

Low iron levels in blood give clue to blood clot risk

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People with low levels of iron in the blood have a higher risk of dangerous blood clots, according to research published in the journal *Thorax* today. A study of clotting risk factors in patients with an inherited blood vessel disease suggests that treating iron deficiency might be important for preventing potentially lethal blood clots.

Each year, one in every 1,000 people in the UK is affected by [deep vein thrombosis](#) – [blood clots](#) that form in the veins. These can cause pain and swelling, but can also be fatal if the clot is dislodged and travels into the [blood](#) vessels of the lungs. Although some [risk factors](#) for blood clots are recognised, such as major surgery, immobility and cancer, often there is no clear reason for the blood clot.

To look for new risk factors for blood clots, scientists at Imperial College London studied patients with hereditary haemorrhagic telangiectasia (HHT). HHT is an inherited disease of the blood vessels, the main symptoms of which are excessive bleeding from the nose and gut. Previous research by the same group had found that HHT patients have a higher risk of blood clots, but the reason for this was unclear.

"Most of our patients who had blood clots did not have any of the known risk factors ," said the paper's lead author Dr Claire Shovlin, from the National Heart and Lung Institute at Imperial College London and an honorary consultant at Imperial College Healthcare NHS Trust. "We thought that studying people with HHT might tell us something important about the wider population."

Dr Shovlin and her team analysed blood from 609 patients reviewed at the HHT clinic at Hammersmith Hospital from 1999 to 2011, to look for differences between the patients who had blood clots and those who did not. Many of the patients had low [iron levels](#) because of iron lost through bleeding. The researchers found that low levels of iron in the blood were a strong risk factor for blood clots. Patients who took iron supplements did not have higher risk, suggesting that treatment for iron deficiency can prevent blood clots.

"Our study shows that in people with HHT, low levels of iron in the blood is a potentially treatable risk factor for blood clots," Dr Shovlin said. "There are small studies in the general population which would support these findings, but more studies are needed to confirm this. If the finding does apply to the general population, it would have important implications in almost every area of medicine."

Iron deficiency anaemia is thought to affect at least 1 billion people worldwide. The association with blood clot risk might not have been found before because the iron levels demonstrating the link fluctuate during the day, and other markers of [iron deficiency](#) can be spuriously high if other medical conditions are present. Consistent timing of blood samples, as in this study, is therefore important for establishing correlations with health outcomes.

The link between iron levels and blood clots appears to be dependent on [factor VIII](#) – a blood protein which promotes normal clotting. High levels of factor VIII in the blood are also a strong risk factor for blood clots, and low iron levels were strongly associated with higher levels of factor VIII. The gene encoding factor VIII has sites where iron-binding proteins can bind, making it plausible that iron levels could regulate the factor VIII gene, and that this might be the mechanism for the link.

"We can speculate that in evolutionary terms, it might be advantageous

to promote blood clotting when your blood is low in iron, in order to prevent further blood loss," Dr Shovlin said.

More information: J.A. Livesey et al. 'Low serum iron levels are associated with elevated plasma levels of coagulation factor VIII and pulmonary emboli/deep venous thromboses in replicate cohorts of patients with hereditary haemorrhagic telangiectasia.' *Thorax*, published online 15 December 2011. [doi:10.1136/thoraxjnl-2011-201076](https://doi.org/10.1136/thoraxjnl-2011-201076)

Provided by Imperial College London

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