

# The breakthrough that reveals if you

## HEART TEST ONE

By Jo Macfarlane

**E**VERY day, around eight million Britons dutifully swallow statin tablets prescribed by their GPs to reduce their risk of heart disease. The drugs are designed to lower cholesterol, thus slashing the chances of a fatal heart attack, and they are among the most widely used medicines in the world.

Yet mounting evidence suggests a significant number of people need not be taking them in the first place. More worrying, others with 'hidden' cardiovascular disease – who would benefit from drug treatment – are thought to be missing out because they tick too few of the 'high-risk' boxes GPs use to work out the danger to patients' health.

Given that statins can have side effects ranging from headache and nausea to muscle cramps, many patients would jump at the chance to find out if they really need to be taking them. Research suggests just 50 per cent of adults prescribed the drug stay on them for more than a year.

So imagine if there was a rapid, non-invasive and highly accurate test to show – once and for all – who really needs to be on the pills? Well, such a test already exists in the UK.

But while it is readily available at private clinics, it is not widely used on the NHS.

Now, as clinics across the United States roll out the five-minute test for all patients with an intermediate risk of a heart attack, British experts are questioning whether to deploy this powerful weapon on the front line of the war against killer heart disease.

Called calcium scoring, the procedure involves a non-invasive CT scan, which uses X-rays of the heart to look for calcium deposits in the coronary arteries. The deposits can cause them to narrow, and increase the risk of a heart attack. This calcium, unrelated to calcium consumed in our diet, occurs as cholesterol and fat builds up in the arterial walls over time, prompting inflammation. The body's response to inflammation is to deposit calcium, which stiffens the arteries.

There is also growing excitement about a more sophisticated form of the test, called CT coronary angiography (CTCA), which could prove even more revolutionary, say experts. This scan not only maps calcium and the degree of narrowing in the arteries, but detects fatty cholesterol deposits that can build up inside heart arteries without symptoms, particularly in the young, who may have no calcium in the arterial walls.

Some cardiologists now believe these highly effective tests should be used to screen patients before they get ill to see if they already have harmful calcium deposits lining their arteries. This more targeted tactic could mean statins are directed specifically at those who need them, rather than what some critics say is more of a 'carpet bombing' approach.

Dr Paul Jenkins, medical direc-

**One in three Britons have high blood pressure, and half are not receiving any treatment.**

tor of the private European Scanning Centre, which offers both calcium scoring and CTCA, said: 'CTCA is the only technique which can detect what cardiologists call the "widow makers" – the areas inside the coronary arteries comprising cholesterol and lipids which haven't yet calcified but which can suddenly burst, causing a total blockage, and kill by causing a massive heart attack without any prior warning.'

The tests are only currently available on the NHS to patients with chest pain who are being investigated for heart disease.

Extending their availability to everyone who qualifies for a free

heart risk assessment would be hugely expensive. CTCA also requires scanners which can cost up to £2million each.

Critics also caution that the test involves being exposed to small amounts of radiation. But supporters say it could prove cost-effective in the long run if significant heart disease could be prevented.

Currently, GPs assess a patient's heart risk during a NHS Health Check by using a scoring system called Qrisk.

It gives a general idea of cardiovascular risk over the next decade based on factors including cholesterol, blood pressure, age, weight and health history. Anyone with a risk of ten per cent or more will be offered statins, according to guidelines.

But Qrisk does not measure the actual condition of a patient's

arteries. As a result, some experts fear that millions may be taking cholesterol-lowering medication when they do not need to.

Data compiled by the European Scanning Centre, based on more than 3,000 cases, suggests that

**Experts fear millions may be taking the drugs when they really don't need to**

almost 60 per cent of women, and 40 per cent of men under 55 being treated with statins under the current guidelines, have perfectly healthy heart arteries, meaning

they probably do not need medication. The astonishing study also found that around a quarter of men and 15 per cent of women may have such significant calcium deposits that the standard dose of statins dished out by GPs would be inadequate to treat it. These patients, say experts, would require further medication or a surgical procedure to lower their heart attack risk.

The study also looked at men and women who were not on statins, and were otherwise healthy with no symptoms of heart disease.

In this group, more than half of men over 55, and almost a third of those aged 40 to 55, had calcium build-ups that put them at risk of heart disease.

Shockingly, around 17 per cent of the older men were in the highest risk category, meaning a sud-

## HEART



**With my history, the results were such a relief**

FIONA BATES, a property management consultant from Islington, North London, knows first-hand the benefits of a calcium scan.

She had one of the worst family histories of cardiovascular disease her heart specialist had ever seen. Her grandmother, a former professional ballerina, died from heart disease aged 54. Her mother suffered three heart attacks and had triple bypass surgery before the age of 60, and her maternal uncle died of a heart attack at 56.

Meanwhile, Fiona's father had lifelong high blood pressure, which led to a stroke in his 70s.

Despite leading a healthy lifestyle herself, Fiona, left, had consistently high cholesterol levels and her GP advised her to take statins to reduce her risk of heart disease.

But Fiona, now 63, was reluctant because she was concerned about potential side effects and unsure whether there was evidence that, in her case, they were necessary.

She paid to have a CTCA scan which revealed a calcium score of zero – she had no calcium deposits. Her arteries were entirely clear.

Her consultant, cardiologist Azad Ghuran, advised against taking statins.

'The scan gave me peace of mind. With my history, it was such a relief,' says Fiona.



# FIVE MINUTE test really need statins

## TEST TWO

### I'll have to take statins for life – but they work

EVEN in his 20s, Kevin Bird knew he was at risk of heart problems. Several family members, including a grandfather and two maternal uncles, had died of heart disease, and his mother had suffered a heart attack in her 40s.

Despite quitting smoking and eating healthily, Kevin's cholesterol levels were persistently high.

But his GP had always been reluctant to prescribe statins because he was too young.

After turning 40 last year, father-of-two Kevin, from Stevenage, Hertfordshire, had a full medical assessment as part of his job as a project manager for Tesco. It revealed he was a 'borderline' case for further investigation on his heart.

He chose to be referred to consultant cardiologist Azad Ghuran, who performed calcium scoring with CTCA. It revealed calcium build-up in his arteries, and Kevin began taking a low-dose statin. Three months on, his cholesterol levels have halved.

Kevin, left, said: 'There's an obvious male issue with having this insight, a head-in-the-sand approach.'

'Colleagues and friends all said, "Oh, I'd rather not know." But given my family history, and knowing what was already starting to happen to me, taking the statins felt like the right thing to do, even though I'll now have to take them for life.'

den heart attack would be likely.

Dr Azad Ghuran, consultant cardiologist in London and Hertfordshire, said: 'One patient I saw was 35, with low cholesterol and a normal BMI and blood pressure but was having chest and hand pain. His QRISK score was just two per cent. You'd probably say he didn't yet need a statin. But investigations showed all three of his arteries were severely narrowed.'

In such serious cases, patients can have bypass surgery to improve blood flow around the heart and reduce the risk of a heart attack. Alternatively, they can opt instead – as Dr Ghuran's patient did – to have less invasive surgery to insert stents to widen the arteries.

Trials are investigating the benefits of CTCA. Later this year, a British Heart Foundation-funded

study called SCOT-HEART2 will start to recruit up to 10,000 people aged 50 to 70 with a single risk factor for cardiovascular disease, such as smoking, high blood pressure or raised cholesterol.

The trial will examine whether CTCA improves long-term health outcomes as well as the cost-effectiveness of picking up heart disease earlier.

Professor David Newby, BHF's Duke of Edinburgh Chair of Cardiology at the University of Edinburgh, who will be leading the study, said: 'We hope to identify people who are asymptomatic who are actually at risk of heart attacks – and prevent those heart attacks. It could justify giving the scan to people with a singular risk factor.'

'But we need the evidence before recommending it as a standard screening test.' NHS patients

## HEART TEST THREE



### Now I know my risk of a heart attack ... it's ZERO

I'M NOT what you'd call an obvious candidate for a heart attack, writes Health Editor BARNEY CALMAN.

At 10st, my weight is normal for my height (5ft 8in). I don't smoke, I don't drink much and I try to go to the gym but I probably eat way too much cheese. I'm 40 this year.

My father, 73, has suffered severe angina and there's family history of high blood pressure.

So when I was offered the chance to have a CTCA, which costs about £500 privately, I was confident – but not sure – I'd be given the all-clear.

The test took about five minutes. First, while lying on a bed, an IV needle was inserted into an arm vein. A special contrast dye was injected into a blood vessel and travelled around the bloodstream. Because X-rays cannot pass through the dye, it helped create a highly detailed image of the heart and arteries.

The scanner creates a 3D image of the heart and surrounding blood vessels, which shows soft plaques and hardened calcium deposits, their position and whether they are causing blockages. The scan gives a 'calcium score', which can be zero if no calcium is detected. Anything between one and 100 is deemed low risk, 101 to 300 is intermediate risk, over 300 is high risk.

My results? 'Completely clear – zero heart attack risk,' I was told. 'Have a glass of wine to celebrate.' So I did.

Annual heart deaths have roughly halved in the past 50 years, from 320,000 in 1961 to 150,000 last year.

being investigated for heart disease sometimes only receive a calcium score, using a standard CT scan, which reveals whether they have calcium deposits present and may need further treatment. In contrast, CTCA provides a map of the heart and the precise location of any blockages, but can only currently be done in a handful of NHS trusts which have the expensive scanners.

In the US, where Donald Trump had a CTCA scan in 2017, medical guidance to doctors recommends wider use of the calcium scan.

The American Heart Association says all patients over 55 – even if they have no symptoms of heart disease – as well as

younger patients over 40 who have an intermediate risk of having a heart attack, should be tested. It follows studies showing half of those aged 45 to 84 offered statins actually had a calcium score of zero, which means the drugs were not clinically necessary.

It will not be a cheap solution. Mr Jenkins says: 'The scanners also need experienced radiographers to operate them as they're like Formula 1 cars.'

Others question if the evidence currently supports CTCA's use for routine screening. One study, SCOT-HEART1, found that it cut the number of deaths from heart attacks by nearly half within five

years. But Jonathan Hill, consultant cardiologist at HCA London Bridge Hospital, warned: 'CTCA will replace calcium scoring for investigating chest pain, but the screening question is controversial in otherwise healthy patients. The radiation risk, although it's going down, is not quite low enough with most machines.'

Professor Sir Nilesh Samani, medical director of the British Heart Foundation, said that while CTCA was an 'important tool', its use over and above calcium scoring alone was 'somewhat debatable'. He said: 'We need to find out which groups could benefit, which is what SCOT-HEART2 will do.'

However, Dr Jenkins added: 'If this could be introduced for every patient over 40, you'd save on statin prescriptions and long term on potential heart problems too.'

By Jo Macfarlane

**T**HEY are among our most devastating killers: heart disease and dementia. And now, astonishing new evidence from the world's leading experts suggests these two diseases, which blight the lives of millions of Britons, are inextricably linked.

Doctors suspect well-known cardiovascular risk factors – including poor diet, obesity and conditions like high blood pressure and diabetes – not only damage the heart but also quietly wreak havoc on the tiny, delicate blood vessels supplying the brain. The implications are profound and could completely overhaul the way both conditions are treated within a generation. In short, it means each one of us can reduce our risk of dementia simply by taking steps to improve our diet and lifestyle.

As British Heart Foundation spokesman Professor John Deanfield, of University College Hospital, London, explains: 'We now know we can at least delay dementia in many cases, and may even prevent it by tackling heart disease head-on.'

The burden of caring for dementia patients is a staggering £26billion a year, more than the cost of cancer (£9.4billion) and heart disease (£9billion) combined. But the emerging picture is one of hope: there are steps we can all take to protect ourselves. Here we look at the exciting science uncovering links between heart health and dementia that could one day lead to new tests to identify those most at risk well before symptoms begin, and new drugs to stave off the worst effects.

### IT'S NEVER TOO EARLY TO START TAKING CARE

THE key, say researchers, is the state of the heart and circulatory system in mid-life – roughly between 40 and 65. Those with poorer heart health during this stage are more likely to develop cognitive decline 20 years later. But does someone in their 30s or early 40s really need to worry about 'old-age' illnesses such as heart disease and dementia?

Dr Laura Corr, consultant cardiologist at the Harley Street Clinic, says: 'All the data shows that your health in mid-life predicts where you're going to end up.'

Pressure on the arteries can cause them to stiffen, become blocked with fatty plaques and narrow, all of which restricts blood flow to the tiny, delicate blood vessels in the brain.

Now scientists believe at least a third of dementia cases may be linked with circulation and potentially preventable.

Dr James Pickett, Head of Research at the Alzheimer's Society, says: 'With no new dementia drugs in over 15 years, prevention is key, and evidence suggests that getting regular exercise, eating a healthy, balanced diet, not smoking and keeping blood pressure in check can all help lower risk of cognitive decline.'

Dementia affects 850,000 people in the UK – someone is diagnosed every three minutes – with that number expected to pass one million by 2025. The most common type, Alzheimer's, is thought to account for between 60 and 80 per cent of cases. Professor Roxana Carare, a specialist in anatomy of the brain at the University of Southampton, says: 'A growing number of researchers don't use the term Alzheimer's or dementia any more. We call it

# Startling new evidence that looking after your heart helps avoid Alzheimer's

In the 1960s more than 7 out of 10 heart attacks in the UK were fatal. Today 7 in 10 people survive.

vascular cognitive impairment, because we recognise these problems all come from the blood vessels.'

### KEEP BLOOD PRESSURE LOW

ONE of the most important studies ever published on dementia suggests reducing blood pressure significantly reduces risk of the brain disease. The SPRINT-MIND

study, reported at the Alzheimer's Association International Conference in Chicago last July, followed nearly 10,000 patients with high blood pressure, also known as hypertension, over three years.

It found those who reduced it to healthy levels had a lower risk of mild cognitive impairment – memory problems – and dementia.

High blood pressure places more force on artery walls, making them stiffer and less pliable. This makes it hard for oxygen-rich blood to flow freely through the small blood vessels in the brain. Scientists think this may deprive brain cells of the nutrients they need and increase the risk of mini-

strokes, both of which may lead to dementia. Even more interesting are suggestions that the earlier doctors treat high blood pressure, the better the chances of avoiding dementia. Jonathan Schott, professor of neurology at the Dementia Research Centre at the UCL Institute of Neurology, says: 'Early mid-life seems to be the most important time to get blood pressure under control – not only to reduce heart disease and stroke, but also dementia.'

Funded by the BHF, Alzheimer's Research UK and the Medical Research Council, Prof Schott and his team are in the final stages of a major study tracking hundreds

of British men and women born in the same week in 1946 who had blood pressure monitored from their 30s. The results, to be published later this year, will reveal how blood pressure in mid-life impacts on brain health 40 years later.

### SCAN SPOTS DEMENTIA BEFORE IT HAPPENS

FOR decades, scientists have searched for a test that can spot dementia in its earliest stages. A breakthrough has remained elusive but new research shows



## GP urged me to take up running to keep my brain disease at bay

FOR Sue Strachan, being diagnosed with dementia in her 50s was devastating. The former publishing house sales rep, 63, admits 'it was a punch to the stomach' when told in 2014 that she had a type caused by reduced blood flow to the brain. Doctors said the disease was the result of ischaemia – a narrowing of the arteries which reduces blood flow to the frontal lobes. The

cause of the ischaemia was never determined but it is usually linked with cardiovascular disease.

Sue's father suffered a heart attack in his 50s and later developed dementia.

Today, determined to slow the march of her condition, Sue, left, has transformed her lifestyle. She has ditched midweek glasses of wine, now eats a healthy, balanced diet, and has taken up running, even completing last year's

London Marathon. Knowing she is 'doing the best I can' is motivating her to keep her brain – and heart – as healthy as possible for as long as possible.

Sue, from Herefordshire, says: 'I buried my head in the sand at first, but now I've adopted a healthier lifestyle. My GP also advised me to take up running to reduce my cardiovascular risk because of the potential for my arteries to be blocked.'



## Dad's lifestyle led to a major stroke – and then dementia

TV PRESENTER Anna Richardson is doing everything she can to look after her heart health.

She has witnessed the damage an unhealthy lifestyle can cause, with her 'big, charismatic, stubborn' father Jim – a retired Anglican canon – now suffering dementia after a series of strokes and a heart attack.

Anna (pictured left, and above as a young girl with her father) says looking back, the risks were clear. 'Dad is from that generation who likes nothing more than meat, pies, potatoes and bread, with plenty of butter and cream thrown in.

'A terrible diet and a high-stress lifestyle was a recipe for disaster. He was a workaholic and out all the time, grabbing chips for lunch. By Friday he'd be exhausted and order a Chinese takeaway, then be in the pub on Sunday with his parishioners.'

Jim, 78, was living on his own in Dorset in 2014 when he suffered a couple of mini-strokes, a heart attack and then a major stroke within

a matter of months. Doctors later diagnosed vascular dementia.

Caused by blocked blood vessels to the brain, it can be linked to high blood pressure, diabetes, smoking or being overweight. It is the second most common type of dementia after Alzheimer's and affects more than 135,000 Britons.

There is no cure, though some treatments can slow its progression. Jim recently suffered another small stroke and Anna, 48, who has two brothers, says: 'We're concerned we have something in our genes to be worried about. My younger brother and I both have high cholesterol.

'We have all had to watch as Dad got very ill which I'm convinced is because of poor lifestyle choices.'

Anna – whose partner is TV star Sue Perkins – does regular hill walks with her rescue dog, and practises meditation to reduce stress.

As for her diet, she doesn't claim to be a saint. 'I'm vegetarian and I would say I'm attuned to feeding my body properly,' she says. 'But it is probably 70/30 good and bad. Last night I was drinking amaretto and eating sticky toffee pudding – but it was a Saturday night.'

promise. Last November, Professor Deanfield's group at UCL developed a method to measure the intensity of blood flow travelling along the carotid artery, which supplies blood through the neck to the brain.

When carried out in midlife, the simple ultrasound scan identified those at risk of cognitive decline, particular in relation to language and memory. If the carotid artery is healthy, it is elastic and flexible and cushions the physical pulse which comes from the heart when it beats. This process protects the delicate blood vessels deeper in the brain.

But age and problems such as high blood pressure and diabetes, stiffens the arterial walls.

The heart's pulse is no longer cushioned and the intensity of blood flow, known as pulsatility, increases and causes damage over time to brain cells.

The team studied scans carried out on more than 3,000 civil servants in mid-life, and followed them up for 15 years to measure their cognitive abilities. Those with the most intense blood flow – and therefore potentially the stiffest arteries – were 50 per cent more likely to be suffering from

cognitive decline than those with the least intense pulse.

The test could be used to identify people at risk of heart disease and dementia who could benefit from preventative drugs.

'Potentially, this could be a test to spot cognitive decline in middle-aged adults, well in advance of actual symptoms,' says Dr Scott Chiesa, of UCL's Institute of Cardiovascular Science.

### COULD STATINS BE THE ANSWER?

STATINS are taken by millions of Britons to slash their risk of heart disease and heart attacks. But could similar medicines be used to protect the brain from the ravages of dementia?

The answer is, possibly, yes.

A key factor in the progression of heart disease is atherosclerosis, where arteries become inflamed and clogged with fatty substances called plaques, or atheroma.

These plaques cause arteries to harden and narrow, restricting blood flow and oxygen supply and increasing the risk of clots that could potentially block the flow of blood to the heart or brain.

Atherosclerosis has few symp-

toms and many people are unaware they have it. Statins are thought to lower levels of harmful cholesterol in the blood, known to play a key role in the build-up of atheroma, and may also dampen down artery inflammation.

Research suggests such inflammation in the brain could be linked to cases of dementia, and a study funded by Alzheimer's Research UK is investigating whether blocking the chemical pathways that lead to inflammation can reduce the risk of cognitive decline. The aim is to find potential treatments – which could prove similar to those already used to treat heart disease.

Dr Patrick Strangward, from Manchester's Faculty of Biology, Medicine and Health, said: 'Inflammatory processes that occur in heart blood vessels also occur in the brain, so treatments that protect against cardiovascular disease are likely to help prevent vascular dementia, too.'

### NEW DRUGS ARE COMING

SINCE 2002, more than 100 promising drugs to treat Alzheimer's have entered clinical trials. Every

single one has failed. The main problem is the brain changes that cause it occur decades before symptoms emerge.

Now, thanks to better understanding of the vascular causes of dementia, new medication for those at risk but not necessarily with symptoms may be close.

Scientists at Southampton are investigating if dementia could be tackled by improving the brain's vascular 'waste disposal system'.

As cells – including brain cells – go about their job, consuming or producing energy, they produce waste by-products. These are eliminated via very thin channels – one millionth of the thickness of a human hair – within the walls of the blood vessels. The Southampton team is investigating whether damage to blood vessels stops the brain eliminating waste properly.

Dr Strangward is convinced diet and lifestyle are key to prevention – and patients should not rely solely on medication. 'Once the structural changes have occurred, like shrinkage of the brain, it can't be recovered.

'But we're getting better at detecting subtle changes in cognition, so in time we'll be able to deliver therapies much earlier.'

## Dr Ellie Cannon's Heart Health Q&A

Our resident GP columnist answers the questions she's asked most in her clinic

**Q I TAKE daily aspirin to reduce my heart attack risk. But is it worth risking damage to my stomach?**

**A ONCE aspirin was recommended to prevent heart attacks as it thins the blood and makes arteries less likely to fur up. But we know now there is little benefit in taking it daily unless your heart disease risk is particularly high. And, yes, it is known to cause bleeding of the stomach.**

**Q I'M told I'm at risk of heart failure – does this mean it can stop any time?**

**A NO, because the term does not refer to a sudden failure of the heart (that's a cardiac arrest) but rather a decline in its pumping ability, often due to high blood pressure or faulty valves. It is a serious condition, though, and if you have high blood pressure, you'll need drugs to lower it. Symptoms include breathlessness, fatigue, and heart palpitations and swollen ankles due to fluid retention.**

**Q CAN I take an online tests to find out my heart attack risk?**

**A NOT exactly. There is a five-minute online heart age test launched by Public Health England in 2018. It takes account of age, lifestyle and medical and family history. Then it tells you ways to improve your health. It can't tell you your heart attack risk, though, as this has to be done by your GP, after an assessment. The online test is free at nhs.uk.**

**Q MY parents died from heart attacks in their early 60s. I am 50, go to the gym three times a week, eat healthily and am slim. Will my genes curse me?**

**A YOUR parents' deaths could have been due to their poor diet, lack of exercise or smoking. You are less likely to be affected if you live healthily. If they died due to raised cholesterol, high blood pressure or type 2 diabetes, there may be a genetic element. But these can still be well controlled with medication.**

**Q A FRIEND has an abnormal heart rhythm and is being treated to prevent a stroke. I also get palpitations: do I need treatment?**

**A ATRIAL fibrillation is the most common rhythm problem and causes the heart to race (130 beats per**

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