# Understanding Venous Blood Clots

**VENOUS BLOOD CLOTS: FAST FACTS**

- Venous blood clots (also known as venous thromboembolism or VTE for short) originate in the venous system and can take the form of either:
  - A deep vein thrombosis (DVT) / a blood clot in a deep vein (usually in the leg) that partially or totally blocks the flow of blood;
  - A pulmonary embolism (PE) / a blood clot blocking a vessel in the lungs.
- People at risk of venous blood clots include healthy people undergoing major orthopedic surgery and patients hospitalized for an acute medical illness.
- Effective prevention and treatment of venous blood clots are a major global public health issue.

## a. What are venous blood clots?

Venous blood clots can either take the form of a DVT, a blood clot in a deep vein that partially or totally blocks the flow of blood; or a PE, a blood clot blocking a vessel in the lungs.

Venous blood clots are difficult to diagnose as up to half of patients have either no symptoms or no specific symptoms. Consequently, avoiding venous blood clots by preventative measures is the most economical and effective approach in current clinical practice.[1]

Patients with venous blood clots have a substantially increased long-term risk of subsequent arterial cardiovascular events, such as heart attack and stroke, according to research recently published in the Lancet. Compared to people who had never had a venous blood clot, heart attack risk rose by 60% and stroke risk increased by 119% for DVT patients in the first year after having a DVT.[2]

*Deep vein thrombosis (DVT)*

- Venous blood clots originate in deep veins, usually in the legs.
- Two thirds of people with symptomatic venous blood clots have DVT alone that does not progress to a PE (see below).[3]
- DVT symptoms include chronic pain and swelling in the legs. Even in the absence of PE, DVT may have serious consequences such as venous hypertension and ulceration, and an increased risk of clots recurring.

*Pulmonary embolism (PE)*

- A PE occurs when a DVT breaks loose and travels to the lungs. Here the blood clot may block the circulation, threatening sudden death or long-term damage to the lungs and other vital organs.

- One third of people with symptomatic venous blood clots have PE.[3]
- PE symptoms include acute shortness of breath, chest pain, and rapid heart rate; some people also cough blood.
- 10–25% of PEs are rapidly fatal – usually within 2 hours of the onset of symptoms.[4,5,6]
- PE can recur after the first event, and if it does, it is usually fatal.[7]
- 10% of all deaths in hospitals can be attributed to PE.[8]
- Almost all the hospital deaths resulting from PE are preventable.[8]

**b. How common are venous blood clots?**

- Venous blood clots are estimated to be the third most common cardiovascular disease after heart disease and stroke.[10]
- Each year about 1 in 1,000 people will experience a venous blood clot for the first time.[3]
- Every year, venous blood clots kill nearly 1 million people: around 300,000 people in the US[11] and 544,000 in Europe.[12]
- PE is a leading cause of in-hospital death.[13]

**c. Who is at risk for venous blood clots?**

- Healthy patients undergoing elective major orthopedic surgery, such as total knee or total hip replacement, are at risk of venous blood clots due to factors such as vascular damage and reduced mobility.[14] Such patients may not realize that they are at critical risk of developing a life-threatening blood clot.
- Venous blood clots occur in up to 50% of patients undergoing orthopedic surgery who do not receive preventative care.[15]
- Approximately 700,000 total hip replacement and total knee replacement procedures are performed annually in the US.[16]
    - With an ageing population, the number of hip and knee replacement surgeries is expected to rise in the US by 137% and 601%, respectively, by 2030.[17]
- Patients who are hospitalized for an acute medical illness associated with reduced mobility such as cancer, heart failure and severe respiratory disease are also at risk of venous blood clots.[18]
    - Up to 30% of general medical patients may develop DVT or PE.[19]
- The threat of a blood clot does not go away just because a patient leaves the hospital. A recent study showed that out of a total 1,897 subjects who experienced a venous blood clot:
    - 74% developed a venous blood clot in the outpatient setting.[19]
    - A substantial proportion of these outpatients had undergone surgery (23%) or hospitalization (37%) in the preceding three months.[19]
- Older people and pregnant women are also at risk for venous blood clots.
    - The incidence of venous blood clots rises exponentially with age:
        - At 15 years it is < 5 per 100,000 per year. [3]
        - Among people over 80 years it is 450–600 per 100,000 per year. [3]
    - The risk of venous blood clots increases 5–10 fold during pregnancy; venous blood clots are a leading cause of direct maternal deaths in the developed world.[20,21]

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