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heart [2] drugs [3] blood [4]



We've all got our smartphones within reach, but for the patient with angina it's essential that their under-the-tongue GTN spray remains at hand to provide rapid pain relief.

How it works

Chest pain is a sign that your heart is not receiving enough oxygen. When struggling for air, your heart produces chemicals that activate nerve fibres which sense pain. It's a helpful early warning system that your heart needs help.

GTN relaxes and widens your blood vessels, increasing oxygen delivery and reducing oxygen demand in the heart as pressures within the heart are reduced so the heart doesn't have to work so hard to contract.

Chest pain is a sign that your heart is not receiving enough oxygen.

Think of it in terms of road tunnels. Engineers across the world have attempted to build wider road tunnels to increase traffic flow and decrease traffic pressures (congestion). However, they don't always achieve in tunnels what GTN routinely achieves in blood vessels: the planned 19-metre wide Orlovsky tunnel [5] in St Petersburg was cancelled due to cost; 'Big Bertha' [6], the world's largest tunnel-boring machine got stuck in Seattle.

Men tend to use GTN more than women

I spent two years interviewing patients with angina and noted that GTN helped men and women alike. Men, however, seemed to turn more readily to their GTN since they would present with the classic symptoms of angina such as a central crushing chest pain radiating to the arms, back and neck.

In women, angina sometimes presented as feelings of nausea, breathlessness, abdominal pain and fatigue, so would be less recognisable as an angina attack needing GTN therapy.

Side effects

By widening your blood vessels, GTN drops your blood pressure. You may momentarily feel dizzy or have a headache. One man noted that GTN warmed his hands by increasing blood flow to the fingers, so he would use his GTN like a pair of mittens. This is not recommended as GTN can become less effective if overused, as tolerance develops.

However, GTN will continue to work if used whenever angina strikes.

Ways to administer GTN

The most common method is to *spray* 1 to 2 puffs under the tongue, though a GTN *tablet* [7] can also be placed under the tongue and absorbed, or a GTN *patch* [8] applied to the skin for longer term pain control.

It can also be given via *injection* to control blood pressure during heart surgery or acute heart failure.

Away from angina, GTN *ointment* can also ease pain in the anus if a small rectal tear [9] exists.

GTN spray doesn't always work

If the pain doesn't go away, you may be having a heart attack.

If angina persists after GTN, doctors suggest another 1-2 puffs of your spray. If the pain doesn't go away, you may be having a heart attack and need to call an ambulance. It may be that your coronary artery is truly blocked, despite having been widened by GTN. Clot-busting drugs may clear the way; if it's a fatty lump, doctors can laser it away, squash it or blast it to pieces. When the blockage won't clear, bypass surgery [10] may be needed.

Even when effective against angina, GTN has its limitations: in a recent study [11] at the University of Toronto, Dr Edwin Ho showed that administration of GTN did not improve survival in patients with acute heart failure. The cardiologist's drug cabinet needs to contain a lot more than GTN.

GTN proved a nice little earner for Dr Nobel

In 1867, Alfred Nobel discovered that GTN could be mixed with another substance to produce dynamite [12] (the workers in his factories often complained of headaches and dizziness as they absorbed dangerous levels of GTN).

This made him a fortune, but in order to leave a more positive legacy, he bequeathed his estate to fund the Nobel Prizes.

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