

# Characteristics of Patients with Deep Vein Thrombosis in RSUD Dr. Soetomo, Surabaya from 2019-2021

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## Abstract

**Background:** Deep Vein Thrombosis refers to a disease where abnormal blood clot is formed within a vein. It is one of the most common vascular diseases with unspecific symptoms and may complicate to pulmonary emboli and cause death. Hence, it is a disease with high morbidity and mortality.

**Objective:** This study aims to identify the characteristics of outpatients with DVT at RSUD Dr. Soetomo during 2019-2021.

**Material and Methods:** This study is a retrospective descriptive study using the total sampling technique to collect samples from patient medical records diagnosed as DVT, which confirmed by ultrasonography examination at RSUD Dr. Soetomo during January 2019 - July 2021.

**Results:** This study discovered 24 outpatients with DVT at RSUD Dr. Soetomo during January 2019 - July 2021. DVT was found to affect more women than men. The most common age group for DVT is 46-55 years old. The most frequently found clinical manifestations were swelling. The vital signs examination results were within normal limits, with the exception of systolic blood pressure, which was found to be higher than normal. The CBC examination results were also within normal limits. DVT was most commonly found in the femoral vein. All of the patient received rivaroxaban as anticoagulant treatment.

**Conclusion:** This study discovered that DVT patients were mostly women and highly found in patients over the age of 40 years with the femoral vein being the most common location of DVT.

Keywords : Deep vein thrombosis, venous thromboembolism, clinical profile, characteristics.

## 1. INTRODUCTION

Venous thromboembolism (VTE), comprises of Deep Vein Thrombosis (DVT) and Pulmonary Embolism (PE), is one of the most commonly found vascular diseases where abnormal blood clot is formed within a vein (1)(2). The incidence of VTE is 1 per 1000 annually in adult populations and rises with age(3). DVT refers to abnormal blood clot formation in the deep venous system of the body(4). Thrombus in DVT is formed because of Virchow's triad consisting of blood vessel injury, reduced blood flow, and hypercoagulability(5). Any risk factor leads to the development of Virchow's triad may provoke thrombus formation. Risk factors of DVT can be divided into acquired and inherited. Among the acquired risk factors are surgery, trauma, immobilization, prior history of thromboembolism, malignancy, pregnancy, antiphospholipid antibody syndrome (APLS), medications (oral corticosteroids, oral contraceptive, hormone replacement therapy, tamoxifen), and chronic medical conditions such as hypertension, inflammatory bowel disease, and chronic kidney disease(6)(7).

Obesity and smoking are also associated with higher risk for DVTs (8)(9). Obesity increases the likelihood of developing DVT by 2-3 folds(3). Moreover, obesity is also a significant risk factor for diabetes mellitus, which is also a risk factor for DVT and other cardiovascular diseases (10). Inherited risk factors are associated with genetic abnormalities, which are referred to as thrombophilic disorders. Thrombophilic disorders are divided into loss-of-function disorders and gain-of-function disorders(11). More than 50% of DVT patients with inherited thrombophilic disorders are due to gain-of-function disorders such as factor V Leiden mutations and prothrombin gene mutations(6). Even though loss-of-function disorders (protein S, protein C, antithrombin III) are less common, they are still a potent risk factor for DVT(3).

DVT is most commonly found in the lower limb. However, DVT may also occur in the upper limb, visceral veins, and even the vena cava(11). The clinical manifestation of lower limb DVT usually presents with swelling, tenderness, redness, and the presence of collateral superficial veins. However, these manifestations are not typical and can mimic other conditions such as trauma, infection, and other vascular disease. DVT can be asymptomatic and only be detected when complications occur. One of concerning complications with high mortality is pulmonary embolism(12).

According to the National Institute of Health and Care Excellence (NICE) guidelines, the well's score, d-dimer test, and ultrasonography examination are used to diagnose DVT. Well's score is a clinical tool to predict DVT clinically. If DVT is suspected clinically, d-dimer test may be done and confirmed based on the presence of thrombus in the deep veins that is visible on ultrasonography examination(13). Early treatment of DVT aims to alleviate acute symptoms and potential complications(14). Anticoagulants are recommended by the American Society of Hematology for the early management of DVT in outpatient settings. The patient's condition determines the dosage and duration of treatment(15).

## 2. MATERIAL AND METHOD

This study is a retrospective study using a total sampling technique to collect data. The data was obtained from the electronic medical records of outpatients from January 2019 - July 2021 at RSUD Dr. Soetomo. The inclusion criteria were patients diagnosed with DVT, which were confirmed by ultrasonography examination. This study used Microsoft Excel 2016 to analyse the data statistically.

## 3. RESULTS

A total of 96 outpatients were suspected of having DVT in RSUD Dr. Soetomo during January 2019–July 2022 and only 24 patients were confirmed to have DVT by ultrasonography examination. Characteristics of the patients are summarized in table 1.

Out of 24 patients confirmed with DVT, 19 (79.2%) of the patients were women. Patients between the ages of 46–55 years were found to be the most common age group to experience DVT. The most frequently found clinical manifestations were swelling (61.7%) and tenderness (32.4%). The most common location of DVT was discovered to be the common femoral vein (55%), followed by the popliteal vein (27%). There were 21 patients with pharmacological therapy data. All of the patients (100%) received rivaroxaban as the treatment for DVT. Vital signs results were within the normal limit. However, the SBP was found to be slightly higher than normal. The CBC test result was also within the normal limit. The vital signs and CBC test result are summarized in table 2.

Table 1. Characteristics of DVT patients

Characteristics	Frequency	Percentage (%)
Sex		

Male	5	20,8
Female	19	79,2
Age		
<26	0	0
26-35	0	0
36-45	5	20,8
46-55	8	33,3
56-65	7	29,2
>65	4	16,7
Clinical manifestations		
Swelling	21	61.7
Tenderness	11	32.4
Redness	2	5.9
Collateral superficial veins (nonvarises)	0	0
DVT location		
Common femoral vein	22	55
Popliteal vein	11	27,5
Peroneal vein	2	5
Anterior tibial vein	2	5
Posterior tibial vein	3	7.5
Anticoagulants		
Unfractionated heparin	0	0
Dalteparin	0	0
Enoxaparin	0	0
Tinzaparin	0	0
Fondaparinux	0	0
Apixaban	0	0
Edoxaban	0	0
Rivaroxaban	21	100
Dabigatran	0	0
Warfarin	0	0

Table 2. Vital signs and CBC results

	Mean±SD	Median
Vital signs		
SBP (mmHg)	129.75 ± 18.42	123
DBP (mmHg)	83.21 ± 9.73	80
HR (/minutes)	92.42 ± 15.39	87
RR(/minutes)	18.58 ± 1.47	19
Temperature (°C)	18.58 ± 1.47	36
CBC results		
HCT (%)	37,51 ± 6,88	37,90
Hb (g/dL)	12,1 ± 2,33	12,2
RBC (10 <sup>6</sup> /μL)	4,36 ± 0,86	4,53
WBC (10 <sup>3</sup> /μL)	8,88 ± 2,83	8,46

PLT ( $10^3/\mu\text{L}$ )	389,95 $\pm$ 226,38	340
MCHC (g/dL)	32,23 $\pm$ 1,77	32,5
MPV (fL)	9,26 $\pm$ 0,83	9,1

#### 4. DISCUSSION

Deep Vein Thrombosis is one of the major vascular diseases in the world. The incidence of DVT is 1 per 1000 annually and is rising with age. The thrombus in DVT not only disables the patient, but it may also progress into pulmonary emboli that can lead to death. Hence, it is a disease with high morbidity and mortality (3).

In this study, women were found to have a higher incidence of DVT compared to men. A previous study in 2020 also showed the incidence of DVT was slightly higher in women than in men(16). Women have a greater risk of developing DVT than men. Several risk factors that may contribute to the development of DVT in women are pregnancy, hormone replacement therapy, antiphospholipid antibody syndrome, menopause, and oral contraceptives (OCPs)(17).

DVT is an age-related disease. The likelihood of developing DVT begins to increase in the fourth decade of life, which was seen in this study. A previous study in 2018 also showed that DVT is frequently found in people aged over 40 years(18). Changes in the venous wall and valves play a role in this case. Venous valves begin to thicken gradually with age due to an increase in the number of collagen fiber bundles(19). The thickening of the valves results in blood stasis. Furthermore, older age is also associated with enhanced platelet activity and an elevated inflammatory state that may contribute to thrombus formation(20).

The most common clinical manifestations observed in this study were swelling and tenderness. These manifestations are also frequently found in previous studies in 2018 and 2021(21)(22). Those manifestations can be associated with the thrombus location. Thrombus in the proximal veins of the lower limb typically results in swelling more often than in distal veins. The proximal veins consist of a single iliac, femoral, and popliteal vein for each leg, while the distal veins consist of paired veins. It makes the occlusion of the proximal vein obstruct the entire deep venous outflow due to no alternative vascularization. Tenderness is also frequently found as a result of inflammatory reactions from the venous wall around the thrombus. Distal smaller veins may be more perceptible to tenderness than proximal larger veins(22).

In this study, proximal veins (femoral vein and popliteal vein) were found to have thrombus more frequently than the distal veins (peroneal veins, anterior tibial vein, and posterior tibial vein) in this study. Previous studies in 2014 and 2018 also reported similar results, which showed that proximal veins DVT are more frequently found than distal DVT(23). The thrombus location might have an association with the etiology of the DVT. Proximal DVT is associated with the history of surgery, malignancy, and recurrent DVT. Distal DVT is associated with post-operative cases, obesity, traumatic DVT, and thrombophilic disorders(24).

The anticoagulant which was given to the patient in this study was rivaroxaban. Rivaroxaban is one of DOACs that acts as a factor Xa inhibitor. A previous study in 2021 showed that factor Xa inhibitors are effective for the management of VTE(25). ASH also recommends the use of DOACs for VTE in outpatient settings(15).

#### 5. CONCLUSION

Based on this study, the incidence of deep vein thrombosis was found higher in woman than man. It mostly affected patient over the age of 40 years. Swelling and tenderness were the most complained symptoms. Proximal DVT was more commonly encountered than distal DVT with femoral vein as the most frequent site of thrombus location.

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