

health

The risk posed by blood clots goes far beyond Covid-19

Dr Mark Porter

Blood clots are in the spotlight this week after reports that they are “clogging up” the lungs of patients in intensive care with Covid-19. Not that you have to be infected with the virus to be at risk. Despite the NHS being a world leader in clot prevention, venous thromboembolism — deep vein thrombosis (normally in the leg) and pulmonary embolus (clots in the lungs) — remains the main cause of preventable deaths in our hospitals.

Three factors classically contribute to the abnormal clotting that results in a deep vein thrombosis (DVT): overly “sticky” blood, injury to the lining of blood vessels and sluggish flow. Most DVTs form in the deep veins of the leg, and the most common symptom is a painful and occasionally swollen calf that is all too easy to attribute to a pulled muscle. The main risk from delayed diagnosis is that part of the clot will break off and travel to the lungs, causing a pulmonary embolus (PE). And the risk is considerable: about a third of patients with DVTs in their

“**If you are going into hospital you can take steps to protect yourself**

thighs develop a PE and one in three of them will die from it.

Sick people in hospital — whether they have Covid or not — are likely to have all three predisposing factors, particularly if they are immobile in bed after major surgery or in an intensive treatment unit (ITU) after an accident or serious infection. And to compound matters, patients with Covid also develop massive inflammation in the lungs, which leads to further clotting in the small blood vessels in the part of their lungs where gases are exchanged. Little wonder that ventilating such people has proved a significant challenge — you can boost breathing artificially with a machine, but it’s not going to make a huge difference if large sections of the lungs have no blood supply. Air and blood need to meet to keep people alive.

This double whammy of blood clots travelling round the circulation and wedging in the lungs and smaller vessels becoming inflamed and blocking off happens in other illnesses, including bacterial pneumonia and sepsis. And it is very difficult to treat. Conventional clot-prevention measures — eg anticoagulants such as heparin — are used routinely in ITUs, and on many other hospital patients, but while they can help with DVT and PE, we still don’t know for sure what impact they have on the microvascular clotting seen in Covid.

In a typical (pre-Covid) year 5,000 people die in England alone from

blood clots, most of them while in hospital or within a few months of being discharged. Since 2007, when NHS hospitals started a much more aggressive clot-prevention programme, the number of deaths (in hospital and up to 90 days after going home) has fallen by about 20 per cent, but preventive measures can’t stop all clots, and early diagnosis remains vital. Prompt treatment with anticoagulants dramatically reduces the risk of DVTs breaking off and ending up in the lungs.

Diagnosing a DVT in someone exhibiting all the classic signs isn’t that hard and, once suspected, can be clinched using blood tests and/or scans, but most DVTs are not that obvious. As many as 80 per cent are “silent” until a bit breaks off and becomes lodged in the lungs. Even then diagnosis can be missed. The textbook symptoms of a PE are sudden-onset chest pain made worse by breathing deeply, breathlessness and coughing up blood, but smaller PEs often present as non-specific unexplained shortness of breath.

Anyone can develop a DVT/PE at any time, but those most at risk include the over-60s; people taking certain medications, particularly oral hormone replacement therapy (HRT); pregnant women; and those who are obese and/or have underlying diabetes (type 1 and 2) or cancer.

Surgery, particularly intra-abdominal operations and orthopaedic procedures such as hip or knee replacement, is a significant risk factor in patients being treated in hospital, as is any serious infection or illness. And there is a small group (about 5 per cent of the population) who have an inherited tendency to “stickier blood”, often evident from a history or family history of DVT/PE.

As well as reporting any suspicious symptoms, you can take steps to protect yourself if you are going into hospital (see right), particularly for a planned procedure such as an operation.

For more details on the diagnosis, management and prevention of DVT visit thrombosisuk.org.

DVT: the facts

● **Although DVT is often linked to long-haul flights (remember those?), air travel accounts only for a tiny proportion. Being treated in hospital is the most common risk factor. And while it is more common in older people, any age group can be affected. Every year at least 2,500 people under 40 in England and Wales develop a DVT and as many as 250 of them will die from it.**

● **The risk varies depending on the individual and why they are in hospital, but as many as one in three surgical patients will develop a DVT unless specific preventive measures are taken.**

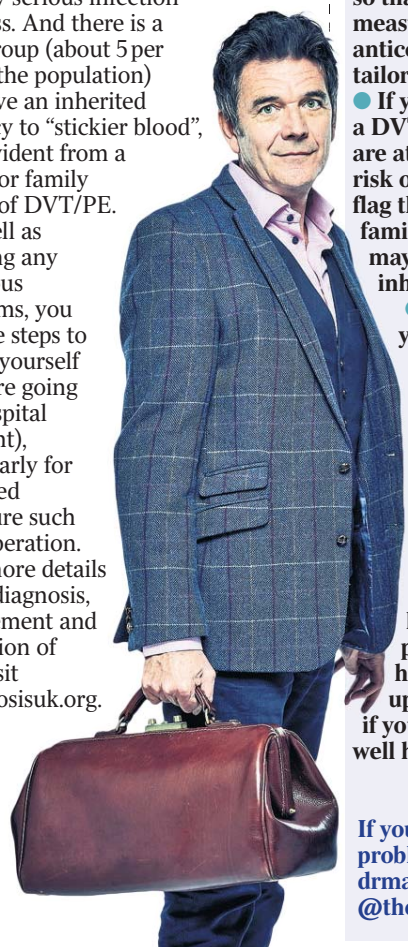
● **If you are admitted to hospital, ask the doctor or nurse looking after you what steps will be taken to reduce the risk of DVT. All patients should be individually assessed so that preventive measures such as anticoagulants can be tailored accordingly.**

● **If you have had a DVT/PE, you are at much higher risk of another, so flag this up. A strong family history may suggest an inherited tendency.**

● **Seek advice if you are on the combined contraceptive Pill (the mini Pill is fine) or HRT. Both should generally be stopped a month before major surgery.**

● **Spend as little time as possible in your hospital bed, get up and walk about if you can and stay well hydrated.**

If you have a health problem, email drmarmporter@thetimes.co.uk



Salt: it's more

We eat far too much of it — and it's taking a toll on our health. **Jennie Agg** asks the experts how we can cut back

If you pride yourself on bypassing the chocolate and nibbling on nuts or hummus in between meals, I have bad news for you. The chances are — if the nuts are salted and the hummus shop-bought — your chosen snack may be rather less healthy than you realised, all because of one, admittedly delicious, ingredient: salt.

We are a nation of saltaholics. On average, we eat a third more salt than is recommended — 8g a day according to Public Health England, rather than the suggested 6g (a little more than a teaspoon). And while our national intake had been dropping steadily each year, progress has stalled since 2011, according to research published last year in the *Journal of Epidemiology and Community Health*.

“Salt pushes up blood pressure, and high blood pressure is a major cause of strokes, heart failure and heart attacks,” says Graham MacGregor, professor of cardiovascular medicine at the Wolfson Institute of Preventive Medicine in London. “Raised blood pressure is the biggest killer in world, yet many people are still unaware of how dangerous it is.”

Even if your blood pressure is in the normal range now, your salt intake could still have an effect in the long run. “Salt seems to be the major factor that puts up blood pressure with age,” MacGregor says. “If you look at traditional communities that eat hardly any salt, they get no blood pressure rise at all with age.”

New research suggests that salty diets have many other consequences too. They can weaken certain immune cells, reducing our ability to fight off bacterial infections, according to a German study published in March. “The effects of salt, other than on blood pressure, are surprisingly large,” says MacGregor, who co-authored a review of the evidence, also published in March, which found that there is “clear evidence” high salt intake is associated with conditions including kidney disease, kidney stones and stomach cancer. “There is also emerging evidence for an association with dementia,” the paper noted.

Bad for bones — and gut health

Salt appears to raise the risk of osteoporosis — where bones become thinner, weaker and prone to fractures. “Salt dramatically increases the amount of calcium excreted in urine,” MacGregor says. This means you have to absorb more calcium from the gut from food, which the body is not very efficient at doing, “so you also mobilise calcium from the bone”. Losing calcium like this means weaker bones. While there aren’t any direct studies showing that reducing salt intake can improve bone strength, “it seems from the physiology of it, if we all reduced our salt intake it would have quite a dramatic effect on osteoporosis rates,” MacGregor says.

Other research has shown people who eat high-salt diets tend to have less healthy, less diverse gut bacteria, according to Dr Megan Rossi, a registered dietitian specialising in gut health and the author of *Eat Yourself Healthy*. “Though there may be confounding factors, as people who have a very high-salt diet typically have a very heavily processed diet, so they also don’t tend to get much dietary fibre, which we know is our gut bacteria’s favourite food,” she says.

However, in 2017 a small study by German researchers found that asking volunteers to eat an extra 6g of salt a day for two weeks killed off 90 per cent of their gut’s lactobacillus bacterium (largely considered a “good” bacterium — it’s the strain found in live yoghurt and kefir).

Some people are ‘salt sensitive’

Salt may be worse for some people’s health than others’ — with some people able to eat 11-12g per day with little effect on their blood pressure, while others need only 2 or 3g a day before it starts to raise their blood pressure, according to Dr Gordon Williams, a professor of medicine at Harvard Medical School.

This is down to “thrifty, salt-conserving” genes, says Williams, one of the authors of a 2019 study that identified 21 genes associated with high blood pressure, 18 of which related to salt sensitivity. “There are a couple of dozen systems in the body — maybe more than that — involved in the process of whether we hang on to salt or whether we get rid of it.”

An enhanced ability to hold on to salt probably gave a survival advantage thousands of years ago, when we had little access to dietary salt, Williams explains, but now, when it’s abundant, it puts people with these gene variants at increased risk of high blood pressure. Sixty per cent of people with high blood pressure are thought to be “salt sensitive”, while the other 40 per cent may be “salt resistant”, meaning even if they drastically reduce their salt intake it doesn’t improve their blood pressure.

There isn’t yet an easy way for doctors to identify who is salt sensitive and who isn’t, so everyone has to be advised to reduce salt, Williams says. In the future he believes we’ll have “gene-based, patient-oriented” treatments for high blood pressure. “You would have maybe 20 different ways to specifically treat an individual using their genotype.”

Can you have too little salt?

We need some salt — a compound of sodium chloride — because our bodies need sodium to regulate fluid levels. If levels of sodium in the blood get too low it can lead to a condition called hyponatraemia. Symptoms include nausea, confusion and even loss of consciousness. It tends to affect people

dangerous than you think

GETTY IMAGES



Bread is the biggest source of salt in our diet



Don't season food before tasting and try using herbs instead

who are malnourished or who are on medication that affects sodium levels. More rarely, it can happen from drinking excessive amounts of water.

Some studies have suggested that a low salt intake can be as bad as too much. A 2016 analysis of 130,000 people, published in *The Lancet*, concluded that people who ate the least salt had the highest risk of death, heart attack or stroke. However, the research was heavily criticised.

As a general rule, it's unlikely someone is low on salt, says Francesco Cappuccio, a professor of cardiovascular medicine and epidemiology at the University of Warwick, who has worked with the World Health Organisation on its salt guidelines. "We eat almost ten times as much as the biological need — 1g of salt per day would be plenty. You could get this amount from fruit, vegetables, dairy, anything that is not processed."

However, he points out that aiming to eat this little salt would be difficult because as much as 80 per cent of the salt we eat comes from prepared, packaged foods rather than salt we add. "I've measured my own intake several times and it's usually 6g or 7g per day — and I'm a highly motivated person, I don't add salt to food at all."

What do salt cravings mean?

A craving for salt is unlikely to mean you need more, according to Cappuccio, instead it's probably because salt is addictive. "Saltiness gives us pleasure, which gives us the craving — and over time you demand more to get the same effect," he says, adding that experiments using functional MRI scans have shown that the brain area activated

when you eat salt is the same area that lights up with cocaine use.

A predilection for salt could also be a sign that you're a super-taster — that is, someone who perceives tastes more strongly. Researchers at Pennsylvania State University have found that confirmed super-tasters perceive the flavour of salt more intensely and also eat more high-salt foods than other people. This, they suggested, is not only because super-tasters appreciate the salty flavour more, but because salt also masks bitterness in food.

The salt hidden in our food

"Bread is actually the biggest source of salt in the UK diet," MacGregor says. (Two slices of a typical thick-cut supermarket loaf alone contain 1g.) We tend to forget that salty foods don't always taste salty, adds Laura Tilt, a registered dietitian (tiltnutrition.com). "Quite often they don't — which is why it's important to check the label." Two digestive biscuits contain 0.5g of salt, for example, while a small bowl of bran flakes has a fifth of a gram, and there's a third of a gram in a Cadbury's Crunchie. "Some granolas — even higher-end ones — can have quite a lot of salt in too," Rossi says. The same goes for shop-bought hummus, which can have more than 0.5g per serving.

Cooking from scratch as much as possible helps to avoid hidden salt, Tilt suggests. "Most of our salt comes from processed foods, so this alone could make a big difference."

MacGregor agrees: "If you're prepared to cook for yourself, sticking to fresh meat, fish, fruit and veg, making your own bread and cakes, and not adding salt or soya sauce or

using too many stock cubes, you'll probably be on a low-salt diet."

It's fine to add salt to cooking water for pasta, according to Cappuccio, but only if you rinse it after cooking. Although MacGregor points out that if you let the water boil off — when cooking rice, for example — any salt you've added will remain in the food.

How to make up for less salt

"Taste your food before adding salt and try using herbs and spices, garlic and lemon to add flavour instead," Tilt suggests. "I advise patients to swap the salt-shaker for a shaker of mixed herbs," Rossi adds.

And according to Dr Jane Parker, an associate professor and flavour researcher at the University of Reading, "there are specific things you can use which enhance saltiness".

"One thing is to use aromas that remind people of saltiness, such as anchovies or cheese — if you can put very low levels of these in, it makes people think something is saltier."

Enhancing the umami (strong, savoury) flavours of a dish will also help to compensate for lack of salt, she says. "There are two different categories of things that give you umami. The first is glutamate, which is in tomatoes, onions and parmesan cheese, as well as kombu seaweed. The second is nucleotides, which are in fish, meat and mushrooms. They're synergistic, so if you use the two categories together you get a super-enhanced flavour. It's a two-plus-two-equals-ten effect."

She recommends small amounts of Worcestershire sauce or mushroom ketchup to pep up otherwise bland dishes without salt.

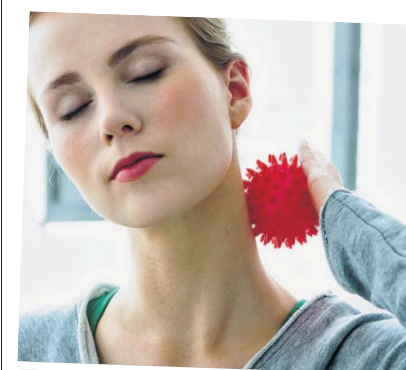
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Three ways to perform a DIY massage

1 Use a tennis ball on your legs
If you've taken up running recently, your glutes and calf muscles may feel tight, and a tennis ball is perfect for targeting hard-to-reach knots, says Anna Poyser, a physiotherapist for the Lawn Tennis Association's performance team. "Glutes help with hip extension, the motion that drives you forward, and help to stabilise your pelvis, so it's important they stay tension-free." After a run, sit on the floor with a tennis ball under your left glute. Bend the right leg so your foot is flat on the floor and support yourself by placing your hands behind you. Raise your left foot on to your right thigh, just above the knee, and roll gently to release tension. For tight calf muscles, sit on the floor with your left knee bent and right leg extended, supporting your body with hands on the floor behind you. "Place a tennis ball under your right calf," Poyser says. "Allow some weight on the ball and roll it up and down the calf."

2 Buy a cheap spiky ball to roll on your neck
Athletes swear by expensive vibrating massage guns, but cheap spiky massage balls do the same job (you can buy three for £7.46 at [physioroom.com](https://www.physioroom.com)), says the physiotherapist Leanne Antoine, a



spokeswoman for the Chartered Society of Physiotherapists (CSP). "Lie on your back or stand with your back to a wall and place a spiky ball behind one shoulder," she says. "Slowly roll side to side and up and down the shoulder area for up to 90 seconds to find the sensitive area." For neck tension, hold the ball with your right hand to rub over your left upper trapezius muscle (where the neck slopes into your shoulder), then repeat on the other side. "Be careful about massaging any area if you have an underlying injury," she warns.

3 A foam roller alternative
Any unyielding household implement, such as a rolling pin, can be used, says Uzo Ehiogu, a specialist musculoskeletal physiotherapist and spokesman for the CSP. "I was an army physiotherapist in Afghanistan and didn't have foam rollers, so got the lads to use a boot or metal flask instead." Apply a hot water bottle to muscles before rolling. "Heat encourages blood flow to the muscles," he says.

Peta Bee