

# Prophylaxis against Deep Venous Thrombosis in Patients Hospitalized in Surgical Wards in One of the Hospitals in Iran: Based on the American College of Chest Physician's Protocol

## Abstract

**Background:** There is not enough studies to determine the frequency of using the prophylaxis against deep venous thrombosis (DVT) based on the American College of Chest Physician's (ACCP) guidelines in Iran. Thus, providing such statistics is essential to improve thromboprophylaxis in hospital. The present study aimed to determine the frequency of using the prophylaxis against DVT based on ACCP guidelines in patients hospitalized in surgical wards in one of teaching hospital in Ilam, Iran. **Methods:** In a cross-sectional, the samples were selected among medical records of patients who were hospitalized and underwent surgery in surgical wards of the hospital from April 2012 to September 2013. Type of prophylaxis was determined based on ACCP guidelines. After reviewing inclusion and exclusion criteria, patients' data were extracted from medical records based on required variables. **Results:** In reviewing 169 qualified samples, 46.2% (78 patients) were women. Of these, 132 patients were at risk of DVT and needed prophylaxis, only 39 patients (29.5%) received prophylaxis. Thromboprophylaxis based on ACCP guidelines had been fully implemented only in 30 cases (22.7%) of patients with the risk of DVT. The highest thromboprophylaxis was in the intensive care unit (46.6%) and neurosurgery (37.5%), and the least rate was in urology (0%). **Conclusions:** As the results of this study, there are differences between clinical practice and the ACCP guidelines recommendation in prophylaxis against DVT. Thromboprophylaxis has not been implemented based on ACCP guidelines in more than 75% of patients with the risk of DVT. Thus, new strategies are needed to implement thromboprophylaxis against DVT in Iranian hospitals.

**Keywords:** *Deep venous thrombosis, prophylaxis, thromboprophylaxis*

## Introduction

Venous thromboembolism (VTE) is a silent, killing, and curable disease that includes deep venous thrombosis (DVT) and pulmonary embolism (PE). It is one of the reasons for death caused by cardiovascular diseases.<sup>[1]</sup> A study has been reported annual incidence of DVT by about 130–395 cases in 1000 high-risk patients in Iran.<sup>[2]</sup> The most well-known risk factors of the DVT including aging, previous history of VTE, malignancy, trauma, obesity, pregnancy, varicose veins, superficial thrombophlebitis, hormones, venous catheterization and conditions that increases clotting risk.<sup>[3]</sup> Inactivity has been cited as a major cause of DVT in various studies.<sup>[4-6]</sup> VTE occurs 9 in 1000 hospitalized patients with a 9% mortality rate in Iran.<sup>[7]</sup> The average annual patients who are susceptible for DVT have been reported 5,288,272. The average annual prevalence of DVT is estimated

12.90 and 395.16 in 1000 cases among hospitalized patients in Iran.<sup>[1]</sup>

Common features of DVT include pain, swelling in calf and Homans' sign (calf pain at dorsiflexion of the foot).<sup>[8,9]</sup> However, DVT is often with no clinical sign that is likely because of lack of complete venous obstruction or side branches. Thus, unlike most other diseases, the history and physical examination are unreliable in the diagnosis.<sup>[10]</sup>

American College of Chest Physician's (ACCP) has issued guidelines for prevention of VTE since 1986. These guidelines have been presented for a particular group of medical and surgical patients who are at risk for VTE. It includes recommendations regarding the type (mechanical, pharmaceutical, or a combination), dose, and duration of thrombotic prophylaxis. The importance of using thromboprophylaxis for preventing

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VTE in hospitalized patients is accredited by the Joint Commission on Accreditation Healthcare Organizations and the National Quality Forum.<sup>[1,11]</sup>

Studies conducted in other countries have been shown that 25%–84% of hospitalized patients are at risk for VTE, and only 21%–59% of them receive thromboprophylaxis.<sup>[12-15]</sup>

There are few studies in this regard in Iran; therefore, it will be hard to determine the frequency of using the prophylaxis against DVT based on ACCP guidelines in Iran, and providing such statistics is essential to improve thromboprophylaxis in hospital. Thus, this study aimed to determine the frequency of using the prophylaxis against DVT based on ACCP guidelines (7<sup>th</sup> edition) in hospitalized patients in teaching hospital in Ilam from 2012 to 2013.

## Methods

### Design and participants

This is a cross-sectional study which approved by the Ethics Committee of Ilam University of Medical Sciences. The samples were selected among medical records of patients who were hospitalized and underwent surgery in the surgical wards of the Imam Khomeini teaching hospital from April 2012 to September 2013.

Imam Khomeini teaching hospital is one of the three hospitals affiliated to Ilam University of Medical Science. This hospital is located in Ilam. It was founded in 1935 and has pediatrics and surgical wards. This was the only teaching hospital in Ilam providence that has surgical wards. In this study, we divided the surgical ward to General Surgery, Orthopedics, Neurosurgery, Urology and Intensive care unit (ICU) according to the type of specialties involved.

Inclusion criteria consist of all patients who had a record in the hospital. Exclusion criteria include (1) confirmed or possible diagnosis of DVT, (2) length of hospitalization < 24 h, (3) taking anticoagulant due to past disease, (4) active bleeding, (5) hemorrhagic stroke, and (6) contraindications for receiving anticoagulant medications.

### Procedures and variables assessment

Patients' data were extracted based on variables including age, sex, ward, receiving, and not receiving prophylaxis and the type of prophylaxis from the medical records. In this study, the factors that increase the risk of developing DVT include age, previous history of VTE, malignancies, trauma, obesity, pregnancy, varicose veins, nephrotic syndrome, myeloproliferative disorders, inflammatory bowel disease, superficial thrombophlebitis, venous catheterization, cardiac or respiratory failure, taking medications that increase the risk of thrombosis and smoking.

The type, dose, and duration of thromboprophylaxis were defined based on the ACCP seventh conference protocol in

2003.<sup>[1]</sup> According to ACCP protocol, patients were divided into three groups of low, medium, and high risk.

The groups are defined as follows:

- Low-risk group
  - Minor surgery in patients under 40 years, with no risk factors.

Successful prevention strategies were without a specific prevention.

- Medium risk
  - Aged 40–60 years in patients without risk factors
  - Minor surgery in patients with risk factors.

Successful prevention strategies were low-molecular-weight heparin (LMWH)  $\leq 3,400$  U daily, graduated compression stockings (GCS), or intermittent pneumatic compression (IPCS).

- High risk
  - Major and minor surgery in patients with no risk factors, aged older than 60 years
  - Aged 40–60 years in patients with risk factors
  - Surgery in patients with multiple risk (age >40 years, cancer and previous VTE).

Successful prevention strategies were low-dose unfractionated heparin (q8 h), LMWH >3.400 U daily), GCS, or IPCS.

In reviewing of patients, all low-risk patients based on ACCP protocol had not been received prophylaxis.

### Statistic analysis

Categorical data were expressed as frequency and percentage. Data extracted from the medical records and analyzed using SPSS software (version 17 for Windows; SPSS Inc., Chicago, IL, USA). The Chi-square and Fisher's exact tests were used for measuring the relation between qualitative variables (sex and the need for prophylaxis) and independent *t*-test was used to measure the relationship between age and the need for prophylaxis.

## Results

Among 1650 available medical records, 230 samples were randomly selected. Sixty-one samples were excluded from the study based on exclusion criteria. From 169 remaining samples, 46.2% were women and mean age for all participants was  $43.63 \pm 19.40$ . Distribution of samples in terms of hospital wards was urology - 9.5%, orthopedics - 30.2%, general surgery - 46.7%, neurosurgery - 4.7%, and ICU - 8.9%. The distribution of the samples based on the risk groups was 21.9%, 42.6%, and 35.5% in low-, medium-, and high-risk groups, respectively.

In the present study, of all 132 patients with indications of prophylaxis, 39 patients (29.5%) received prophylaxis. Thromboprophylaxis based on ACCP guidelines was implemented only in 30 cases (22.7%) of patients with the

risk of DVT. The distribution of wards and prophylaxis modality according to patients with indication for prophylaxis are presented in Table 1.

The relationship between receiving prophylaxis and hospitalized ward was statistically significant ( $P < 0.001$ ). Receiving prophylaxis based on the ACCP protocol in different hospital wards are presented in Table 2.

About 82% and 57% of patients did not receive any prophylaxis in medium- and high-risk groups, respectively. Moreover, significant relationship was found between risk groups and receiving prophylaxis ( $P < 0.001$ ) [Table 3].

The distribution of patients' risk level in each ward of teaching hospital in Ilam has been presented in Table 4. It shows the highest distribution of patients with medium and high risk is in orthopedics, general surgery, and ICU.

**Table 1: The distribution of wards and prophylaxis modality based on the ACCP protocol according to patients with an indication for prophylaxis**

Variable	The patients with indication for prophylaxis			P
	Yes (%)	No (%)	Total (%)	
Wards				
Urology	12 (75)	4 (25)	16 (100)	0.034
Orthopedic	42 (82.4)	9 (17.6)	51 (100)	
General surgery	55 (69.6)	24 (30.4)	79 (100)	
Neurosurgery	8 (100)	0	8 (100)	
ICU	15 (100)	0	15 (100)	
Prophylaxis				
Complete	30 (100)	0	30 (100)	0.001
Incomplete	9 (100)	0	9 (100)	
No prophylaxis	93 (71.5)	37 (28.5)	130 (100)	
Total	132 (100)	37 (100)	169 (100)	

ICU=Intensive Care Unit; ACCP= American College of Chest Physicians

**Table 2: Receiving prophylaxis based on the ACCP protocol in different wards**

Ward's name	Nonprophylaxis (%)	Incomplete prophylaxis (%)	Complete prophylaxis (%)	Total (%)	P
Urology	16 (100)	0	0	16 (100)	<0.001
Orthopedic	33 (64.7)	4 (7.8)	14 (27.5)	51 (100)	
General surgery	71 (89.8)	2 (2.5)	6 (7.6)	79 (100)	
Neurosurgery	5 (62.5)	0	3 (37.5)	8 (100)	
ICU	5 (33.3)	3 (20)	7 (46.6)	15 (100)	
Total	130 (76.9)	9 (5.3)	30 (17.8)	169 (100)	

ICU=Intensive Care Unit; ACCP= American College of Chest Physicians

**Table 3: Receiving prophylaxis based on the American College of Chest Physicians protocol in different risk groups**

Risk groups	Nonprophylaxis (%)	Incomplete prophylaxis (%)	Complete prophylaxis (%)	Total (%)	P
Low risk	37 (100)	0	0	37 (100)	<0.001
Medium risk	59 (81.9)	3 (4.2)	10 (13.9)	72 (100)	
High risk	34 (56.7)	6 (10)	20 (33.3)	60 (100)	
Total	130 (76.9)	9 (5.3)	30 (17.8)	169 (100)	

A significant relationship was found between age and receiving prophylaxis ( $P = 0.009$ ). Hence, the need for prophylaxis increases with aging. However, there was no significant relationship between sex and need for receiving prophylaxis ( $P = 0.564$ ).

## Discussion

In the current study, of 132 patients who were at-risk for developing DVT, thromboprophylaxis was implemented only in 30 cases (22.7%) according to ACCP guidelines. Therefore, it can be concluded that efforts for prophylaxis of DVT in Iranian hospitals are inappropriate. This rate has been reported differently in other studies on surgical patients, including Amin in the USA (17.9%),<sup>[16]</sup> Pinjala in India (16.3%), França in Portugal (59%), and Musial in the Poland (54.7%), Hoseini Nasab in Tehran, Iran (13.7%), and Khavaninzadeh in Tehran, Iran (24.3%).<sup>[12-15,17,18]</sup> Thromboembolism has been called the most preventable cause of death.<sup>[19]</sup> The rationale for using prophylaxis is based on several principles: (1) the incidence of DVT is higher in patients who have had surgery, (2) no sign of progression of DVT, so that the first symptom can be sudden death caused by a PE, (3) the mortality rate from PE is higher in patients undergoing surgery following DVT, (4) the complications of thrombophlebitis are harmful. It makes patients prone to recurrent thrombosis and ultimately PE, (5) methods that diagnose thrombosis in the early stages are costly and time-consuming (Doppler sonography). In addition, this test is not sensitive and specific in the early stages of the developing thrombosis in the lower extremity veins. (6) Effectiveness of methods for preventing the VTE.<sup>[20,21]</sup>

Amin *et al.* reviewed more than 258,000 hospitalized patients in USA and the highest thromboprophylaxis rate had been reported in orthopedics (32%) and cardiology (18.3%).<sup>[16]</sup> This ratio is associated with orthopedics (65.4%) and surgical (56.5%) in the study of

**Table 4: The distribution of patients' risk level in each ward**

Ward's name	Low risk (%)	Medium risk (%)	High risk (%)	Total (%)	P
Urology	4 (25)	4 (25)	8 (50)	16 (100)	0.001
Orthopedic	9 (17.6)	25 (49)	17 (33.3)	51 (100)	
General surgery	24 (30.4)	37 (46.8)	18 (22.8)	79 (100)	
Neurosurgery	0	2 (25)	6 (75)	8 (100)	
ICU	0	4 (25)	11 (75)	15 (100)	
Total	37 (21.9)	72 (42.6)	60 (35.5)	169 (100)	

ICU=Intensive Care Unit

Khavaninzadeh *et al.* in Tehran.<sup>[18]</sup> In present study, the highest thromboprophylaxis was in the ICU (46.6%) and neurosurgery (37.5%), but it was generally low and the least rate was in Urology (0%). The possible cause can be fear of bleeding after surgery of urologists.

According to this study, there was a significant relationship between age and the need for prophylaxis. So that, prophylaxis rate increases with aging. Elderly is not only a separate risk factor for developing DVT but also increases other risk factors particularly cardiovascular disease. Khavaninzadeh *et al.* also obtained similar results.<sup>[18]</sup> There was not a significant relationship between sex and prophylaxis in this study. This could be because of the absence of women's ward in the hospital. In the study of Khavaninzadeh *et al.*, this relationship was statistically significant. It indicates that patients received the least prophylaxis in the women's ward.<sup>[18]</sup>

## Conclusions

As the results of this study, there are differences between clinical practice and the ACCP guidelines recommendation in prophylaxis against DVT. Thromboprophylaxis has not been implemented in more than 75% of at-risk patients based on ACCP guidelines. Therefore, new strategies such as more education, national conference, and quality improvement committees are needed for thromboprophylaxis against DVT in Iranian hospitals.

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## Conflicts of interest

There are no conflicts of interest.

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