

Complications in Untreated Deep Venous Thrombosis

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ABSTRACT

Deep venous thrombosis (DVT) is the formation of a thrombus within the deep venous system, most commonly affecting the lower extremities but potentially occurring in other locations such as the pelvis or upper limbs. It constitutes a primary manifestation of venous thromboembolism (VTE) alongside pulmonary embolism (PE), which arises from thrombus migration to the pulmonary arteries. Clinical presentation ranges from limb swelling, pain, erythema, and warmth to asymptomatic cases, making diagnosis reliant on a combination of pretest probability assessment, D-dimer measurement, and confirmatory imaging, typically compression ultrasonography. Major risk factors include surgery, trauma, immobility, malignancy, and thrombophilia. Management is centered on anticoagulation, with direct oral anticoagulants favored for most patients, and advanced interventions reserved for select severe cases. Untreated DVT carries high morbidity and mortality due to complications such as PE, postthrombotic syndrome (PTS), recurrent VTE, sepsis, and, rarely, chronic thromboembolic pulmonary hypertension (CTEPH). Long-term consequences include chronic venous insufficiency, disability, impaired quality of life, and increased mortality risk. Early recognition and timely intervention are critical to reducing complications and improving outcomes.

ARTICLE DETAILS

Published On:
18 August 2025

Available on:
<https://ijmscrs.com>

INTRODUCTION

Deep venous thrombosis (DVT) is defined as the formation of a thrombus (blood clot) within the deep veins, most commonly of the lower extremities, including the calf, femoral, and iliac veins, but it can also occur in other deep venous systems such as the pelvis or upper extremities.[1-8] DVT is a principal manifestation of venous thromboembolism (VTE), which also includes pulmonary embolism (PE), the latter resulting from migration of a thrombus to the pulmonary arteries.[2][5-6][8]

Clinically, DVT may present with unilateral limb swelling, pain, erythema, and sometimes warmth, but symptoms are often nonspecific and may be absent, particularly in distal or asymptomatic cases.[4][7] The diagnosis relies on a combination of clinical pretest probability assessment (e.g., Wells score), D-dimer testing, and confirmatory imaging, most commonly compression ultrasonography.[4-5][7-8]

DVT is associated with significant morbidity and mortality, primarily due to the risk of PE and long-term complications such as postthrombotic syndrome, which manifests as chronic pain, swelling, and skin changes in the affected limb.[1][4][6-7] Major risk factors include recent surgery, trauma, immobility, active malignancy, inherited or acquired

thrombophilia, and certain chronic medical conditions.[4-5][7]

Management of DVT centers on anticoagulation to prevent thrombus propagation and embolization, with direct oral anticoagulants now preferred for most patients due to favorable efficacy and safety profiles.[1][5][7-8] In select cases with extensive iliofemoral DVT and severe symptoms, advanced interventions such as catheter-directed thrombolysis or thrombectomy may be considered.[2][4][7]

COMPLICATIONS IF UNTREATED

Untreated deep vein thrombosis (DVT) is associated with several potentially serious complications, both acute and chronic. The most immediate and life-threatening risk is pulmonary embolism (PE), which occurs when thrombus propagates proximally and embolizes to the pulmonary arteries. The medical literature indicates that PE can develop in 50–60% of patients with untreated DVT, with an associated mortality rate of 25–30%.[1] The risk is highest with proximal (above-knee) DVT, while isolated distal (calf) DVT carries a lower but non-negligible risk of propagation and PE (propagation rate ~9%, PE rate ~1.5%).[2-3]

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Chronic complications are also significant. Postthrombotic syndrome (PTS) develops in up to 30–50% of patients following DVT, even with anticoagulation, and is characterized by chronic pain, edema, hyperpigmentation, venous varicosities, and, in severe cases, venous ulceration and disability.[3–6] The pathophysiology involves persistent venous outflow obstruction, valvular incompetence, and venous hypertension, leading to chronic venous insufficiency.[4–5] The risk of PTS is higher with recurrent ipsilateral DVT and proximal DVT.[3][6]

Recurrent venous thromboembolism is another major concern, with cumulative incidence rates of 17.5% at 2 years and 30.3% at 8 years after a first episode of symptomatic DVT.[6] Recurrent events further increase the risk of PTS and mortality.[6]

Additional complications include an increased risk of sepsis, as demonstrated by population-based data showing a hazard ratio of 1.74 for sepsis in patients with DVT compared to those without.[7] Chronic thromboembolic pulmonary hypertension (CTEPH) is a rare but severe long-term complication following PE, associated with substantial morbidity.[5]

In summary, untreated DVT can result in pulmonary embolism, postthrombotic syndrome, recurrent VTE, sepsis, and, rarely, chronic thromboembolic pulmonary hypertension. These complications underscore the importance of prompt diagnosis and management of DVT to mitigate morbidity and mortality.[1–7]

The long-term effects of untreated deep vein thrombosis (DVT) are substantial and well-documented in the medical literature. The most significant chronic complication is postthrombotic syndrome (PTS), which develops in 20–50% of patients following DVT, with 5–10% experiencing severe forms that may include venous ulceration.[1–4] PTS is characterized by chronic pain, limb swelling, skin hyperpigmentation, venous varicosities, and, in severe cases, non-healing ulcers, all of which can lead to significant disability and impaired quality of life. The pathophysiology involves persistent venous outflow obstruction, valvular incompetence, and venous hypertension, often resulting from incomplete thrombus resolution and recurrent thrombosis.[1][4]

Recurrent venous thromboembolism (VTE) is another major long-term risk, with cumulative incidence rates of 16% at 2 years, 25% at 5 years, and up to 36% at 10 years after a first episode of unprovoked VTE, even in patients who have completed a course of anticoagulation.[5–6] Each recurrence further increases the risk of PTS and mortality. The case fatality rate for recurrent VTE is approximately 4%.[5]

Chronic thromboembolic pulmonary hypertension (CTEPH) is a rare but serious long-term complication, particularly following pulmonary embolism, and is associated with substantial morbidity.[2] Additionally, long-term mortality is increased in patients with a history of DVT, with a 30-year

mortality rate ratio of 1.55 compared to the general population, reflecting both direct and indirect consequences of VTE.[2][7]

CONCLUSION

Deep venous thrombosis (DVT) is a common and potentially life-threatening condition that represents a major component of venous thromboembolism. While its initial presentation can be subtle or asymptomatic, untreated DVT carries significant acute risks, most notably pulmonary embolism, and substantial long-term consequences such as postthrombotic syndrome, recurrent VTE, and, in rare cases, chronic thromboembolic pulmonary hypertension. These complications can lead to chronic pain, functional impairment, reduced quality of life, and increased mortality. Prompt recognition through clinical assessment and imaging, followed by timely initiation of appropriate anticoagulation or advanced interventions when indicated, is critical to preventing progression, reducing recurrence, and minimizing morbidity and mortality. Ultimately, effective prevention, diagnosis, and management of DVT are essential to improving both short- and long-term patient outcomes.

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