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Utilization of DVT Prophylaxis in non ICU Hospitalized Patients

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ABSTRACT

The aim of this study was to assess all aspects of the routine clinical practices of DVT prophylaxis followed in the non ICU hospitalised (both medical & surgical) patients in various ward of multispecialty, tertiary care hospital in India (Kolkata). All patients admitted in AMRI hospital in general ward were screened for inclusion and exclusion criteria. Those patients meeting the inclusion criteria were assessed for the risk factor and appropriateness of DVT prophylaxis on third day of hospitalization during August–2009 to April–2010. Further assessment was done to see the light on the thromboprophylaxis practices according to the recommendations given by the American College of Chest Physician (ACCP) in the 8th ACCP Conference on Antithrombotic and Thrombolytic Therapy, (June–2008). Total 1938 patients were enrolled of which 267 patients (13.78%) were excluded (did not meet inclusion criteria) and 1671 patients (86.22%) were included. From included patients 331(19.8%) received any form of prophylaxis and majority of patients 80.2% did not receive any form of prophylaxis. Appropriateness of the prophylaxis practices was low (81.57%) and many patients experienced inappropriate prophylaxis practices (18.43%). Mechanical prophylaxis was used predominantly and GCS was used more than IPC. In pharmacological form of prophylaxis LMWH was used more than UFH and appears to be the prophylaxis of choice. In spite of multiple guidelines on risk factors assessment for venous thromboembolism (VTE), utilization of deep venous thrombosis (DVT) prophylaxis remains less than satisfactory in non ICU hospitalized patients

1. Introduction

Venous thromboembolism (VTE) is a common and potentially life threatening condition. The prevailing belief that VTE in the Asian population is less than in the Western population has essentially been disproved and there appears no reason to believe that it should be any different in India.[1,2]

Studies about DVT prophylaxis practices are lacking in Asian population and especially in Indian population. Use of DVT prophylaxis is avoided in hospitalized medical and surgical patients but their usefulness is established.[3]

In the medically ill patient there have been very few studies about usefulness of DVT prophylaxis. Recent multicentre randomized trials of DVT prophylaxis in hospitalized patient mainly included non critically ill patient.[4]

Many VTE prophylaxis guidelines have been developed including the American College of Chest Physicians (ACCP) [5] is very useful to assess risk factor of DVT. But in India the guidelines has not been systemically studied.

If DVT remains untreated it can further lead to recurrent VTE & PE & remains a significant cause of morbidity & mortality. Studies also show that improvement in prophylaxis & availability of various types of prophylaxis & modalities, with trials to support their safety & efficacy, has reduced the incidence of VTE considerably. [6]

A multicentre study was carried out in ICU in August 2001 at Advanced Medical Research Institute, Kolkata by SK Todi

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et al., and prophylaxis practices were found to vary from 40 – 60% in different. [7]

2. Case Report

The medical records of patients who admitted to medical/surgical ward during August 2009 to April 2010 and stayed more than 48 hrs were screened for inclusion and exclusion criteria. The patients who did not meet exclusion criteria were entered into the study. Included patients were further investigated for their risk factors. The patient's data were analyzed to record the patient's IPN no, date of admission, clinical diagnosis, whether prophylaxis applied or not, type of prophylaxis and contraindication to any form of prophylaxis.

3. Inclusion criteria

1. Age >18 years
2. Immobile for >48 hrs
3. Having risk factors for VTE
4. EXCLUSION CRITERIA:
 1. Age <18 years.
 2. Immobile <48hrs.

3. Known case of DVT on treatment.
4. Death within 48 hours
5. RISK FACTORS FOR VTE:
 1. Surgery
 2. Trauma (major trauma or lower–extremity injury)
 3. Immobility, lower–extremity paresis
 4. Cancer (active or occult)
 5. Cancer therapy (hormonal, chemotherapy, angiogenesis inhibitors, radiotherapy)
 6. Venous compression (tumor, hematoma, arterial abnormality)
 7. Previous VTE
 8. Increasing age (>40 years with additional risk factors, >75 years alone)
 9. Pregnancy and the postpartum period
 10. Estrogen–containing oral contraceptives or hormone replacement therapy
 11. Selective estrogen receptor modulators
 12. Erythropoiesis–stimulating agents
 13. Acute medical illness
 - i. Swollen legs.
 - ii. Acute myocardial infarction.
 - iii. Congestive heart failure (<1month)
 - iv. Serious lung disease including pneumonia (<1month)
 - v. Abnormal pulmonary function (COPD)
 14. Inflammatory bowel disease

Table 1.

Comparison between medical and surgical patients

Type of patients	Total no of included patients	Patients receiving prophylaxis	Patients not receiving prophylaxis
Medical	1001	205(20.48%)	796(79.52%)
Surgical	671	126(18.78%)	545(81.22%)

Table 2.

patients receiving or not receiving prophylaxis: comparison between risk factors

Risk factors	Total no of patients(within risk factor)	Patients receiving prophylaxis (% within risk factor)	Patients not receiving prophylaxis (% within risk factor)
Surgery	671	126 (18.78%)	545 (81.22%)
Trauma (major trauma or lower–extremity injury)	142	42 (29.58%)	100 (70.42%)
Immobility, lower–extremity paresis	191	91 (47.64%)	100 (52.36%)
Cancer (active or occult)	553	65 (11.75%)	488 (88.25%)
Cancer therapy	359	37 (10.30%)	322 (89.70%)
Venous compression	16	4 (25.00%)	12 (75.00%)
Previous VTE	01	0 (0.0%)	01 (100%)
Increasing age	1357	286 (21.00 %)	1071 (79.00%)
Pregnancy and the postpartum period	05	0 (0.0%)	05 (100%)
Estrogen–containing oral contraceptives or hormone replacement therapy	02	0 (0.0%)	02 (100%)
Selective estrogen receptor modulators	00	0 (0.0%)	00 (0.0%)
Erythropoiesis–stimulating agents	00	0 (0.0%)	00 (0.0%)
Acute medical illness	449	140 (31.20%)	309 (68.80%)
Inflammatory bowel disease	62	08 (12.90%)	52 (87.10%)
Nephrotic syndrome	17	08 (47.00%)	09 (53.00%)
Myeloproliferative disorders	12	03 (25.00%)	09 (75.00%)
Paroxysmal nocturnal hemoglobinuria	04	0(0.0%)	04 (100%)
Obesity	37	10(27.00%)	27 (73.00%)
Central venous catheterization	12	04 (33.33)	08 (66.67%)
Inherited or acquired thrombophilia	07	02 (28.57%)	05 (71.43%)

Table 3.

Usage pattern of different forms of prophylaxis

Different pattern of prophylaxis	ufh	Lmwh	GCS	IPC	Fondaparinux	Total
No of prophylaxis used	52 (14.06%)	92 (24.86%)	168 (45.40%)	54 (14.6%)	04(1.08%)	370

Table 4.

Usage pattern of prophylaxis and comparison between risk factors

Risk factors	UFH	LMWH	GCS	IPC	Fonda	Combination
Surgery	14	36	65	26	02	17
Trauma	04	09	23	11	0	05
Immobility	11	32	55	15	02	14
Cancer	09	15	32	06	0	05
Cancer therapy	06	11	18	03	0	01
Venous compression	0	01	02	01	0	0
Previous VTE	0	0	0	0	0	0
Increasing age	47	82	143	47	02	33
Pregnancy	0	0	0	0	0	0
ECOC & HRT	0	0	0	0	0	0
SERM	0	0	0	0	0	0
ESA	0	0	0	0	0	0
AMI	32	40	66	16	04	17
IBD	0	02	03	03	0	02
Nephrotic syndrome	01	01	06	0	01	01
MD	01	0	0	01	0	01
PNH	0	0	0	0	0	0
Obesity	06	01	05	01	0	02
CVC	0	0	03	01	0	0
Thrombophilia	01	0	0	01	0	0

Note : ECOC & HRT– Estrogen–containing oral contraceptives or hormone replacement therapy.

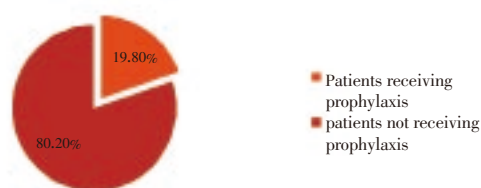
SERM– Selective estrogen receptor modulators, IBD– Inflammatory bowel disease,

ESA– Erythropoiesis–stimulating agents, MD– Myeloproliferative disorders,

AMI– Acute medical illness, PNH– Paroxysmal nocturnal hemoglobinuria,

CVC– Central venous catheterization.

Patients receiving or not receiving prophylaxis:overall view

**Figure 1.** Patients Receiving or Not Receiving Prophylaxis.

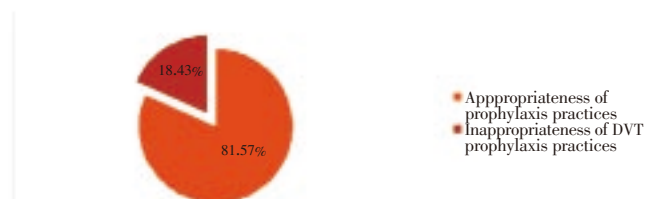
15. Nephrotic syndrome
16. Myeloproliferative disorders
17. Paroxysmal nocturnal hemoglobinuria
18. Obesity
19. Central venous catheterization.
20. Inherited or acquired thrombophilia

6. Data Analysis and Result

Data collection process for this project was started in august 2009 and continued till April 2010. We have collected data of 1939 patients and from them 1672(86.24%) were included and 267 (13.76%) patients were excluded.

The average risk factor for total no of included patients was

Assessment of DVT prophylaxis practices

**Figure 2.** Assessment of appropriateness and inappropriateness of DVT prophylaxis practices

calculated.

The average risk factor= Total no risk factors/ Total no of included Patients

$$= 3899 / 1672$$

$$= 2.33$$

Study objective was to assess routine DVT prophylaxis practice in hospitalized patients. The first measure of assessment was to observe the proportion of patients receiving or not receiving prophylaxis. The study shows that out of total number of included patients (1672) a lower percentage of patients (19.8%) were receiving some form of prophylaxis and a higher proportion of patients (80.2%) were not receiving any form of prophylaxis. This is graphically represented in Figure 1.

Table 1 shows out of total 1001 medical patents 205 patients

(20.48%) received prophylaxis and in other hand out of total 671 surgical patients only 126 patients (18.78%) received prophylaxis.

Patients receiving or not receiving prophylaxis in each of the risk factors is presented in Table 2. Data shows that patients receiving some form of prophylaxis were highest in the immobile patients (47.64%).

Secondly to assess the usage pattern of the various forms of prophylaxis available for prevention of venous thromboembolism. Unfractionated heparin (UFH), Low Molecular Weight Heparin (LMWH), Fondaparinux (Arixtra), Graduated Compression Stockings (GCS), Intermittent Pneumatic Compression Devices (IPC), was used in these patients. A combination of Mechanical and pharmacological form was also seen. The study shows that mechanical prophylaxis was mostly used, among which graduated compression stocking was used more than IPC. Among the pharmacological form LMWH appears to be the prophylaxis of choice (Table 3 and 4).

Furthermore it was to assess the appropriateness of the prophylaxis given to each patient.

Inappropriateness of prophylaxis practices was assessed by following some subset. These are following,

1. Patients having risk factors and no contraindications to pharmacological form of prophylaxis but still given mechanical form of prophylaxis.
2. Patients having risk factors and contraindications to only pharmacological form of prophylaxis but not even given mechanical prophylaxis.
3. Patients having risk factors and contraindications to only pharmacological form of prophylaxis but still given pharmacological prophylaxis.
4. Patients having risk factors and contraindication to only mechanical form of prophylaxis but not given any pharmacological form of prophylaxis.

Among the total no of patients 81.57% received appropriate prophylaxis while 18.43% received inappropriate prophylaxis (Figure 2).

7. Discussion

Use of DVT prophylaxis is avoided in non ICU patients having risk factors to cause DVT. Our study was an observational study based on medical patients to assess appropriateness and inappropriateness and routine clinical practices. As a standard reference we have followed American College of Chest Physician guideline 8th edition. The study is centered at eastern region of India and showed the avoidance of DVT prophylaxis and hope this study will bring some light on the use of prophylaxis properly.

This study was based on data collection, mainly an observational study and we have collected data of 1939 patients those were hospitalised within period of August'09' to April '2010'. Study results show that out of 1939 patients

267 patients were excluded having no any risk factors for DVT and 1672 patients were included for their potential risk in DVT. We have observed average risk factor 2.33 per patients admitted in general /medical ward in our setting.

Our first aim was to assess routine clinical practices of DVT prophylaxis being followed in both medical and surgical patients. Study shows very lower portion of patents 19.8% were receiving prophylaxis but major portion of patients 80.2% having more than one or more than that risk factor did not receive any form of prophylaxis. We have compared surgical patients with medical patents and found within 1001 medical patients 20.48% patients received some form of prophylaxis and in case of 671 surgical patients 18.78% patients received prophylaxis. So utilization of DVT prophylaxis remains less than satisfactory level.

In comparison with previous study (Amrita das et al.2008) in same setting was conducted in ICU patients those were received prophylaxis 88.23%.⁸ So there is huge difference between these two results. The causes of these differences may be due to costs benefit and lack of consciousness from part of physician. Our study found out that contrary to the system that is followed in the ICU, the medical patients were not regularly attended by the physicians. Patients receiving or not receiving prophylaxis and comparison between the risk factors shows that patients receiving some form of prophylaxis were highest in immobile patients (47.64%), nephritic syndrome(47.00%), central venous catheterization (33.33%), and acute medical illness (31.20%) respectively. Pottier and colleagues (2002) studied the presence of risk factors among 450 hospitalized medical patients and found that paralysis was associated with an increased chance of VTE 95%.⁹

Within 6 month of our study we have enrolled various data on different usage pattern of prophylaxis. Data shows a higher use of mechanical form of prophylaxis than pharmacological form of prophylaxis. According to our study physician generally used five forms of prophylaxis and from them unfractionated heparin used 14.06%, low molecular weight heparin 24.86%, graduated compression stocking 45.40%, intermittent pneumatic compression device 14.6% and Fondaparinux 1.08%. So graduated compression stocking remains as choice of prophylaxis used.

This is due to less contraindication of mechanical prophylaxis than pharmacological prophylaxis. LMWH and UFH are not used in hypertensive patients and patients with active bleeding but GCS and IPC are recommended for that patients. However among the pharmacological methods we found a greater use of LMWH than UFH as LMWH have been shown to possess lower hemorrhagic complication. Low molecular weight heparins are more effective than low dose UFH in preventing DVT and proximal vein thrombosis following major trauma and acute spinal cord injuries. [10, 11]

Our next aim was to assess appropriateness and inappropriateness of prophylaxis practices. It requires mentioning that the decision to judge prophylaxis use as

appropriate or inappropriate solely lied in our hand and we have tried to be as objective as possible and strictly adhered to our standard recommendations. We found higher percentage of patients is in inappropriate prophylaxis practices. The most common type of inappropriate prophylaxis was regarding patients where although there seemed to be no contraindication to pharmacological prophylaxis they received mechanical prophylaxis. Another common type of patients those received pharmacological prophylaxis inspite of having contraindication to pharmacological form of prophylaxis. This type indicates patients where the biochemical values for various parameters like hepatic disorder, bleeding disorders and liver insufficiency, did not meet our study criteria(as mentioned in the section of contraindication for heparin) and hence were taken it as inappropriate prophylaxis practices.

Our last aim was to evaluate reasons for not providing prophylaxis. The reasons are as follows:1) One of the reasons for not providing prophylaxis that physician did not think factors to be significant enough and hence prophylaxis not justified. 2) Physician thought that any form of prophylaxis would suffice.3) Physicians were probably unaware of an effective guidance for DVT prophylaxis of or lack of detailed knowledge about it.4) A common reason was financial constrains of the patients due to which prophylaxis was not given.

8. Conclusion

The study was conducted over 8 month and enrolled 1939 patients of which 1672 patients were included and 267 patients were excluded. From included 1672 patients 1001 were medical and 267 were surgical patients. Most of them did not receive any kind of prophylaxis. Immobility was the main criteria for providing prophylaxis. Mechanical prophylaxis was preferred than pharmacological form of prophylaxis, GCS and LMWH was the prophylaxis of choice respectively. Appropriateness of the prophylaxis practices is below satisfactory level. Reasons for not providing prophylaxis may be: physician did not think risk factors to be significant enough to justify prophylaxis. They thought that any one form of prophylaxis would suffice. Fear of bleeding complication. Lack of knowledge or unaware of an effective guideline for DVT prophylaxis. Another reason is financial constraints of the patients. Further study can demonstrate the exact reasons.

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