DIGITALIS DRUGS

Digitalis is the collective term for the naturally occurring substances (also called cardiac glycosides) that are found in the leaves of plants of the foxglove family and used to treat certain heart disorders. The principal drugs in this group are digoxin and digitoxin. Digoxin is more commonly used because it is shorter acting and dosage is easier to adjust (see also Risks and special precautions, below).

Why they are used

Digitalis drugs do not cure heart disease but improve the heart's pumping action and so relieve many of the symptoms that result from poor heart function. They are useful for treating conditions in which the heart beats irregularly or too rapidly (notably in atrial fibrillation, see Anti-arrhythmic drugs, p.58), when it pumps too weakly (in congestive heart failure), or when the heart muscle is damaged and weakened following a heart attack.

Digitalis drugs can be used for a short period when the heart is working poorly, but in many cases they have to be taken indefinitely. Their effect does not diminish with time. In heart failure, digitalis drugs are often given together with a diuretic drug (see p.57).

How they work

The normal heart beat results from electrical impulses generated in nerve tissue within the heart. These cause the heart muscle to contract and pump blood. By reducing the flow of electrical impulses in the heart, digitalis makes the heart beat more slowly.

The force with which the heart muscle contracts depends on chemical changes in the heart muscle. By promoting these chemical changes, digitalis increases the force of muscle contraction each time the heart is stimulated. This compensates for the loss of power that occurs when some of the muscle is damaged following a heart attack. The stronger heart beat increases blood flow to the kidneys. This increases urine production and helps to remove the excess fluid that often accumulates as a result of heart failure.

How they affect you

Digitalis relieves the symptoms of heart failure – fatigue, breathlessness, and swelling of the legs – and increases your capacity for exercise. The frequency with which you need to pass urine may also be increased initially.

Risks and special precautions

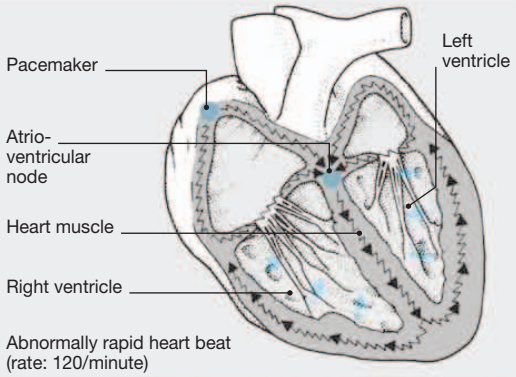
Digitalis drugs can be toxic and, if blood levels rise too high, they may produce symptoms of digitalis poisoning. These include excessive tiredness, confusion, loss of appetite, nausea, vomiting, visual disturbances, and diarrhoea. If such symptoms occur, it is important to report them to your doctor promptly.

Digoxin is normally removed from the body by the kidneys; if kidney function is impaired, the drug is more likely to accumulate in the body and cause toxic effects. Digitoxin, which is broken down in the liver, is sometimes preferred in such cases. Digitoxin can accumulate after repeated dosage if liver function is severely impaired.

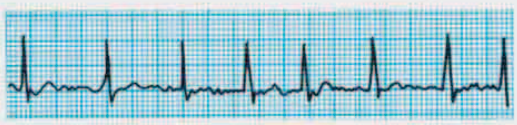
Both digoxin and digitoxin are more toxic when blood potassium levels are low. Potassium deficiency is commonly caused by diuretic drugs, so that people taking these along with digitalis drugs need to have the effects of both drugs and blood potassium levels carefully monitored. Potassium supplements may be required.

ACTION OF DIGITALIS DRUGS

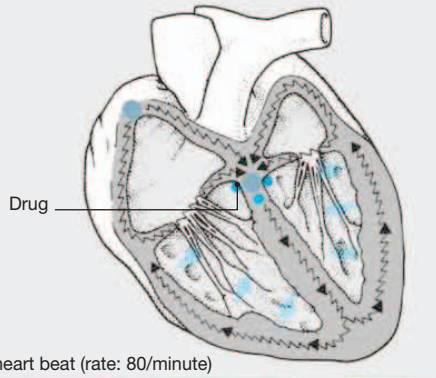
The heart beat is triggered by electrical impulses that are generated by the pacemaker, a small mass of nerve tissue in the right atrium. Electrical signals are passed from the pacemaker to the atrio-ventricular node. From here a wave of impulses spreads throughout the heart muscle, causing it to contract and pump blood to the body. The pumping action of the heart can become weak if the heart muscle is damaged or if the heart beat is too fast, as in atrial fibrillation. In this condition (shown right), rapid signals from the pacemaker trigger fast and inefficient contractions of both the atria and the ventricles.



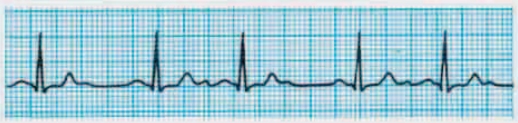
Abnormally rapid heart beat (rate: 120/minute)



The effect of digitalis
Digitalis drugs reduce the flow of electrical impulses through the atrioventricular node so that the ventricles contract less often. In addition, by promoting the chemical changes in muscle cells necessary for muscular contraction, these drugs increase the force with which the heart muscle contracts and thereby improve the efficiency of each heart beat.



Slowed heart beat (rate: 80/minute)



COMMON DRUGS

Digitoxin
Digoxin ❋

❋ See Part 3