

## Original Research Article

# Prevention of subclinical deep vein thrombosis in abdominal surgeries

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### ABSTRACT

**Background:** Deep vein thrombosis (DVT) is a common but elusive illness that can result in disability and death if not recognized and treated effectively. The reported incidence has not changed much over past couple of decades. The aim of this study was to identify the risk of deep vein thrombosis related to the number of days of immobility and the role of low molecular weight heparin in the prevention of deep vein thrombosis.

**Methods:** A total of hundred (n=100) patients undergoing laparotomy were studied in the post-operative period between January 2014 and December 2016. Patients were divided into two groups alternatively; Group I patients did not receive any DVT prophylaxis and Group II patients were given low molecular weight heparin once a day till mobilization. From 3rd POD, all the patients were evaluated with detailed history and lower limb examination. D-dimer study was done in all the patients and if positive then followed by Color Venous Doppler. Regular follow-ups were done weekly once for a month, every two weeks for next month and once a month thereafter, minimum for 6 months.

**Results:** A total of hundred (n=100) patients, including 65 men and 35 women, with median age of 40 years underwent laparotomies in 2 years by a single unit. The incidence of Lower Limb DVT in Group I was 8%. The risk factors associated with DVT were sex, BMI, smoking and Malignancy. The signs and symptoms associated with DVT were swelling of lower limbs, pain and tenderness, fever and Homan's and Moses signs. The D-dimer test results were positive in 9 patients. Color Venous Doppler identified DVT in 8 patients. On regular follow-ups, remissions of clinical symptoms were recorded and repeat Doppler scans showed recanalization in all the patients after 6 months.

**Conclusions:** Deep Vein Thrombosis is multifactorial, and post-operative patients account for majority of cases. Early mobilization and Prophylactic Low Molecular Heparin prevents DVT in abdominal surgeries.

**Keywords:** Abdominal surgeries, DVT, Early mobilization, Low molecular heparin

### INTRODUCTION

Deep vein thrombosis (DVT) or venous thromboembolism is a common but elusive illness that can result in disability and death if not recognized and treated effectively.<sup>1</sup> Usually the diagnosis of DVT is delayed due to late presentations and hence early detection and prevention is the best way to deal with this condition. The incidence of lower limb deep vein thrombosis in post-operative period in general surgery

patients varies from 16% and 38%.<sup>2</sup> Hospitalized patients have over 100-fold increased incidence of acute DVT over community residents.<sup>3</sup> The reported incidence has not changed much over past couple of decades.<sup>4,5</sup> The independent risk factors for venous thromboembolism include increasing patient age, surgery, trauma, hospital or nursing home confinement, active cancer with or without concurrent chemotherapy, central vein catheterization or trans-venous pacemaker, prior superficial vein thrombosis, varicose veins, and neurological disease with leg paresis.<sup>6</sup>

Pulmonary embolism is a potentially fatal complication of DVT.<sup>7</sup> It has been reported in literature that low-molecular-weight heparin is effective in preventing deep vein thrombosis (DVT) in post-operative patients.<sup>8,9</sup>

Herein, we present our study identifying the early detection, risk factors and role of low molecular weight heparin in prevention of DVT in abdominal surgery patients.

The aim of this study was to identify the risk of deep vein thrombosis related to the number of days of immobility and the role of low molecular weight heparin in the prevention of deep vein thrombosis.

## METHODS

A total of hundred (n=100) patients undergoing abdominal surgeries were studied in the post-operative period between January 2014 and December 2016.

### Inclusion criteria

- All consecutive patients who underwent elective or emergency abdominal surgeries at our hospital, irrespective of diagnosis and post-operative outcome.

### Exclusion criteria

- patients already on anti-coagulants, past history of DVT and not requiring a minimum stay of 3 days.

Patients were divided into two groups alternatively, Group I patients did not receive any DVT prophylaxis and Group II patients were given low molecular weight heparin (Enoxaparin 20mgs - 40 mgs, depending on the BMI of the patients) 3-4 hours after surgery, once a day till mobilization.

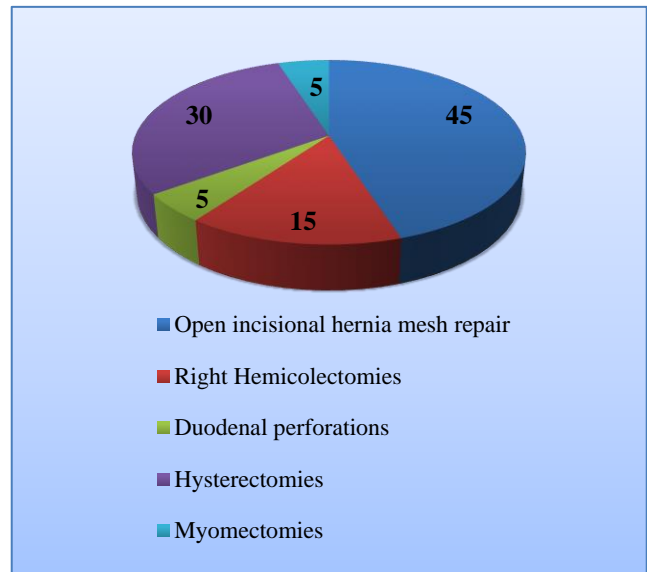
From 3<sup>rd</sup> POD, all the patients were evaluated with detailed history and lower limb examination. The history included pain, swelling, and fever. The important clinical signs included Swelling, Tenderness, Homan's sign and Moses sign. D-dimer study was done in all the patients and if positive then followed by Color venous doppler.

All the patients with DVT were treated with crepe bandage, foot end elevation, restricted mobilization to bathroom and Low molecular heparin for 5 days. Oral warfarin was simultaneously started after a couple of days and PT/INR values were monitored and maintained >2. Patients were discharged with oral warfarin and compression stockings. INR was maintained between 2-3 and doses of warfarin adjusted accordingly.

Regular follow-ups with PT/INR were done weekly once for a month, every two weekly for next month and once a month thereafter, minimum for 6 months. After 6 months color venous doppler was done in all the patients.

## RESULTS

A total of hundred (n=100) patients, including 65 men and 35 women, with median age of 40 years underwent abdominal surgeries in 2 years by a single unit. The median BMI was 25 (range 25-45). The various abdominal surgeries performed were Incisional Hernia Open mesh repair (45 cases), Right Hemi-colectomies (15 cases), Duodenal perforation (5 cases), Hysterectomies (30 cases) and multiple myomectomies (5 cases) (Figure 1).



**Figure 1: Operations performed.**

The incidence of Lower Limb DVT in Group I was 8%. All these patients were immobilized for 3-4 days. The relationship of occurrence of DVT with sex was male 7.69% (5 patients) and female was 8.57% (3 patients). The other risk factors associated with DVT were - BMI more than 30 for men (3 patients) and more than 28 for women (2 patients), smoking (4 patients) and Malignancy (3 patients). Among these patients, 3 patients (two males and one female) were operated for adenocarcinoma ascending colon (right hemicolectomy), 2 patients (females) underwent hysterectomy, 2 patients (males) underwent incisional obstructed hernia mesh repair (known case of COPD) and 1 patient (male) was operated for duodenal perforation (Table 1).

The signs and symptoms associated with DVT were - swelling of lower limbs in 8 patients, pain and tenderness in 7 patients, fever in 2 patients, Homan's and Moses signs positive in 8 patients. The D-dimer test results were positive in 9 patients. These patients were further evaluated with Color Venous Doppler, which identified DVT in 8 patients. Of the patients that developed DVT, 2 were bilateral femoro- popliteal, 1 was bilateral poplito - tibial, 2 had right femoro - popliteal and 3 had right poplito - tibial thrombosis (Table 2)

On regular follow- ups, remissions of clinical symptoms were recorded and repeat Doppler scans showed recanalization in all the patients after 6 months.

**Table 1: Risk factors associated with occurrence of DVT.**

Risk Factors	No. of patients	No. patients developing DVT
Sex		
Male	65	5
Female	35	3
BMI		
Male	65	3 (>30)
Female	35	2 (>28)
Smoking	8	7
COPD	4	1
Malignancy	20	3 (2 males and 1 female)
Procedure		
Right hemicolectomy	15	3 (2 males and 1 female)
Incisional hernia	45	2 (2 females)
Hysterectomy	30	2 (2 females)
Duodenal perforation	5	1 (1 male)

**Table 2 Diagnosis of patients with DVT.**

Clinical parameter	No. of patients
Swelling of lower limbs	8
Pain and tenderness	7
Fever	2
Homan's / moses signs	8
D- Dimer test (positive)	9
Color venous doppler	
Bilateral femoro - popliteal	2
Bilateral poplito -tibial	1
Right femoro - popliteal	2
Right poplito - tibial	3

## DISCUSSION

Deep vein thrombosis is a serious complication of abdominal surgeries and a major cause of hospital deaths in the world. It is also the most preventable cause of morbidity and mortality.<sup>10-12</sup>

The prevalence of venous thromboembolism in patients undergoing surgery, without any thromboprophylaxis can be up to 50%.<sup>13</sup> DVT develops due to venous stasis, vascular injury and hypercoagulability (Virchow's triad). The clinical conditions associated with DVT include trauma, malignancy, prolonged immobility, pregnancy, congestive heart failure varicose veins, obesity, advancing age, and a history of DVT.<sup>14,15</sup> Clinical history of pain/tenderness, fever, swelling in lower limbs, Homan's sign and Moses sign is very important in

suspicion of DVT. D- dimer test is highly sensitive (>95%) in acute deep vein thrombosis.<sup>16</sup> However, Color Venous Doppler remains the gold standard for diagnosis of DVT as reported by literature.<sup>17-19</sup>

Early mobilization and thromboprophylaxis with low molecular weight have shown to reduce the incidence of DVT. It has been recommended for all major abdominal surgeries by various studies.<sup>20,21</sup>

The various reported methods to prevent DVT in post-operative patients are preoperative pharmacologic prophylaxis (unfractionated heparin and low molecular weight heparin) and mechanical prophylaxis (compression stockings and intermittent pneumatic compression).

Combination of these strategies have been recommended by some for high risk DVT patients.<sup>22</sup> Warfarin sodium is an effective option for treating DVT, however dose adjustments based on INR have to be done.<sup>23,24</sup>

Present study has similar results, as suggested by literature. We recommend that prophylactic low molecular weight heparin in abdominal surgery is necessary till the patient is mobilized to avoid complications associated with DVT. The present study has certain limitations. It was a single center study and the size of the study was small. Multi-centric trials are required to standardize the dosage and timing of the prophylaxis.

## CONCLUSION

Deep vein thrombosis is multifactorial, and post-operative patients account for majority of cases. Early mobilization and Prophylactic Low Molecular Heparin prevents DVT in abdominal surgeries.

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