

## Deep Venous Thromboembolism in Gynecological Malignancies

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## 1. Summary

Deep venous thrombosis is a severe complication often following gynecological malignancy. It presents a main reason of post-operative complication, morbidity and mortality in these patients. It is crucial to know risk factors and to diagnose possible early manifestations of the disease in time [1]. DVT is the second leading cause of death in patients with gynecologic cancer and the risk of DVT in women underwent gynecologic surgery ranged from 17% to 40%, while the rate of pulmonary embolism (PE) was about 1% to 26% [2].

## 2. Introduction

The relationship between venous thrombosis and malignancies was first described by Trousseau in 1865. Since then it has been advocated by multiple clinical, pathologic, and laboratory studies [3]. According to Virchow, there is a triad of risk factors that contribute to venous thromboembolism: these include venous stasis, endothelial injury, and hyper-coagulable states [4]. Patients with cancer are vulnerable to thrombosis arising from hematologic and biochemical abnormalities. In addition, gynecologic malignancies are characterized by increased fibrinolytic activity. Therefore patients undergoing surgery, chemotherapy, or radiotherapy are at increased risks of developing thrombosis [5].

Deep venous thrombosis and its possible immediate consequence – pulmonary embolism with direct connection with malignancy – brings in a severe complication, which can be fatal. Risk of venous

thromboembolism (VTE) increases in patients with higher stage of breast carcinoma, pulmonary cancer, pancreatic cancer and epithelial carcinoma of ovary. Etiopathogenesis and pathophysiology of deep venous thrombosis is complicated and multi-factorial. Although there is better knowledge about this, it still represents a dominant medical problem [6].

## 3. Risk Factors of Deep Venous Thrombosis

- Age – incidence of VTE increases with age. Cancer patients older than 65 years have a greater likelihood of developing VTE compared with younger patients [7].
- Sex – retrospective studies show that females are at greater risk for VTE [8]. Male patients show greater risk for arterial thromboembolism.
- Race – in retrospective study there was a significant association with VTE in black patients [5,10], whites and Hispanic patients [4% and the lowest rate were observed in Asian/Pacific Islander patients (3,3%) [8,9].
- Comorbidities – studies have identified an association between medical comorbidities and an increased risk of cancer-associated thrombosis – such as renal failure, respiratory disease, heart disease, obesity, and acute infection [8].
- Immobility – plays a role in predisposing cancer patients to VTE, higher rates of VTE were observed in cancer patients with poor performance status or bed rest. It probably increases the chance of VTE through stasis of the venous blood flow [10].

- Previous History of VTE – patients with history of VTE have 6-7 increased risk of VTE recurrence
- Length of operation
- Chemotherapy
- Radiotherapy [11].

#### 4. Diagnostics

Diagnostics of DVT on clinical basis is unprecise and unreliable, but it has its unsubstitutable place in complex diagnostic approach. The most common clinical sign of DVT is edema, which occurs by increasing intravenous pressure because of the block in blood stream [12]. Another clinical sign is pain that gets worse by standing up or walking, there can be signs of higher temperature, color changes of the skin as a sign of acute infection or trophic changes [13].

In occurrence of clinical signs there is necessary to exactly proof the finding by other diagnostic methods as RTG, contrast phlebography, and laboratory test for D-dimers. Phlebography stays the most reliable and reference method. Phlebographic signs showing presence of thrombus are defects in venous filling, the missing section or unfulfilled venous bloodstream [2]. In clearly symptomatic patients there is use of simple approach, and that is quantitative laboratory testing for D-dimers in bloodstream. Specificity of this test is low, because it can be connected to other diseases with degradation of fibrine, also inflammatory and infectious diseases and malignant tumors. Negative result of D-dimers can predict with high certainty that there is no suspicion for acute venous thrombosis [14].

#### 5. Prophylaxis and Treatment

Prevention of deep venous thromboembolism is based on combination of pharmacological and mechanic measures whereby the basic place in these days have low molecular heparins. They are suggested to all patients before surgical treatment. In suspicion of DVT is necessary to start parenteral anticoagulatory treatment with heparin followed by laboratory and other diagnostic methods. If the diagnosis confirms deep venous thrombosis there is necessary to include peroral anticoagulation treatment on second of third day with Warfarin. Peroral anticoagulatory treatment should continue 3 months depending on the range of surgery and risk factors [15].

#### 6. Conclusion

It is such a potentially life-threatening condition that more than 90% of total patients with deep venous thrombosis of the lower extremities develop pulmonary embolism. Clinicians should consider the possibility of DVT in risk cases, which should be confirmed with imaging modalities such as CT phlebography.

#### 7. Discussion

Major surgeries, distant organ metastasis, advanced stages, lymphadectomy, and amount of intra-operative blood loss has a positive predictive value for the occurrence of DVT in gynecologic

cancers.

Approximately one third of post-operative causes of deep venous thromboembolism occurs in patients after being discharged from hospital. Supposedly it is because during hospitalization all the patients get prophylactic low molecular heparins and after discharge they don't take prophylaxis. Up to 75 of the cases are diagnosed after first post-operative week [13].

Also lymphocele is one of the most common post-operative complications in that it leads to the occurrence of VTE by venous compression. According to a review of the literature, VTE occurred after lymphadectomy at an estimated incidence of 0.8–25% [16]. A substantial amount of blood loss increases the risk of transfusion during peri-operative period, and transfusion has been shown to be associated with the post-operative occurrence of VTE in gynecological surgeries [17]. But the results cannot be generalized, because there are many retrospectively analyzed studies including either small number of patients in secondary medical institutions or large number of patients in big medical institutions. That is why the results can vary. Further multi-center studies with higher number of patients are therefore warranted to establish more precise results.

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