New guidance on potentially fatal blood clots published today

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The European Society of Cardiology (ESC) Guidelines on acute pulmonary embolism are published online today in *European Heart Journal*. They were developed in collaboration with the European Respiratory Society (ERS).

Acute pulmonary embolism is the third most common cause of cardiovascular death in Europe, after heart attack and stroke, contributing to more than 350,000 deaths each year. A blood clot (thrombus) in a deep vein, usually in the legs, is dislodged and travels to the lungs where it blocks one or more vessels. This typically occurs if the vein wall is damaged, blood flow is too slow, or the blood becomes too thick.

Major surgery such as knee or hip replacement, serious injury, prolonged bed rest and cancer are common risk factors for acute pulmonary embolism. It can also happen after long travel and in women who are pregnant or taking the oral contraceptive pill.

"Symptoms including shortness of breath and chest pain resemble other diseases so the diagnosis is often missed, or the severity of the situation is underestimated, and many patients die before getting appropriate therapy," said Professor Stavros Konstantinides, Chairperson of the guidelines Task Force and medical director, Centre for Thrombosis and Haemostasis, Johannes Gutenberg University Mainz, Germany.

The guidelines clarify how to diagnose acute pulmonary embolism step

by step. The process begins with clinical suspicion based on symptoms combined with blood tests (D-dimers). Depending on the severity and urgency of the scenario, a computed tomography (CT) scan may be used to visualise the lung vessels, or cardiac ultrasound to look at the heart chambers.

A new table shows how CT scans and lung scans compare in their ability to diagnose or exclude pulmonary embolism, and how much radiation the patient receives with each of these tests.

"The aim is to get to the diagnosis as reliably and quickly as possible, in order to start lifesaving therapy and prevent other clots from reaching the lungs," said Professor Guy Meyer, Co-Chairperson of the guidelines Task Force and respiratory medicine physician, Hôpital Européen Georges-Pompidou, Paris, France.

Anticoagulant drugs (blood thinners) help the body dissolve clots and reopen the blocked vessels. If the patient is in shock and about to collapse, the clot must be removed immediately, and this can be achieved using thrombolytic drugs (clot busters), catheters, or surgery.

The guidelines recommend how to judge the severity of pulmonary embolism based on a combination of clinical, imaging and laboratory results. This will dictate whether blood thinners alone are sufficient or if clot busters, a catheter intervention, or surgical removal is necessary. There is new advice on how to distinguish, in the CT scan, fresh thrombi in the lungs from chronic obstructions due to a disease called chronic thromboembolic pulmonary hypertension (CTEPH), which requires a different type of therapy.

Also new is the guidance on which drugs to use in a patient with pulmonary embolism and cancer. Patients with cancer have a high risk of recurrence, and indefinite anticoagulation is often necessary.

Acute pulmonary embolism is a leading cause of maternal death in high-income countries, but diagnosis can be challenging because symptoms often overlap with those of normal pregnancy. Novel recommendations outline how to diagnose and treat pulmonary embolism in the pregnant patient.

Updated instructions state when it is safe to send patients home from the hospital. Some have a lifelong increased risk of another event. Anticoagulants are used to treat the acute episode and prevent recurrence but raise the risk of bleeding. The guidelines describe how to decide the duration of treatment. They also specify when and how (with which tools and tests) to follow patients, and which findings suggest chronic disease (CTEPH) requiring diagnosis and treatment in an expert centre.

Last but not least, the 2019 ESC Guidelines endorse a multidisciplinary approach to pulmonary embolism after the acute phase and discharge of the patient. Teams should include physicians, appropriately qualified nurses, and other allied health professionals, aiming to ensure smooth transitions between hospital specialists and practitioners, optimised long term care and prevention of recurrence.

Advice for patients

- Be aware of conditions that predispose to acute pulmonary embolism.
- If you are at increased risk or have previously had pulmonary embolism or deep vein thrombosis, and are admitted to hospital for another disease, ask what is being done to prevent thrombosis.
- If you have one or more risk factors for pulmonary embolism and feel shortness of breath, chest discomfort or chest pain, lightheaded or faint, call a doctor or ambulance immediately. Lie down and do not move around. Do not walk or drive to the

hospital or physician's practice.

- If you had an acute pulmonary embolism and are on blood thinners, when you are discharged from hospital ask when you need to see a doctor again. At the follow-up visit, report any bleeding and whether you have returned to normal or still have symptoms such as shortness of breath.

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