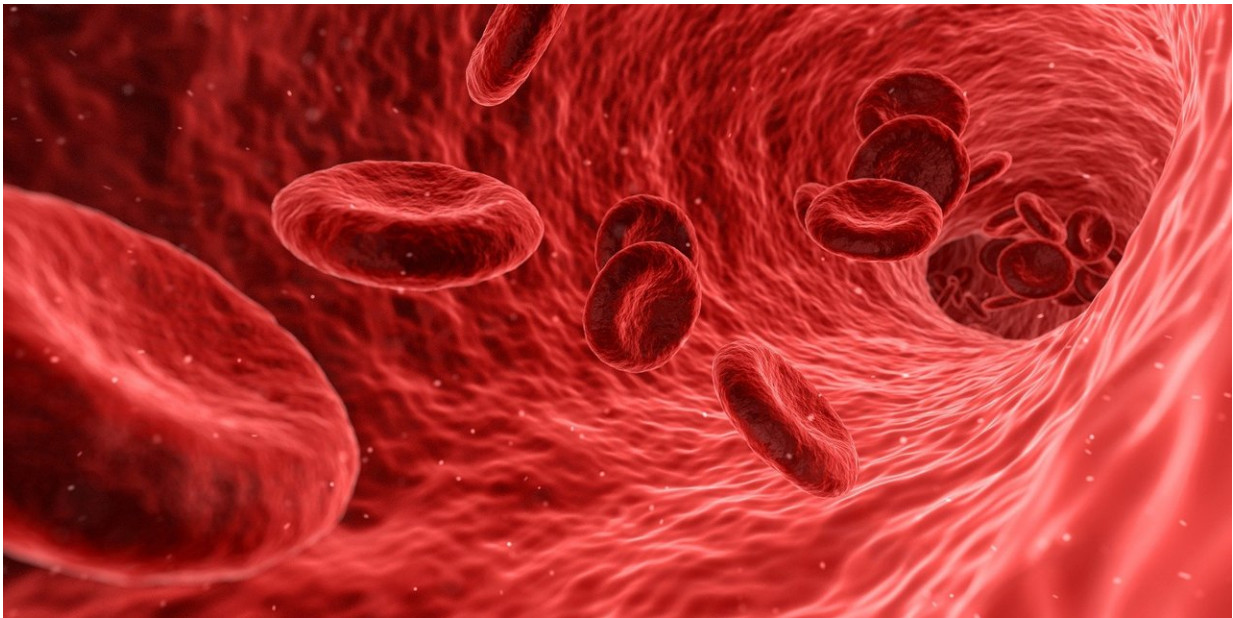


Anatomic compression of iliac vein major factor in pulmonary vascular disease

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Like highways, roads, and side streets, blood vessels in the human body come in different sizes, with a range of traffic-carrying capacities. These differences are critical to facilitating blood flow through tissues. But when it comes to blood clots—oversized vehicles on the blood cell highway—the risk of a traffic jam escalates with every turn into the increasingly narrow vessels supplying the heart and lungs. Eventually, large clots become stuck, holding up blood flow. When this happens in

the lungs, a potentially dangerous condition known as chronic thromboembolic pulmonary hypertension (CTEPH) develops.

In many cases, the clots that cause CTEPH come from veins in the lower half of the body, usually due to [deep vein thrombosis](#) (DVT). A risk factor for DVT is compression of the iliac vein in the pelvis, which can be caused by an anatomical variant known as May-Thurner anatomy (MTA). While MTA is generally thought to be rare, a new study by researchers at the Lewis Katz School of Medicine at Temple University shows that the anomaly is very common in patients with CTEPH—in a sample of 148 patients referred to Temple's CTEPH program since 2016, nearly 30 percent were found to have MTA.

"Very little has been known about the prevalence of MTA and its association with CTEPH," said Riyaz Bashir, MD, FACC, RVT, Professor of Medicine at the Lewis Katz School of Medicine and Director of Vascular and Endovascular Medicine at Temple University Hospital. "Now we know that it is actually quite common, and there are therapies that can improve treatment and quality of life for these patients."

Dr. Bashir and colleagues describe their findings in a report published online in the journal *JACC: Cardiovascular Interventions*.

Patients who are referred to Temple University Hospital for CTEPH evaluation typically undergo pulmonary angiography, an imaging test that determines how well blood is flowing through the lungs. But while the procedure is useful for locating and treating clots in the lungs, it does not provide information about how or where clots originated.

"There are many [risk factors](#) for CTEPH, but DVT is especially important, owing to its frequent involvement of large veins in the legs and pelvis," Dr. Bashir explained. "Compression of the iliac vein leading

to DVT can occur at different anatomical sites in the pelvis, including the anatomical location of MTA."

MTA specifically compresses the left common iliac vein at the site where the vein passes between the overlying iliac artery and the underlying fifth lumbar vertebra. Over time, vessel irritation from compression causes the vein to develop a blockage and this leads blood cell fragments to clump together, forming clots. Clots that arise as a result of MTA are a well-known cause of acute pulmonary embolism and possibly CTEPH.

"No one has really looked at MTA prevalence in CTEPH patients, even though MTA may have been a primary cause of this condition and can be treated very effectively," Dr. Bashir said.

Dr. Bashir and colleagues are in a unique position to investigate MTA in CTEPH patients, owing to Temple University Hospital's renowned Pulmonary Hypertension, Right Heart Failure, and CTEPH Program, which serves as a national referral center for CTEPH patients.

"Clinicians frequently will raise concern for hematologic clotting disorders as a potential cause for CTEPH but do not often consider anatomical and mechanical causes for venous thrombosis," explained Paul Forfia, MD, Professor of Medicine at the Lewis Katz School of Medicine and Co-Director of Temple's Pulmonary Hypertension, Right Heart Failure, and CTEPH Program with Anjali Vaidya, MD, FACC, FASE, FACP. Dr. Vaidya, an Associate Professor of Medicine at the Lewis Katz School of Medicine, was a co-investigator on the new study.

The researchers examined imaging data from 148 patients who were referred to the program between January 2016 and June 2020 and who underwent invasive venography. Analysis of MTA features identified 44 of those patients as having the anatomical variant. History of lower extremity DVT was a key predictor of MTA.

"This work provides novel insight into both the diagnostic and the treatment approaches to CTEPH," Dr. Forfia said.

"Our hope now is that we can use existing screening methods for iliac vein compression and MTA to improve treatment for CTEPH patients and to identify patients who may be at risk of CTEPH, based on history of DVT and recurrent pulmonary embolism," Dr. Bashir added.

In future work, Dr. Bashir and colleagues plan to evaluate the role of other pelvic venous obstructions in CTEPH. "Given the importance of pelvic venous obstruction in DVT, we suspect that sites of iliac vein compression other than MTA are additional causes of CTEPH," Dr. Bashir said.

More information: Mohamad Al-Otaibi et al, May-Thurner Anatomy in Patients With Chronic Thromboembolic Pulmonary Hypertension, *JACC: Cardiovascular Interventions* (2021). [DOI: 10.1016/j.jcin.2021.06.042](https://doi.org/10.1016/j.jcin.2021.06.042)

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