will try again over time to repair the tear on the surface of the plaque. But this newly repaired plaque can also be very unstable. It is more likely to rupture again, putting you at even greater risk of a heart attack.

Figure 2

The heart and the coronary arteries



Coronary arteries are blood vessels that provide oxygen-rich blood and other nutrients to the heart muscle. The coronary arteries attach to and wrap around the heart's surface.

The left coronary artery branches off into smaller arteries. The most prominent ones are the:

- Left anterior descending artery, which supplies blood to the front of the heart.
- Left circumflex artery, which encircles the heart muscle, supplying blood to the back of the heart.

The right coronary artery supplies the back of the heart. The right marginal branch usually extends from the right coronary artery and supplies blood to the lower right side of the heart.

Note: The "printer friendly" document will not contain all the information available in the online document. Some information (e.g. cross-references to other topics, definitions or medical illustrations) is only available in the online version.



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