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## Thromboprophylaxis Practice in Teaching Hospital Settings

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### ABSTRACT

**Background:** Venous thromboembolism (VTE) is known to be a major cause of morbidity and mortality among hospitalized patients. The American College of Chest Physicians (ACCP) published their seventh ACCP Conference on Antithrombotic and Thrombolytic Therapy in 2004, with recommendations for venous thromboembolism prophylaxis. Despite these recommendations, appropriate thromboprophylaxis is underused.

This study was performed to examine the frequency and adequacy of thromboprophylaxis in hospitalized patients in three primary-tertiary teaching hospitals in Urmia, Iran.

**Materials and Methods:** We carried out a cross-sectional prospective study on 436 patients hospitalized in three teaching hospitals in Urmia, Iran. Information was obtained from medical-nursing records and patient observation and was compared with the recommended guidelines of the ACCP. The appropriateness of diagnoses was not evaluated.

**Results:** Of 436 patients, 352 subjects required thromboprophylaxis and the total proportion of them who underwent some form of thromboprophylaxis was 16.7% with only 9.9% receiving ACCP recommended prophylaxis. Prophylaxis rate was: 29.7% in medical wards, 27.8% in ICU, 11.0% in surgical wards overall and 14.7% postoperatively. Low dose heparin was the most common type of prophylaxis.

**Conclusion:** Despite the widely disseminated, evidence-based recommendations, venous thromboembolism prophylaxis is underused in our hospitals. It is more commonly neglected in our hospitals than those in Western countries. We think that in most other developing countries, this condition is similar. Therefore, the consensus statements alone are insufficient to ensure the routine use of prophylactic strategies in clinical practice. In addition to the statements, other strategies are required to solve the problem. (*Tanaffos* 2006; 5(2): 21-26)

**Key words:** Thromboprophylaxis, Thromboembolism, Guidelines, Prevention

### INTRODUCTION

Venous thromboembolism (VTE) is known to be a major cause of morbidity and mortality among hospitalized patients (1). Pulmonary embolism (PE) is estimated to cause death in more than 100000

patients each year in the United States and may be a contributing factor in the death of another 100000 (2, 3). In the United States alone, approximately 250000 hospitalized patients will need therapy for symptomatic deep vein thrombosis (DVT) every year (4). Moreover, since VTE is most often clinically silent, the actual frequency of PE and DVT is probably much greater (2).

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Furthermore, several studies have shown the benefit of various prophylactic measures, and clinicians have faced the dilemma of identifying optimal therapy. It is clear; therefore, that in order to reduce the incidence of venous thromboembolism, prevent fatality, and minimize the recurrence and complications, hospitalized medical and surgical patients who are deemed to be at increased risk should undergo appropriate prophylaxis. The importance of improved recognition of at-risk patients, better risk stratification and avoidance of risk exposure where possible, cannot be overemphasized (1.5).

The 2004 conference on Antithrombotic therapy. Other similar guidelines are published by an international group (6).

Yet, despite these guidelines, European (7) and North American (8) surveys show persistent underused of prophylaxis.

Because information about the use of thromboprophylaxis in Iranian hospitalized patients is scarce in general and in our institution, we carried out a survey aiming at (I) establishing the proportion of patients given thromboprophylaxis in medical and surgical services; and (II) assessing the appropriateness of thromboprophylaxis according to ACCP recommendations.

## MATERIALS AND METHODS

This cross-sectional prospective study was performed at three teaching primary-tertiary care hospitals of Urmia city, and referral centers of West Azerbaijan province, Iran. Each patient's VTE prophylaxis was evaluated in keeping with the ACCP consensus group guidelines. Information was obtained from medical, nursing records and patient observation. The appropriateness of diagnoses was not evaluated. Physicians in charge of patients were not informed of the aims of the study in order to the avoid bias due to previous information.

### *Excluded patients:*

- 1) Patients <16 years old
- 2) Patients of the psychiatry, pediatric,

ophthalmology, and ENT wards

- 3) Patients with the hospitalization period less than 24 hours were not considered, since such a short period may not provide sufficient time for the medical teams to initiate prophylaxis.
- 4) Patients receiving anticoagulants prior to admission and those who were receiving anticoagulant therapy for diagnosed or suspected VTE or other conditions, were considered ineligible for the study.
- 5) Furthermore, any patient who had one of the stipulated contraindications to prophylaxis was excluded.

## RESULTS

Of the 436 patients who were fully assessed, 352 required thromboprophylaxis. The remaining fell into the secondary prophylaxis category, had a contraindication to prophylaxis or had no indication for prophylaxis and, hence, was excluded from the study.

Of 352 patients, the total proportion who underwent some form of thromboprophylaxis was 16.7% with only 9.9% receiving ACCP recommended prophylaxis. Prophylaxis rate was: 29.7% in medical wards, 27.8% in ICU, 11.0% in surgical wards overall and 14.7% postoperatively (Figure 1).

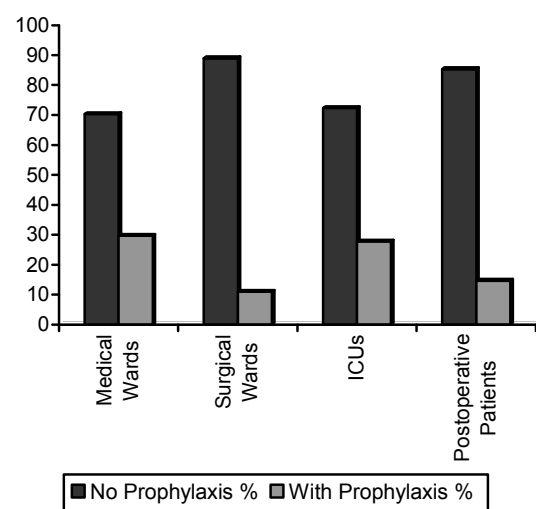


Figure 1. Prophylaxis rate in different wards.

Prophylaxis rate in medical wards was 29.7% overall (30% in general internal ward, 14% in neurology, and 32% in cardiology ward). In medical wards prophylaxis near to 100% was compatible with ACCP recommendation i.e. low dose unfractionated heparin (LDUH) subcutaneously. In surgical wards prophylaxis rate was 11% overall, with 0.19%, 40%, 19%, 0.5%, and 0.45% in general and thoracic surgery, urology, neurosurgery, orthopedic, and gynecology wards respectively. The lowest prophylaxis rate was in general surgical ward and the highest rate was in urology which was with aspirin (not recommended by ACCP).

LDUH 5000 U bid was the most common type of prophylaxis. LDUH 5000 tid which is recommended in high risk surgical patients was not used. Aspirin was used for the prophylaxis in urology ward despite the fact that ACCP guidelines do not recommended it. Mechanical prophylaxis i.e. graduated compression stockings (GCS), use of intermittent pneumatic compression (IPC) devices and the venous foot pump (VFP) were not used.

## DISCUSSION

There was a significant lack of VTE prophylaxis in both medical and surgical inpatients in the hospitals we studied. In fact, prophylaxis was consistently underutilized and only implemented correctly (according to ACCP guidelines) in small percentage of patients. The fact that this was a prospective study leads us to believe that it is a truer reflection of the actual state of affairs.

Several studies from all over the world have consistently shown a lack of prophylaxis for medical (9,10) and surgical (11) inpatients. In an American retrospective study of 100 medical patients with established VTE risk factors, pharmacological prophylaxis was prescribed for only 31% (12). In a similar Canadian retrospective study of 446 eligible medical patients at two teaching hospitals, only 146 patients (33%) received some form of VTE prophylaxis (13). Finally, a case-control comparative study from Saudi Arabia found that 39% of the 249

medical patients investigated received VTE prophylaxis (14). In Iran, Heidarnazhad et al. (15) with retrospective chart review study showed neglected thromboprophylaxis in most wards of Tabriz University hospitals with variation from 63.4% in cardiology ward to 2.7% in thoracic surgery ward. Our study, in keeping with Heidarnazhad et al. (15) study showed a higher rate of thromboprophylaxis underutilization in Iran compared to Western countries and even in Urmia the condition is worse than Tabriz.

There are several reasons that might explain why prophylaxis is not a widespread practice. Recently, the Seventh ACCP consensus statement highlighted some of these factors (1). First, many practitioners believe (incorrectly) as a result of their own observations that VTE is uncommon and that anticoagulation is unwarranted. However, it is critical to remember that the majority of VTE events are clinically silent and the condition remains underdiagnosed. Secondly, there is an unjustified anxiety about bleeding risk despite the reassuring meta-analyses and randomized control trials which demonstrate small increases in the absolute risk of major bleeding with the use of LMWH. Finally, cost issues may still deter some practitioners. But health economic studies have consistently proven that broad application of pharmacological prophylaxis is highly cost effective (1).

### *Some of ACCP recommendations*

ACCP evidence-Based Guidelines are graded as: Grade 1 recommendations are strong and indicate that the benefits do, or do not, outweigh risks, burden, and costs. Grade 2 suggests that individual patients' values may lead to different choices.

***ACCP recommend against the use of aspirin alone as thromboprophylaxis for any patient group (Grade 1A)*** (1). Aspirin and other antiplatelet drugs are highly effective on reducing major vascular events in patients who are at risk for or who have established atherosclerotic disease. Evidence suggests that antiplatelet agents also provide some protection against VTE in hospitalized patients who

are at risk. However, ACCP do not recommend the use of aspirin alone as VTE prophylaxis for several reasons. First, much of the evidence citing a benefit for the use of antiplatelet drugs against VTE are based on methodologically limited studies. Second, a number of trials found no significant benefit from aspirin therapy. Finally, aspirin use is associated with a small but significant increased risk of major bleeding, especially if combined with other antithrombotic agents. However, in the present study it is commonly used in urology ward for thromboprophylaxis. This leads to biases; therefore, although the urology ward has the highest rate of thromboprophylaxis, in regard to the appropriate prophylaxis, this ward has a low level.

On the other hand, for patients undergoing major, open urologic procedures, ACCP recommend routine prophylaxis with LDUH twice daily or three times daily (Grade 1A). Acceptable alternatives include prophylaxis with IPC and/or GCS (Grade 1B) or LMWH (Grade 1C+) (1).

In general and thoracic surgical wards prophylaxis rate was lowest similar to Heidarneshad et al study in Tabriz. Only LDUH 5000 U bid was used while ACCP recommendation was at least heparin 5000 tid.

Thromboprophylaxis rate was very low in gynecology ward. ACCP recommend that thromboprophylaxis should be used in all patients undergoing major gynecologic surgery (Grade 1A) or major, open urologic procedures. Also ACCP recommends prophylaxis with LDUH two times or three times daily (Grade 1A).

#### ***Thromboprophylaxis in medical wards:***

Although VTE is most often considered to be associated with a recent surgery or trauma, 50 to 70% of symptomatic thromboembolic events and 70 to 80% of fatal PEs occur in non-surgical patients. Hospitalization for an acute medical illness is independently associated with about an eightfold increased relative risk for VTE and accounts for almost one quarter of all VTE events within the general population. Thus, the appropriate prophylaxis of medical inpatients offers an important opportunity

to significantly reduce the burden of disease due to VTE. General medical inpatients who are not receiving prophylaxis are at a low-to-moderate risk for the development of VTE, with a typical rate of asymptomatic DVT of approximately 15% using venography for screening tests. Several attempts have been made to identify risk factors for VTE in hospitalized medical patients. Major risk factors include New York Heart Association class III and IV heart failure, COPD exacerbations, and sepsis. Additional risk factors include advanced age, history of VTE, cancer, stroke with lower extremity weakness, and bed rest.

In the present study, despite the prophylaxis rate being only 27.8% in medical wards almost all were according to ACCP guidelines. Why? The reason is that ACCP recommendation for medical patient is simple including the well known method of subcutaneous injection of LDUH.

One of the interesting recommendations of ACCP is that: In medical patients with the risk factors for VTE, and in whom there is a contraindication to anticoagulant prophylaxis, ACCP recommends the use of mechanical prophylaxis with GCS or IPC (Grade 1C+) (1).

This recommendation was only for ischemic stroke patients with contraindication to pharmacologic prophylaxis according to 2001 ACCP guidelines (5) but in accord with the recent guidelines extended to all groups of medical patients. This recommendation will be useful in some medical patients such as chronic renal failure patients on hemodialysis. A study on more than 75,000 patients with end-stage renal disease revealed that the risk of PE was increased in those undergoing long-term dialysis (1).

#### **Prophylaxis Method**

In this survey representing practice patterns in three teaching hospitals, we found that LDUH was the dominant method for prophylaxis against VTE in medical, surgical and ICU patients. As opposed by other studies, low molecular weight heparin was used for VTE prevention only in one patient. The clinical

advantages of LMWH over LDUH include its once-daily administration and the lower risk of heparin-induced thrombocytopenia (HIT) and osteoporosis, while LMWH is more costly.

Fondaparinux is a synthetic pentasaccharide and a selective inhibitor of factor Xa. It is structurally similar to region of the heparin molecule that binds antithrombin and is currently approved for DVT prophylaxis in patients undergoing total hip replacement.

Mechanical methods of prophylaxis, which include GCS and IPC were not used in the present study. They increase venous outflow and/or reduce stasis within the leg veins. The primary attraction of mechanical prophylaxis is the lack of bleeding potential. ACCP recommended that mechanical methods of prophylaxis should be used primarily in patients who are at high risk of bleeding (Grade 1C+), or as an adjunct to anticoagulant-based prophylaxis (Grade 2A). ACCP recommend that careful attention should be directed toward ensuring the proper use of, and optimal compliance with, the mechanical device (Grade 1C+) (1).

These mechanical methods are not available in our hospitals and probably in most other Iranian hospitals. Although apparently they are expensive but are less extensive relative to others. The cost/benefit ratio is high with decreasing VTE. We suggest these devices to become readily available in hospitals.

Prophylactic inferior vena cava filter (IVCF) insertion has been recommended by some to be used in traumatic patients who were thought to be at great risk for VTE. We recommend not to use IVCFs as primary prophylaxis in trauma patients (Grade 1C) (1).

## CONCLUSION AND SUGGESTIONS

Our study showed a higher rate of thromboprophylaxis underutilization as compared to Western studies. There is an urgent need to change this practice. In this regard, we suggest several strategies:

- 1) Appropriate dissemination of consensus conference recommendations is necessary to increase the awareness of physicians in regard to the importance of VTE and its prophylaxis in hospitalized patients. However, consensus statements alone are insufficient to ensure the routine use of prophylactic strategies in clinical practice (11).
- 2) Change in education and continuing medical education (CME) programs: Anderson et al. (16) demonstrated that the application of educational strategies significantly increased by almost two folds as well as the frequency of VTE prophylaxis prescription. These findings, coupled with our observation of a very low rate of VTE prophylaxis usage, suggest that educational programs should be locally developed and designed to increase the use of prophylaxis both in teaching and non-teaching hospitals.
- 3) Electronic alert to prevent venous thromboembolism (17-19) among hospitalized patients: The institution of a computer-alert program increased physicians' use of prophylaxis and markedly reduced the rates of deep-vein thrombosis and pulmonary embolism among at risk hospitalized patients.
- 4) In an attempt to improve the current unsatisfactory situation, in the short term, all hospitalized patients should have a VTE prophylaxis tick sheet attached to their drug charts once they are admitted.
- 5) Mechanical prophylaxis devices are not available in many hospitals; it is suggested that these devices become readily available.

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