

Breaking the circuit: a cure for supraventricular tachycardia

'I don't want to alarm you,' said the paramedic chirpily as he peered down at my electrocardiograph (ECG) read-out, 'but this is the fastest heartbeat I've ever seen.'

It was mid-Sunday afternoon and my partner and I were in an ambulance *en route* to the Royal Free Hospital in London. An hour earlier we had been shopping in Camden market.

That's when it happened. Somewhere between a makeshift kebab stall and a tie-dye T-shirt emporium I felt an unnerving lurch in my heart. For a second, my heart felt normal again. Then, quite suddenly, it seemed to flip into overdrive.

Blood rushed to my head. I felt dizzy and breathless. My heart was galloping so fast I couldn't feel my pulse.

My partner asked if I was OK. 'Not exactly,' I muttered. In truth, I was terrified.

Ten minutes into the ambulance journey, my heart rate returned to normal, as suddenly and inexplicably as it had begun. My symptoms were diagnosed as supraventricular tachycardia (SVT), a condition that causes a sudden increase in heart rate to approximately 200 beats per minute. At this rate, the heart does not work properly and people may feel weak and short of breath, and even collapse.

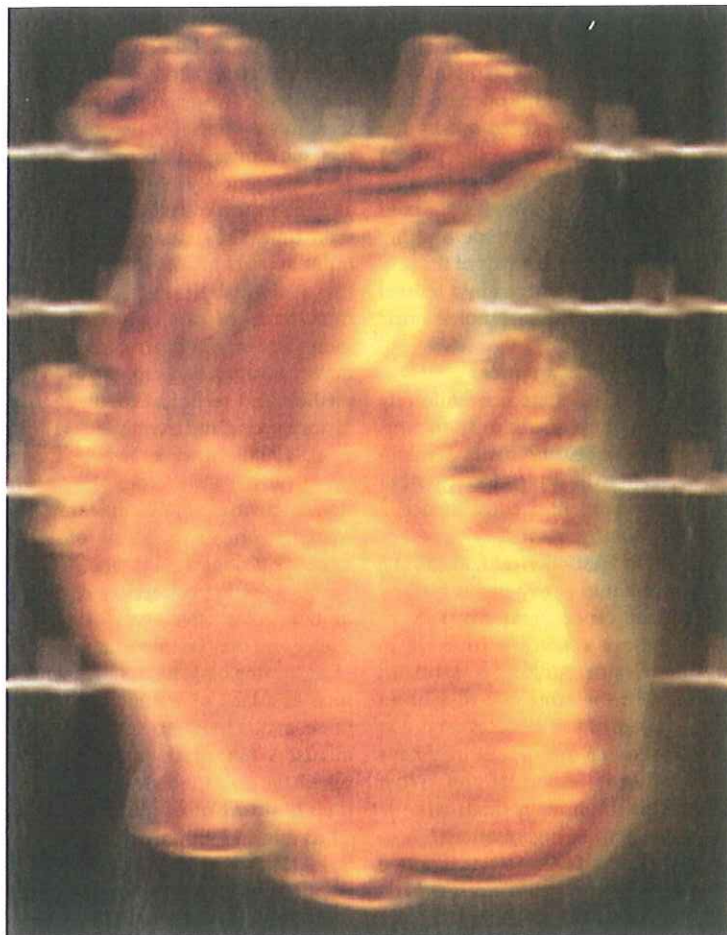
That was September 1993. Since then I have experienced numerous other attacks. Until recently, long-term medication was the only treatment available.

But in the last few years a new treatment has been developed capable of curing this condition. UK cardiologists are reporting impressive success rates. For sufferers like myself, the treatment could mean relief from uncomfortable and distressing symptoms for good.

Causes

An estimated 5% of people experience an attack of SVT at some point in their lives. The most common forms are atrioventricular nodal re-entrant tachycardia and Wolff-Parkinson-White (WPW) syndrome.

Neil Crossley reports on a new cure for supraventricular tachycardia that means he will no longer need drugs to control his alarming symptoms



In both conditions, accessory tissue or pathways are present in the heart. SVT occurs when electrical impulses travel back up these pathways, creating a circuit. While there is a minute risk of death in patients with WPW syndrome, SVT is generally benign. But, for some, the psychological effects can be devastating.

'For many patients, it really can seem like the sword of Damocles hanging over them,' says Dr Edward Roland, consultant cardiologist at St George's Hospital in London.

'These things are generally triggered by ectopic beats. So patients become very cautious when they have these "missed" beats because they know they run the risk of having an attack.

'That becomes inhibiting. They

don't want to go abroad because they fear they may end up in hospital somewhere unfamiliar. They worry that it may occur in the middle of an interview. And they often become very introspective and frightened as a result.'

In my case, numerous parties, dates and even friends' wedding receptions have been utterly ruined by the sudden onset of my galloping heart. It is not difficult to disguise it. Despite the uncomfortable sensation, I can continue standing, walking and talking as though nothing has happened.

But it has an unnerving effect. A heart pumping at over 200 beats per minute reverberates through every bone, muscle and organ in your body. And at these moments, your only thought is: 'How do I stop this?'

Medication

There are various self-help methods, all aimed at breaking the electrical circuit that causes the symptoms. Some people can achieve this by drinking a glass of ice-cold water or administering carotid sinus massage to the neck. Others require a visit to A&E, where an injection of adenosine can be administered. For me, lying down and breathing deeply to lower my pulse rate generally works.

For doctors faced with patients complaining of SVT, the first step is to determine the cause. A 24-hour ECG recording will generally detect any abnormality, but it is only of real use if a tachycardia occurs while the tracing is being done. To rule out underlying heart disease and provide accurate diagnosis, patients must undergo an electrophysiology study.

Eighteen months after my first attack of SVT, I was wheeled into the electrophysiology room at King's College Hospital. Under local anaesthetic, a catheter was inserted through my groin up into my heart. Over the next 40 minutes, the six-strong medical team induced numerous SVTs to test electrical conduction in my heart.

After each episode, I was given intravenous adenosine to restore normal sinus rhythm. This was not pleasant. For a few brief seconds, I felt as though life was being sucked out of me. I couldn't breathe and my arteries felt ready to explode.

It transpired my symptoms were due to atrioventricular nodal re-entrant tachycardia, caused by congenital accessory tissue. While the symptoms were troublesome, the condition was benign. I was prescribed beta blockers to be taken regularly or intermittently when symptoms were most prevalent.

The next morning on the ward, a nurse outlined my treatment. As most people cannot predict when attacks of SVT will occur, she explained, medication must generally be taken regularly to have any effect.

Catheter ablation: a cure?

Beta blockers and channel blockers have traditionally been prescribed for

patients with SVT. But in the past five years, a new form of treatment has been developed called radio frequency (RF) catheter ablation.

The aim of this is to destroy the abnormal accessory pathways or tissue that facilitate SVT rhythms. A small RF catheter tip is inserted into the heart and guided towards the electrical signal that characterises the abnormal pathway. Local heat is then generated by the catheter tip to destroy this.

Immediately after ablation, the heart is put through a series of tests to check if SVT can be induced artificially. Inability to do so generally assures the physician and the patient that ablation has been successful.

The UK has led the way in the development of RF catheter ablation. Initial success rates of 80% are now touching 100% in some centres. Much of this is due to the recent development of a 'deflectable' catheter tip and the increased expertise of cardiologists in interpreting the data.

The great attraction for patients is that, unlike medication, this treatment is curative. Dr Roland believes that patients' disaffection with drug therapy has contributed to the dramatic increase of catheter ablation in the UK.

'What we're increasingly finding is that people are saying: "I don't want to take tablets. I want something done." That attitude is influenced as much by the negative press of drug therapy as it is by the encouraging results of catheter ablation. And in my view, the kinds of results we can achieve nowadays have moved the goalposts towards an intervention.'

Despite the encouraging results, however, there are risks. In patients with conditions such as mine, the accessory pathways are close to the heart's atrioventricular (AV) node.

Consequently, there is a risk of damaging the AV node, resulting in heart block and the need for a pacemaker. While the risk is less than 1%, it is sufficient for cardiologists to advise many patients against catheter ablation.

'In my view, ablation is reserved for when drug therapy doesn't work or

Supraventricular tachycardia

Atrioventricular nodal re-entrant tachycardia

This rhythm is caused by re-entry within the atrioventricular node and produces a regular tachycardia of 140–220 beats per minute. It can last from a few seconds to several hours. The patient usually feels he or she has a fast heartbeat and may feel breathless and dizzy.

The ECG will show a tachycardia with normal QRS complex. There is sometimes, however, a rate-dependant bundle branch block.

Wolff-Parkinson-White syndrome

Patients with this condition have a strip of accessory conducting tissue between the atria and the ventricles. This allows electricity to bypass the AV node and spread from the atria to the ventricles without delay.

When the ventricles are depolarised through the AV node, the ECG will be normal, but when they are depolarised through this accessory conducting tissue, the ECG will show a very short PR interval and a broad QRS complex (called a delta wave). As the AV node and bypass tract have different conduction speeds and refractory periods, a re-entry circuit can develop.

The condition is sometimes associated with paroxysmal tachycardia.

when it's not what the patient wants,' says Dr Roland. 'I've caused heart block in patients and it's a memory that lives with me. It's making someone dependent on a pacemaker for the rest of their life. Pacemakers are very good when you need them. But it's nice to know nature caused it rather than yourself.'

As most SVT is harmless, there is generally no urgent need for intervention. Consequently, the decision to ablate depends on how intolerable the symptoms are and how adversely it affects lifestyle. And that is ultimately the patient's choice.

In effect, catheter ablation is a reserve choice. But refinements and expertise are improving all the time. In recent months, papers have been published in medical journals outlining its potential for treating more serious heart conditions such as ventricular tachycardia, atrial flutter and atrial fibrillation. And as the number of catheter ablations increases, more centres are being set up across the UK to meet demand. **NT**