

**EVALUATION OF PRACTICE PATTERN OF VTE PROPHYLAXIS IN POSTOPERATIVE PATIENTS**Sujay R. Belgod<sup>1</sup>, Aishwarya Pandyan<sup>2</sup>, K. Thinakaran<sup>3</sup>**HOW TO CITE THIS ARTICLE:**

Sujay R. Belgod, Aishwarya Pandyan, K. Thinakaran. "Evaluation of Practice Pattern of VTE Prophylaxis in Postoperative Patients". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 48, June 15; Page: 8271-8277, DOI: 10.14260/jemds/2015/1200

**ABSTRACT:** Venous thromboembolism (VTE) is one of the common complications in surgical patients. Venous thromboembolism (VTE), which is manifested as deep vein thrombosis (DVT) and pulmonary embolism (PE), represents a significant cause of death, disability, and discomfort. With the various evidence based studies now we have a better understanding of the VTE/PE risk factors and preventive measures. However most of the hospitals and doctors fall short in implementing the knowledge while treating their patients. Hence the need for the present study to assess the practice pattern of VTE prophylaxis in surgical patients. **MATERIALS AND METHODS:** It's a retrospective study in which 100 patients were randomly selected from the operation theatre registry. Individual risk assessment was done and VTE prophylaxis given was recorded and then compared with the Caprini's VTE risk assessment model and suggested prophylaxis. **RESULTS AND CONCLUSION:** Appropriate VTE prophylaxis was given only in 42.03% of the postoperative patients (18.75% of low risk, 29.17% of moderate risk and 65.51% of high risk patients). The remaining 57.97% of patients were at increased risk of developing DVT and pulmonary embolism thus increasing the chances of morbidity and mortality. The prophylaxis was inadequate mainly in the moderate and low risk individuals. Hence there is a strong need for a standard hospital policy for VTE risk assessment and prophylaxis in surgical patients.

**KEYWORDS:** Evaluation of practice pattern of VTE prophylaxis in postoperative patients.

**INTRODUCTION:** Venous thromboembolism (VTE) is one of the common complications in surgical patients.<sup>1</sup> Venous thromboembolism (VTE), which is manifested as deep vein thrombosis (DVT) and pulmonary embolism (PE), represents a significant cause of death, disability, and discomfort. The risk for VTE in surgical patients depends both on patient related factors and the type of surgery.<sup>1,2</sup>

The commonly used guidelines for VTE risk assessment and prophylaxis are Caprini's VTE risk assessment model and American College of Chest Physicians (ACCP) consensus guidelines for VTE prophylaxis. Use of LMWH, pneumatic compression stockings or graded compression stockings have greatly reduced the incidence of VTE and thereby reducing the morbidity and mortality.<sup>2</sup> Pulmonary embolism (PE) is now the most common cause of preventable death in surgical patients.

With the various evidence based studies now, we have a better understanding of the VTE risk factors and preventive measures. The high incidence of postoperative VTE and the availability of effective methods of prevention mandate that thromboprophylaxis should be considered in every surgical patient. However most of the hospitals and doctors fall short in implementing the knowledge while treating their patients.<sup>3,4,5</sup> Hence the need for the present study to assess the practice pattern of VTE prophylaxis in surgical patients.

**MATERIALS AND METHODS:** It's a retrospective study in which 100 patients were randomly selected from the operation theatre registry. The case sheets were studied focussing on the patient profile including age, comorbidities, coagulation disorders, current medications, diagnosis and type

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of surgery, its duration, postoperative orders and nurse's records. Individual risk assessment was done and VTE prophylaxis given was recorded and then compared with the Caprini's VTE risk assessment and suggested prophylaxis.

**Inclusion Criteria:** All elective surgical cases including general surgery, orthopaedic, oncosurgery, plastic surgery and urology.

**Exclusion Criteria:** Short duration procedures (less than 30 minutes) were excluded from the study. Patients with previous DVT/PE were excluded from the study.

**RESULTS:** Among 100 patients studied, there were 61 male and 39 female patients. The mean duration of stay was 9 days.

Age group	No. of patients
<40 years	33 %
41-60 years	36 %
61-74 years	22 %
>74 years	9 %

**Table 1: Age wise distribution of patients**

Type of SURGERY	No. of patients
General Surgical procedures	29%
Laparoscopy	7%
Ortho-including hip and knee surgeries	22%
Malignancy-breast, stomach, colon & rectum	8%
Gynaecological procedures	17%
Plastic & reconstructive surgeries	9%
Urological procedures	8%

**Table 2: Distribution of patients according to the type of surgery**

Level of risk According to caprini's model	Suggested prophylaxis according to guidelines	No. of patients	Prophylaxis given
Very low Score 0-1	No specific measures; early ambulation	31	No measures-19 Early ambulation-12
Low Score 2	ES, IPC, LDUH (5000U BID), OR LMWH (<3400 u)	16	Es-3, Early ambulation-5
Moderate Score 3-4	IPC, LDUH (5000U TID), OR LMWH (>3400u)	24	Es-8, ipc-2, lmwh-5, Early ambulation-4
High Score: 5 or More	LDUH, LMWH (>3400 U), warfarin, Or FXA i alone or in Combination with ES or IPC	29	LMWH -7 LMWH + ES -6 LMWH + IPC-4 LDUH-1 FXA I-1 ES-4

**Table 3: distribution according to caprini's VTE risk assessment and prophylaxis given**

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ES - Elastic Stockings, IPC – Intermittent Pneumatic Compression.

LDUH - Low Dose Unfractionated Heparin.

LMWH - Low Molecular Weight Heparin.

FXa I - Factor X Inhibitor.

VTE Risk level	Total patients	Appropriate prophylaxis	Inadequate prophylaxis	No. VTE prophylaxis
Low	16	3(18.75%)	5(31.25%)	8(50%)
Moderate	24	7(29.17%)	12(50%)	5(20.83%)
High	29	19(65.51%)	4(13.79%)	6(20.69%)
At risk	69	29(42.03%)	21(30.43%)	19(27.53%)

Table 4: Distribution according to VTE risk and appropriateness of prophylaxis

Number of patients at risk of VTE: 69%

Number of patients who received appropriate VTE prophylaxis: 42.03%

Number of patients who received inadequate VTE prophylaxis: 30.43%

Number of patients who didn't receive any VTE prophylaxis: 27.53%

**DISCUSSION:** VTE is one of the common complications seen in surgical patients. Approximately one-third of the 150, 000 to 200, 000 VTE-related deaths per year in the United States occur following surgery.<sup>6</sup> In India, the reported incidence of VTE is 17.46 per 10000 admissions and mortality in patients with VTE was 13%.<sup>7</sup> The reported overall mortality for PE was 49.5% in India compared to 45.1% in the Western countries.<sup>8</sup>

The incidence of VTE depends on both the patient and the procedure related factors.<sup>1</sup> The patient factors include age, sex, obesity, medications etc. The VTE risk increases with increasing age, smoking, obesity, polytrauma, deranged coagulation profile, neoplasm and those on Hormonal replacement therapy. The surgery related factors include the type of surgery and its duration. The risk is more in hip and pelvic surgeries, bariatric surgeries and prolonged surgeries. The risk is very minimal in day care surgeries, short duration procedures like hernioplasty and haemorrhoidectomy.<sup>2,9</sup>

The occurrence of VTE increases in the immediate postoperative period due to prolonged immobilisation, muscle relaxation due to anaesthetic agents and increased thrombotic activity. Hence the prophylaxis should be commenced either 2 hours before or within 10 hours following surgery in high risk individuals.<sup>10</sup>

Postoperative deep vein thrombosis (DVT) of the lower limbs is often asymptomatic; in many patients, fatal PE is the first clinical manifestation of postoperative VTE. Therefore, it is inappropriate to rely on early diagnosis and treatment of postoperative thromboembolism. Hence routine and systematic prophylaxis in patients at risk is the strategy of choice to reduce the burden of VTE after surgery.<sup>1</sup>

Many studies have been done to assess the various risk factors and identify the patients with high risk of developing VTE. Caprini scoring system and American College of Chest Physicians (ACCP) consensus guidelines for VTE prophylaxis are one of the most widely accepted scoring systems for VTE risk assessment.

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These scoring systems have issued guidelines for the use of mechanical or pharmacological measures for the prevention of VTE. If used appropriately, such prophylaxis is cost effective because it reduces the incidence of symptomatic thromboembolic events, which require costly diagnostic procedures and prolonged anticoagulation therapy.<sup>1</sup>

VTE Risk Assessment Model by Joseph A Caprini.<sup>11,12</sup>

In this model, each risk factor will be given scores as below and then added to know the cumulative risk.

### **A. Each risk factor carries 1 point:**

- Age 41-60 years.
- Minor surgery planned.
- History of prior major surgery.
- Varicose veins.
- History of inflammatory bowel disease.
- Swollen legs (current).
- Obesity (BMI>30).
- Acute myocardial infarction (<1 month).
- Congestive heart failure (<1 month).
- Sepsis (<1 month).
- Serious lung disease incl. pneumonia (<1month).
- Abnormal pulmonary function (COPD).
- Medical patient currently at bed rest.
- Leg plaster cast or brace.

### **A2: For Women Only (Each Represents 1 Point):**

- Oral contraceptives or hormone replacement therapy.
- Pregnancy or postpartum (<1 month).
- History of unexplained stillborn infant,
- Recurrent spontaneous abortion ( $\geq 3$ ),
- Premature birth with toxemia of pregnancy or growth restricted infant.

### **B. Each risk factor carries 2 points:**

- Age 60-74 years.
- Major surgery (>60 minutes).
- Arthroscopic surgery (>60 minutes).
- Laparoscopic surgery (>60 minutes).
- Previous malignancy.
- Central venous access.
- Morbid obesity (BMI >40).

### **C. Each risk factor carries 3 points:**

- Age over 75 years.
- Major surgery lasting 2-3 hours.

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- BMI >50 (Venous stasis syndrome).
- History of SVT, DVT/PE.
- Family history of DVT/PE.
- Present cancer or chemotherapy.
- Positive Factor V Leiden.
- Positive Prothrombin 20210A.
- Elevated serum homocysteine.
- Positive Lupus anticoagulant.
- Elevated anticardiolipin antibodies.
- Heparin-induced thrombocytopenia (HIT).
- Other thrombophilia.

### D. Each risk factor carries 5 points:

- Elective major lower extremity arthroplasty.
- Hip, pelvis or leg fracture (< 1 month).
- Stroke (<1 month).
- Multiple trauma (<1 month).
- Acute spinal cord injury (paralysis) (<1 month).
- Major surgery lasting over 3 hours.

Total Risk Factor Score	Incidence of DVT	30-day Proven DVT Incidence*	Risk Level	Prophylaxis Regimen
0-1	<10%	0%	Low Risk	No specific measures; early Ambulation
2	10-20%	0.7%	Moderate Risk	IPC, LDUH (5000U BID, or LMWH (<3400 U)
3-4	20-40%	0.97%	High Risk	IPC, LDUH (5000U TID), or LMWH (>3400U) or FXa I
5 or more	40-80%	1-5% Mortality 1.94%	Highest Risk	Pharmacological: LDUH, LMWH (>3400 U), Warfarin, or FXa I alone or in combination with IPC

**TABLE 5: VTE risk and suggested prophylaxis for surgical patients**

\*30-day post-discharge clinically evident imaging proven DVT.

IPC - Intermittent Pneumatic Compression; LDUH - Low Dose Unfractionated Heparin LMWH - Low Molecular Weight Heparin FXa I - Factor X Inhibitor #reproduced with permission from Joseph A. Caprini MD, MS, FACS, RVT.

Despite guidelines being regularly published since 1986 by the American College of Chest Physicians, VTE prophylaxis remains underutilized.<sup>13,14</sup> Current estimates suggest that only 30 - 60% of “at-risk” patients receive appropriate VTE prophylaxis.<sup>4,5</sup>

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At many medical institutions, residents perform the majority of admission risk assessments and order VTE prophylaxis; despite few studies showing if residents can reliably apply a VTE risk assessment tool.<sup>15,16</sup>

In the present study, appropriate VTE prophylaxis was given in only 18.75% of low risk, 29.17% of moderate risk and 65.51% of high risk patients. These data suggest that those patients with high risk were easily picked up and given appropriate VTE prophylaxis whereas there is a tendency of under prophylaxis in medium and low risk individuals. This could be either due to lack of identification of risk factors or due to lack of proper understanding of the guidelines by the residents.

The Indian data from ENDORSE study revealed that there is major underutilization of prophylaxis (17.4%) in India as compared to higher usage of prophylaxis globally (50.2%).<sup>17,18</sup>

A similar study made in a Lebanese hospital has shown appropriateness VTE prophylaxis in 51.2 % to 67.2 % of the patients.<sup>3</sup>

Thrombophilia screening was not routinely done preoperatively which is the limiting factor of the present study. However the appropriate VTE prophylaxis usage was still low at our hospital at 42.03%.

**CONCLUSION:** In the present study, appropriate VTE prophylaxis was given only in 42.03% of the postoperative patients. The remaining 57.97% of patients were at increased risk of developing DVT and pulmonary embolism thus increasing the chances of morbidity and mortality. Though there is a regular discussion on VTE risk factors and prophylaxis, most of the clinicians still fail to implement the same in their practice. Hence there is a strong need for a standard hospital policy for VTE risk assessment and prophylaxis in surgical patients.

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### AUTHORS:

1. Sujay R. Belgod
2. Aishwarya Pandyan
3. K. Thinagaran

### PARTICULARS OF CONTRIBUTORS:

1. Assistant Professor, Department of General Surgery, PESIMSR, Kuppam, Andhra Pradesh.
2. Resident, Department of General Surgery, PESIMSR, Kuppam, Andhra Pradesh.
3. Professor & HOD, Department of General Surgery, PESIMSR, Kuppam, Andhra Pradesh.

### FINANCIAL OR OTHER

**COMPETING INTERESTS:** None

### NAME ADDRESS EMAIL ID OF THE CORRESPONDING AUTHOR:

Dr. Sujay R. Belgod,  
Assistant Professor,  
Department of General Surgery,  
PESIMSR, Kuppam,  
Andhra Pradesh, India.  
E-mail: drsujaybr@gmail.com

Date of Submission: 03/06/2015.  
Date of Peer Review: 04/06/2015.  
Date of Acceptance: 08/06/2015.  
Date of Publishing: 12/06/2015.