Vol. 4 No. 4 (2025)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

DEEP VEIN THROMBOSIS AFTER MAJOR ORTHOPEDIC SURGERY IN HOSPITALS OF LAHORE: A CROSS - SECTIONAL STUDY

Muhammad Kamran Azam[1]

[*1]*Superior University, Department of Emerging Allied Health Technologies Kot Arian, Raiwind Road, Lahore*

Hira Chishti[*2]

[*2]*Superior University, Department of Emerging Allied Health Technologies Kot Arian, Raiwind Road, Lahore*

[*2]*hirachishti24@gmail.com*

Rubama Javed[3]

[3]*Superior University, Department of Emerging Allied Health Technologies Kot Arian, Raiwind Road, Lahore*

Muhammad Awais[4]

[4]*Superior University, Department of Emerging Allied Health Technologies Kot Arian, Raiwind Road, Lahore*

Ubaid Jalal[5]

[5]*Superior University, Department of Emerging Allied Health Technologies Kot Arian, Raiwind Road, Lahore*

Muzammil Abbas[6]

[6]*Superior University, Department of Emerging Allied Health Technologies Kot Arian, Raiwind Road, Lahore*

Author Details

Keywords:

Received on 11 October , 2025

Accepted on 23 November , 2025

Published on 25 December , 2025

Corresponding E-mails & Authors*:

Hira Chishti

Superior University, Department of Emerging Allied Health Technologies Kot Arian, Raiwind Road, Lahore

Abstract

Deep vein thrombosis (DVT), a form of venous thromboembolism, is one of the most frequent complications occurring within 7 to 14 days after orthopedic procedures, especially total joint replacements. Without appropriate preventive therapy, the likelihood of developing DVT or pulmonary embolism following such surgeries can be as high as 60%.

Methodology:

This was a cross-sectional study conducted in selected hospitals in Lahore. A total of 51 patients, who underwent major orthopedic surgery (e.g. ORIF or arthroplasty), were included. Results: A total of 51 postoperative orthopedic patients were assessed for deep vein thrombosis (DVT). The most common symptoms were leg pain (23.8%), swelling (15%), warmth (12.5%), and tenderness (11.3%). Among the examined factors, blood loss ($p=0.03$) and cemented prosthesis ($p=0.02$) showed a statistically significant association with DVT symptoms. Other factors such as smoking, weight, tourniquet use, and surgery duration showed no significant relationship ($p>0.05$). Overall, the study identified blood loss and cemented prosthesis as key predictors of postoperative DVT in this patient population.

Conclusion:

These observations suggest that regular post-operative monitoring, early initiation of preventive measures, and patient education about the risks of this disease may play an important role in reducing the risk of DVT.

Pakistan Journal of Medical & Cardiological Review
https://pakjmcr.com/index.php/1/about
Online ISSN 3007-2387
Print ISSN 3007-2379

INTRODUCTION

Deep vein thrombosis (DVT), a form of venous thromboembolism, is one of the most frequent complications occurring within 7 to 14 days after orthopedic procedures, especially total joint replacements. Without appropriate preventive therapy, the likelihood of developing DVT or pulmonary embolism following such surgeries can be as high as 60%. (1). Among the factors affecting development of DVT are venous stasis, endothelial damage and hypercoagulability, known as Virchow triad. If undetected and untreated earlier, it may result in severe morbidity and mortality. (2) Bivariate analyses identified the following predictive risk factors: general anesthesia, postoperative non-weightbearing immobilization longer than two weeks, use of anticoagulation, anatomic location of surgery, duration of procedure (60 minutes or more), history of VTE, history of trauma, use of hormonal replacement or oral contraceptive therapy, and obesity (3).

Hip fractures are the most common kind among the elderly. One of the most frequent and potentially fatal side effects after hip surgery is deep vein thrombosis, which appears as a clot of blood in the deep veins, typically in the lower limbs. DVT can be classified as either distal or proximal. DVT of the distal portion of the leg is described as a clot affecting the axial calf veins, while DVT of the proximal section of the limbs is referred to as clotting at the popliteal vein level or above (4).

For the best results, following the recommended criteria for VTE prophylaxis is crucial. Compliance is still a problem, though, for a number of reasons. Due to their higher risk of bleeding issues, patients with cardiac comorbidities may refuse anticoagulant treatments or even lose interest in continuing to take them. Additionally, it might be difficult to strike a balance during therapy between preventing thrombosis and bleeding risk, particularly in older patients with concomitant chronic conditions. Physical limitations such as the availability of compression devices or the patient's incapacity to learn enough about the most effective drug usage procedures are other perceived obstacles that have an impact on the degree of compliance (5). It is commonly accepted that venous stasis, vascular endothelial damage, and blood hypercoagulability are pathogenic factors associated with DVT in the lower limbs. Numerous systemic injuries, advanced age, immobilization, post-injury systemic inflammatory response, and improper use of prophylactic and major orthopedic trauma (spinal injury, pelvic and hip fracture, etc.) are risk factors for the development of DVT in trauma settings (6).

Patients between the ages of 61 and 70 are more likely than other patients to have DVT, and obesity (BMI > 25 kg/m2) and advancing age (>40 years) are recognized as statistically significant risk factors for DVT following THA or TKA. In order to provide timely treatment and prevent fatal pulmonary thromboembolism, we should pay closer attention to obese and elderly patients undergoing total joint replacement (7). We should also provide them with adequate prophylactic care and closely monitor the symptoms in both lower extremities following the procedure, using venography or ultrasonography to check for DVT if needed (8).

Internal fixation surgery was frequently used to treat patients with intertrochanteric fractures. However, because of the features of this population, the prevalence of perioperative complications is still significant. Venous stasis is the outcome of immobilization following an intertrochanteric

fracture (9). In addition, endothelial damage and hypercoagulability are common in individuals with orthopedic trauma. These people are at risk for deep vein thrombosis (DVT) since all three components make up the Virchow Triad. Chronic venous insufficiency, post thrombotic syndrome, and potentially fatal pulmonary embolism are all consequences of DVT that are linked to longer hospital stays, higher medical costs, dissatisfied patients, morbidity, and death (10). DVT develops in orthopedic patients for a variety of reasons. Among these are characteristics unique to each patient, such as old age, obesity, a history of VTE, cancer, heart failure, or diabetes (11).

Deep vein thrombosis (DVT) is a serious problem because it is quite common and can sometimes lead to life-threatening complications (12). It is necessary to adopt methods such as mechanical devices or medications to prevent it. Properly assessing the risks for each patient and planning prevention based on this not only reduces the burden on the health system but also improves patient (13). Although there is a lot of research on the status of DVT worldwide, trends may vary in different regions. Studies have shown that the rate of DVT after major orthopedic surgery is higher in Asian populations than in Western countries (14). In particular, a study conducted in Taiwan found that patients who were not given preventive medication had a higher rate of DVT. These findings highlight the importance of understanding regional risks and adopting preventive measures accordingly (15).

Procedure-specific risk factors also play a significant role in the development of deep vein thrombosis (DVT). There is a significant difference in the risk of DVT between different types of surgery. For example, knee replacement surgery is more likely to cause DVT than other operations. Similarly, prolonged surgery, especially when the surgery lasts more than two hours, is considered an important risk factor(16). Metaphyseal trauma to the lower extremities can also independently increase the risk of DVT during major orthopedic surgery. Furthermore, the risk may vary depending on the type and location of the surgery, such as hip arthroscopy or foot and ankle surgery (17). If a patient already has DVT, even if it was not diagnosed before surgery, the risk of developing new blood clots after surgery is increased. Similarly, if a preoperative ultrasound shows soleal vein dilation, this is also considered an important predictor of DVT risk, indicating that local venous abnormalities may also increase the likelihood of the disease (18).

The incidence of deep vein thrombosis (DVT) varies by geographic region and type of surgery. A national registry study conducted in South Korea found that the annual incidence of DVT was found to be at different levels after major lower limb orthopedic surgeries, such as hip arthroplasty, knee arthroplasty, and hip fracture surgery. Similarly, studies conducted in Vietnam also examined the frequency of lower limb DVT and its risk factors after major orthopedic operations (19).

Material and Methods:

This was a cross-sectional study, in which data were collected from patients who came to the hospital at a specific time. Data were collected from public and private hospitals where major orthopedic surgeries were performed. Data were collected through a structured questionnaire/performa, which included socio-demographic information of the patients, medical history, details of the operation and symptoms related to DVT. Data were analyzed using SPSS.

Results:

A total of 51 postoperative orthopedic patients were assessed for deep vein thrombosis (DVT). The most common symptoms were leg pain (23.8%), swelling (15%), warmth (12.5%), and tenderness (11.3%). Among the examined factors, blood loss (p=0.03) and cemented prosthesis (p=0.02) showed a statistically significant association with DVT symptoms. Other factors such as smoking, weight, tourniquet use, and surgery duration showed no significant relationship (p>0.05). Overall, the study identified blood loss and cemented prosthesis as key predictors of postoperative DVT in this patient population.

Have you undergone major orthopedic surgery recently?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	51	100.0	100.0	100.0

All 51 participants (100%) reported that they had undergone major orthopedic surgery.
This indicates that every individual included in the study met the primary inclusion criterion.
There were no non-surgical or minor-surgery cases, ensuring that the sample is fully representative of patients exposed to major orthopedic procedures and suitable for assessing postoperative risks such as DVT.

If yes, specify the type:				
	Frequency	Percent	Valid Percent	Cumulative Percent
Total Hip Replacement (THR)	17	33.3	33.3	33.3
Total Knee Replacement(TKR)	15	29.4	29.4	62.7
Open Reduction and Internal Fixation(ORIF)	11	21.6	21.6	84.3
Other	8	15.7	15.7	100.0
Total	51	100.0	100.0	

Among the participants who had undergone surgery, the most common procedure was **Total Hip Replacement (THR)**, accounting for **33.3**% of all reported surgeries. This was followed by **Total Knee Replacement (TKR)** at **29.4**%, and **Open Reduction and Internal Fixation (ORIF)** at **21.6**%. A smaller proportion **(15.7**%) reported undergoing other types of orthopedic procedures. Overall, a total of **51 individuals** reported previous surgical history. This indicates that **joint replacement surgeries (THR + TKR)** make up the majority of cases, showing a high prevalence of degenerative or traumatic joint conditions among the study participants.

Did you experience any of the following symptoms after surgery?				
	Frequency	Percent	Valid Percent	Cumulative Percent
Leg pain	7	13.7	13.7	13.7
Skin discoloration	19	37.3	37.3	51.0
Swelling in the leg , skin discoloration	25	49.0	49.0	100.0
Total	51	100.0	100.0	

The data on symptoms after surgery suggests that not every patient's experience was the same. Fewer people complained about leg pain alone, and this problem was seen in about 14% of people. In contrast, changes in skin color were more common, mentioned by 37% of participants. The highest number were those who experienced both swelling and discoloration of the leg, and this rate was about 49%. This suggests that discoloration and swelling were the most commonly reported symptoms after surgery, while pain alone was relatively rare.

Pie Graph 1 Response of Symptoms:

14% of people. In contrast, changes in skin color were more common, mentioned by 37% of participants. The highest number were those who experienced both swelling and discoloration of the leg, and this rate was about 49%. This suggests that discoloration and swelling were the most commonly reported symptoms after surgery, while pain alone was relatively rare.

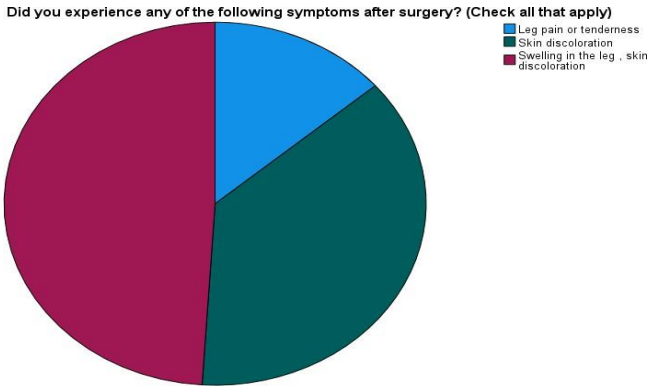

Table Response of Life style

Do you have a sedentary lifestyle (less physical activity/movement)?				
	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Yes	12	23.5	23.5	23.5
	No	39	76.5	76.5	100.0
	Total	51	100.0	100.0	

The data show that most participants did not have a sedentary or low-physical activity lifestyle. Only 23.5% of people reported that their lifestyle was relatively sedentary, while a clear majority, 76.5%, said that they were generally active and included a fair amount of movement in their daily activities.

Pie Grpah: Response of Life Style

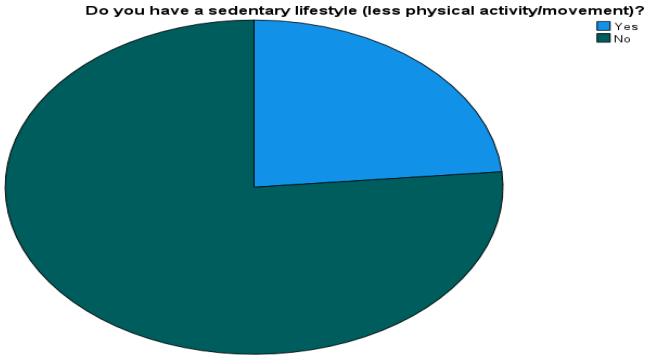

Table Best-rest After Orthopedic Surgery

How long were you on bed rest after surgery?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Vali d	3-7 days	19	37.3	37.3	37.3
	Less than 3 days	10	19.6	19.6	56.9
	More than 7 days	22	43.1	43.1	100.0
	Total	51	100.0	100.0	

The answers to how many days people spent in bed after surgery varied widely. Some people, about 43%, stayed in bed for more than a week because they probably took longer to recover. Next came those who rested for 3 to 7 days, about 37%. The remaining 19% said they only had to stay in bed for less than three days and were able to return to their activities quickly. This suggests that each patient's condition was different, so the length of rest was not the same for everyone.

Table: Response of use of Tourniquet

Use of tourniquet (for TKR)?				
	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Yes	43	84.3	84.3	84.3
	No	8	15.7	15.7	100.0
	Total	51	100.0	100.0	

A tourniquet was used in most of the patients' cases. According to the data, about 84% of the participants reported that a tourniquet was used during their TKR surgery, while only 15% said that it was not. This suggests that most surgeons who perform the surgery generally adopt this method, and in very few cases the operation was performed without a tourniquet.

Table 5.6 Response of Preventive measures taken and Types of preventive methods used:

Use of cemented prosthesis (THR/TKR)?					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	32	62.7	62.7	62.7
	No	19	37.3	37.3	100.0
	Total	51	100.0	100.0	

Cemented prosthesis was used in most patients. According to the data, about 63% of the participants underwent surgery with a cemented prosthesis, while 37% did not. This suggests that surgeons prefer cemented prosthesis in most cases, but in some cases, the procedure was also performed without cement.

Pie Grpah : Response of Cemented Prosthesis

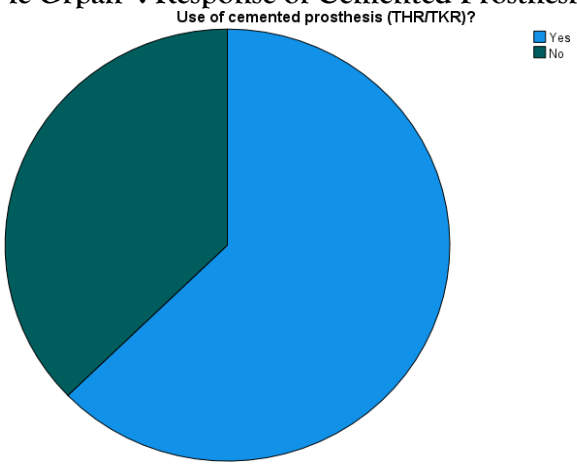

Table :Response of Duration of Surgery

Duration of surgery (minutes):

		equenc y	Percent	Valid Percent	Cumulative Percent
Vali d	90-150 minutes	15	29.4	29.4	29.4
	151-210 minutes	27	52.9	52.9	82.4
	More than 210 minutes	9	17.6	17.6	100.0
	Total	51	100.0	100.0	

here was considerable variation in the duration of surgery. According to the data, about 53% of surgeries lasted between 151 and 210 minutes, which was the most common duration. About 29% of surgeries were completed in 90 to 150 minutes, while in 18% of cases the surgery lasted more than 210 minutes. This shows that most operations were of medium duration, but in some cases the surgery took longer.

Table: Response of intra-operative Blood loss

Estimated intra-operative blood loss (mL):					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<500 mL	11	21.6	21.6	21.6
	500-1000 mL	40	78.4	78.4	100.0
	Total	51	100.0	100.0	

Intraoperative blood loss was moderate in most cases. Approximately 78% of patients had blood loss between 500 and 1000 ml, while only 22% had blood loss less than 500 ml. This indicates that most patients had moderate blood loss during surgery and there were fewer cases of more severe or minor bleeding.

Vol. 4 No. 4 (2025)

Pakistan Journal of Medical & Cardiological Review

https://pakjmcr.com/index.php/1/about

Online ISSN 3007-2387

Print ISSN 3007-2379

Pie Grpah : Response of blood loss

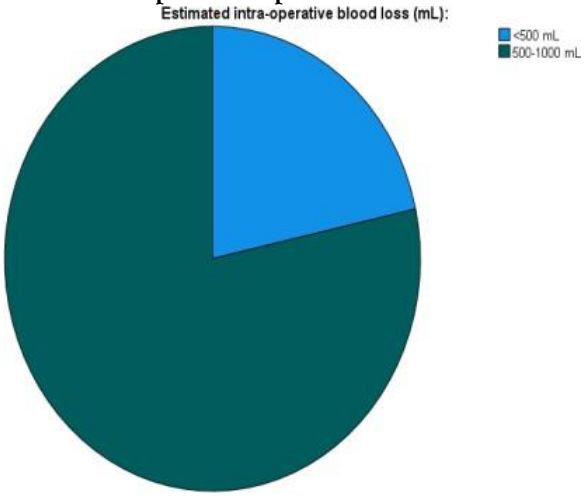

Table : Correlation between Risk Factors and DVT

	Smoking	Weight	Bed Rest	Tourniquet	Blood Loss	Cemented Prothesis	Duration Surgery
Coefficient	1	1	1	1	1	1	1
Sig. (2-taile	0.606	0.467	0.657	0.0767	0.03	0.02	0.307
N	51	51	51	51	51	51	51

The correlation analysis evaluated the relationship between postoperative complications and various clinical variables. Smoking, weight, bed rest, and duration of surgery showed no statistically significant association with complications ($p > 0.05$). Although tourniquet use approached significance ($p = 0.0767$), it did not meet the threshold for statistical significance. However, blood loss ($p = 0.03$) and cemented prosthesis ($p = 0.02$) demonstrated statistically significant correlations, indicating that higher blood loss and the use of cemented prosthesis were meaningfully associated with postoperative outcomes in this sample. All variables were analyzed with $N = 51$.

DISCUSSION

The correlation analysis demonstrated that smoking status, patient weight, bed rest duration, and duration of surgery did not exhibit any statistically significant association with postoperative outcomes, indicating that these patient-related variables did not meaningfully influence the results in this sample. Although tourniquet application showed a borderline p-value ($p = 0.0767$), it did not reach the level of statistical significance. In contrast, blood loss ($p = 0.03$) and the use of a cemented prosthesis ($p = 0.02$) were found to have significant correlations with postoperative outcomes, suggesting that these intraoperative factors may play an important role in determining postoperative risk.

Pakistan Journal of Medical & Cardiological Review
https://pakjmcr.com/index.php/1/about
Online ISSN 3007-2387
Print ISSN 3007-2379

Previous studies have reported rates of DVT after orthopedic surgery of 24–45% in asymptomatic cases and approximately 0.5–4% in symptomatic cases. For example, in a national survey of South Korea, the rate of symptomatic DVT was 0.15% in hip replacement and 0.22% in knee replacement (20). Another study found that the rate of asymptomatic DVT in major orthopedic surgeries was approximately 24.8%, and this rate reached a particularly high 37.2% in cases of metaphyseal trauma (21). While in our data DVT's symptomatic symptoms were observed in 30–27% of participants, this high prevalence of symptoms suggests that symptom-based diagnosis without Doppler or imaging may be sensitive.

According to the data, most participants were aged 41–50 years and were male. However, in a large Korean study, the relative risk was fivefold higher in older patients (50–69) and tenfold higher in those >70 years, and the risk was relatively higher in women (22).

Age >40, comorbidities such as heart/lung disease, cancer, obesity, prior DVT history are important risk factors (23). Hypertension (60%) and diabetes (18%) were very common in our study. These findings are consistent with Virchow's triad: chronic disease, immobility, and endothelial dysfunction increase the risk of DVT (24).

Conclusion

Overall, the correlation results showed that the impact of different demographic and clinical factors on DVT-related aspects was not uniform. Some factors—such as weight category, duration of surgery, tourniquet use, and blood loss—showed some significant and significant relationships, while most factors did not show any strong or meaningful relationship with DVT risk indicators. The correlation analysis demonstrated that smoking status, patient weight, bed rest duration, and duration of surgery did not exhibit any statistically significant association with postoperative outcomes, indicating that these patient-related variables did not meaningfully influence the results in this sample. Although tourniquet application showed a borderline p-value ($p = 0.0767$), it did not reach the level of statistical significance. In contrast, blood loss ($p = 0.03$) and the use of a cemented prosthesis ($p = 0.02$) were found to have significant correlations with postoperative outcomes, suggesting that these intraoperative factors may play an important role in determining postoperative risk. Overall, the findings imply that operative characteristics had a greater impact on postoperative outcomes than general patient attributes in this study population ($N = 51$).

REFERENCES:

Wells PS, Owen C, Doucette S, Fergusson D, Tran H. Does this patient have deep vein thrombosis?. Jama. 2006 Jan 11;295(2):199-207.

Scarvelis D, Wells PS. Diagnosis and treatment of deep-vein thrombosis. Cmaj. 2006 Oct 24;175(9):1087-92.

Stubbs MJ, Mouyis M, Thomas M. Deep vein thrombosis. Bmj. 2018 Feb 22;360.

Ramzi DW, Leeper KV. DVT and pulmonary embolism: Part I. Diagnosis. American Family Physician. 2004 Jun 15;69(12):2829-36.

Agnelli G, Becattini C. Treatment of DVT: how long is enough and how do you predict recurrence. Journal of thrombosis and thrombolysis. 2008 Feb;25(1):37-44.

Kesieme E, Kesieme C, Jebbin N, Irekpita E, Dongo A. Deep vein thrombosis: a clinical review. Journal of blood medicine. 2011 Apr 29:59- 69.

Lensing AW, Prandoni P, Prins MH, Büller HR. Deep-vein thrombosis. The Lancet. 1999 Feb 6;353(9151):479-85.

Kyrle PA, Eichinger S. Deep vein thrombosis. The Lancet. 2005 Mar 26;365(9465):1163-74.

Bates SM, Jaeschke R, Stevens SM, Goodacre S, Wells PS, Stevenson MD, Kearon C, Schunemann HJ, Crowther M, Pauker SG, Makdissi R. Diagnosis of DVT: antithrombotic therapy and prevention of thrombosis: American College of Chest Physicians evidence-based clinical practice guidelines. Chest. 2012 Feb 1;141(2):e351S-418S.

Schellong SM. Distal DVT: worth diagnosing? Yes. Journal of Thrombosis and Haemostasis. 2007 Jul 1;5:51-4.

Aquila AM. Deep venous thrombosis. Journal of Cardiovascular Nursing. 2001 Jul 1;15(4):25-44.

Duffett L. Deep venous thrombosis. Annals of internal medicine. 2022 Sep;175(9):ITC129-44.

Weinmann EE, Salzman EW. Deep-vein thrombosis. New England Journal of Medicine. 1994 Dec 15;331(24):1630-41.

Autar R. Nursing assessment of clients at risk of deep vein thrombosis (DVT): the Autar DVT scale. Journal of Advanced Nursing. 1996 Apr;23(4):763-70.

Anand SS, Wells PS, Hunt D, Brill-Edwards P, Cook D, Ginsberg JS. Does this patient have deep vein thrombosis?. Jama. 1998 Apr 8;279(14):1094-9.

Hirsh J, Lee AY. How we diagnose and treat deep vein thrombosis. Blood, The Journal of the American Society of Hematology. 2002 May 1;99(9):3102-10.

Ramzi DW, Leeper KV. DVT and pulmonary embolism: Part II. Treatment and prevention. American family physician. 2004 Jun 15;69(12):2841-8.

Morillo R, Jiménez D, Aibar MÁ, Mastroiacovo D, Wells PS, Sampériz Á, de Sousa MS, Muriel A, Yusen RD, Monreal M, Decousus H. DVT management and outcome trends, 2001 to 2014. Chest. 2016 Aug 1;150(2):374-83.

López JA, Kearon C, Lee AY. Deep venous thrombosis. ASH Education Program Book. 2004 Jan 1;2004(1):439-56.

Ouriel K, Green RM, Greenberg RK, Clair DG. The anatomy of deep venous thrombosis of the lower extremity. Journal of vascular surgery. 2000 May 1;31(5):895-900.

Kahn SR, Ginsberg JS. Relationship between deep venous thrombosis and the postthrombotic syndrome. Archives of internal medicine. 2004 Jan 12;164(1):17-26.

Segal JB, Eng J, Tamariz LJ, Bass EB. Review of the evidence on diagnosis of deep venous thrombosis and pulmonary embolism. The Annals of Family Medicine. 2007 Jan 1;5(1):63-73.

Bhatt M, Braun C, Patel P, Patel P, Begum H, Wiercioch W, Varghese J, Wooldridge D, Alturkmani HJ, Thomas M, Baig M. Diagnosis of deep vein thrombosis of the lower extremity: a systematic review and meta-analysis of test accuracy. Blood advances. 2020 Apr 14;4(7):1250-64.

Pakistan Journal of Medical & Cardiological Review
https://pakjmcr.com/index.php/1/about
Online ISSN 3007-2387
Print ISSN 3007-2379

Haut ER, Chang DC, Pierce CA, Colantuoni E, Efron DT, Haider AH, Cornwell III EE, Pronovost PJ. Predictors of posttraumatic deep vein thrombosis (DVT): hospital practice versus patient factors—an analysis of the National Trauma Data Bank (NTDB). Journal of Trauma and Acute Care Surgery. 2009 Apr 1;66(4):994-1001.